

## **Elements of surgery / by Robert Liston.**

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ELEMENTS OF SUBCUTANEOUS

ROBERT LISTON

PART SECOND

LONDON: ADAM AND CHARLES BLACK, 15, N. MARK LANE.









# ELEMENTS OF SURGERY.

BY

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PART SECOND.

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1831.







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# ELEMENTS OF SURGERY.

## PART II.

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### OF PARTICULAR SURGICAL SUBJECTS.

#### *Injuries of the Head.*

*WOUNDS of the Scalp* are attended and followed by more dangerous symptoms than wounds of the integuments on any other part of the body. This is in a great measure attributable to the nature and connexions of the parts. The subcutaneous fatty matter is condensed, and closely attached to a firm and unyielding tendinous expansion; and betwixt these tissues and the pericranium, a loose cellular tissue is interposed, so as to allow of free motion of the parts. They are highly vascular, with the exception of the occipito-frontalis fascia, and between them and the internal parts a free communication exists. Injuries of these coverings, though at first apparently trifling, and consequently looked upon as of no importance, and unattended with danger, often assume a very



alarming character. No injury of the head is too slight to be despised, or too severe to be despaired of. Punctured and lacerated wounds, more especially those penetrating all the layers of covering, are frequently followed by violent and extensive inflammation of all the tissues, with severe constitutional disturbance, and with delirium and other symptoms denoting functional derangement of the brain. The swelling is often extensive, involving the whole scalp, and the integuments of the face, and completely shutting the eyelids. In some cases resolution may be accomplished, but the most frequent termination is extensive infiltration of purulent matter into the cellular, or even into the more deep structures, with sloughing of the tendinous expansion. Collections of matter frequently form in the loose cellular tissue of the eyelids, whether the surrounding parts are affected with superficial or deeply-seated inflammation.

As to treatment, after the infliction of an injury, the scalp ought to be shaved, and the wound cleansed of coagula and foreign substances. If a large flap of integument is detached, it should be replaced, and retained as nearly as possible in its natural situation; and if, for this latter purpose, slips of adhesive plaster and methodical compression prove insufficient, it will be necessary to employ a very few points of interrupted suture: these, however, must be removed at an early period, that is when either adhesion or suppuration has commenced, and ought, if possible, to be altogether dispensed with, being apt in this



situation to produce injurious effects by their irritation. Light dressing is afterwards applied. On the accession of swelling, heat, and pain, the parts are to be well fomented with a hot decoction of chamomile flowers, and afterwards covered with a warm and soft poultice; and should these symptoms continue, the fomentation ought to be frequently repeated. Fomentation and poultice are also the best applications when a day or two has elapsed between the receipt of the injury, and the patient's application for cure. The constitutional symptoms are to be moderated, and may in many instances be averted, by the exhibition of antimonials and purgatives; and by general bloodletting, when demanded and authorized by the symptoms and the state of the constitution. Punctures or incisions are to be employed according to circumstances, in order to lessen the vascular congestion of the part, and prevent the formation of matter, or evacuate it if already secreted. In many unpromising cases of lacerated scalp, when a great part of the cranium has been exposed, and partially deprived of its periosteum, a rapid cure has taken place without the formation of much matter. The detached scalp, though much torn and bruised, ought not at first to be removed, it being more prudent to leave nature to determine how much must be destroyed. After the sloughs, if any, have separated, and granulation has commenced, the loss of substance is rapidly repaired in this region, more especially when the patient is young and healthy. General or partial support, by bandaging, is required in many



cases, as by a handkerchief, split cloths, or a roller applied in various forms.

*Wounds of the Temporal Artery* are either the result of accident, or made intentionally for the purpose of abstracting blood; and it may be here proper to make a few remarks regarding this latter circumstance. When it is wished to take away blood from the head, no one thinks of opening the trunk of the temporal artery; its anterior branch is generally chosen. By some the vessel is first exposed by means of a scalpel, and then opened with a lancet, but preliminary incisions are altogether unnecessary. The vessel ought not to be cut entirely through, and the incision should extend obliquely across its course; and care is to be taken that the external aperture shall be larger than that in the cellular tissue involving the artery, as thus the blood escapes freely, and no risk is incurred of its becoming infiltrated into the surrounding parts. When the branch is of the ordinary size, a sufficient quantity of blood is readily obtained from it; if, from its small size, or a faulty form of incision, blood does not flow freely and quickly, a cupping-glass may be applied, and its lower edge slightly raised. This latter precaution is absolutely necessary, for if it is neglected, little or no blood can escape, the artery being firmly compressed against the cranium by the edge of the exhausted glass. No other mode of cupping ought to be practised on the temples, for the cupping by scarification is both



unwarrantable and unnecessary—unwarrantable, because the cicatrized scarifications leave an unseemly and permanent mark on a prominent part of the countenance,—and unnecessary, since there can be no occasion for six or eight incisions when one is fully sufficient. The bleeding may be readily stopped, after the requisite quantity has flowed, by a small graduated compress placed over the wound, and retained by bandages, which surround the head, and are afterwards twisted and brought under the chin in order to increase the security. If by these means the bleeding is not readily restrained, the vessel may be divided throughout its whole circumference, by entering the lancet at the original wound, and moving its point laterally. Then compression is to be again employed, by the assistance of which the natural processes for closing the divided extremities are speedily accomplished.

When this artery has been injured by external violence, the wound of the integuments is generally large, and the bleeding profuse. In such cases, both ends of the vessel must be pulled out by means of forceps, and tied separately ; afterwards the integuments are to be approximated and supported.

Unpleasant consequences sometimes result from the simple operation of opening the temporal artery, and occasionally also from accidental wounds of that vessel. The integuments unite, and may soon heal, but, from the compression not being sufficient, a small quantity of blood is insinuated into the cellular tissue, which becomes condensed for a considerable



extent around the wound, and ultimately a sac is formed, which communicates with the ununited opening in the artery, and is consequently filled with blood, coagula, and fibrin; in short, an aneurismal tumour is formed. For the cure of this untoward occurrence, the artery may be tied between the head and tumour, as in the case of spontaneous aneurism; but in consequence of the free inosculation which exists between the numerous ramifications of the artery, this measure may not prove successful, and it will be found necessary, either then or afterwards, to secure the vessel beyond the tumour. But there is another mode of procedure. From the tumour being generally small and circumscribed, excision of the whole of it can be effected easily, and so as to leave but a slight scar: this operation is not liable to failure, and is not more severe than the first mentioned. After the removal of the diseased part by two elliptical incisions, both ends of the artery are to be included in separate ligatures, and the edges of the wound kept together.

A more troublesome accident sometimes takes place,—ulceration of, and over, the vessel, with effusion of serous and purulent fluids into the surrounding cellular tissue, often to a great extent. A profuse flow of blood bursts from the ulcerated surface, perhaps twelve, fifteen, or twenty days after the vessel had been opened, and, if active means are not speedily adopted, the hæmorrhage by its recurrence may prove very dangerous. In such cases compression is of no avail; the bleeding may be staid for a



time by this means, but upon the circulation becoming again active, fresh hæmorrhage must and does take place; the parts around are separated and engorged more and more, the blood escapes in alarming quantities, and the patient is saved only by the occurrence of syncope. To search for, and make a clean dissection of the wounded part of the vessel in such cases, is impossible. A long and deep incision must be made through the swollen and diseased parts in the course of the arterial branch, and a ligature passed under it, on each side of the ulcerated point, by means of the common curved suture-needle, or of one in a fixed handle. The ligatures should be at a considerable distance from each other, in order that they may surround healthy parts of the vessel; after they have been firmly tied, all risk of further hæmorrhage is gone. Of course the ligatures should enclose as little as possible of the parts surrounding the artery. A poultice is perhaps the best application for a few days, and under its soothing influence the effects of the continued compression, which had been previously employed, soon subside. The after applications must be varied according to the appearances which the part presents.

*Laceration* of a large or small *Blood Vessel* is a frequent consequence of *Bruise* of the Scalp.—Blood is effused, and the surrounding parts are thereby separated to a greater or less extent; and thus a tumour is formed, either rapidly or slowly, according to the size of the injured vessel, or the aper-



ture which is made in it. The swelling is in general large, soft in the centre, and hard towards its circumference; the blood in the latter situation being coagulated, and firmly impacted in the condensed cellular tissue; whilst in the centre it is fluid, or at least partially so, and occupies a free cavity. These characters of the tumour are apt to mislead a careless or inexperienced examiner, the feel being in some degree similar to that attending fracture with depression, but still easily distinguishable from it by attentive and experienced manipulation. By pressing the finger or thumb firmly on the centre of the tumour, the blood is displaced, and the bone felt distinctly. In slight cases of this affection, no treatment is required, as the tumour is of no importance, and soon disappears, by the effused blood being absorbed. When, however, the swelling is accompanied with unpleasant symptoms, cold applications are to be made to the part, and low diet, with occasional purgatives, enjoined. If inflammatory symptoms occur, local abstraction of blood may be necessary, followed by hot fomentations to the part. When the pain has ceased, and the swelling is not speedily removed, absorption is promoted by stimulating applications, such as fomentation with a solution of the muriate of ammonia in a decoction of the anthemis nobilis, in the proportions of  $\mathfrak{z}$ fs. to lbii., or with a solution of common salt.

Such tumours may ultimately require to be laid open, in consequence of the blood putrefying and becoming mixed with purulent secretion. Under no



other circumstances is incision warrantable, as unhealthy, troublesome, and tedious suppurations are sure to follow.

*Of Concussion.*—Concussion, in a greater or less degree, attends most injuries of the head. The functions of the brain are either disturbed or suspended; there is loss of sensibility, of volition, and frequently of the power of motion. The confusion of intellect or stunning may disappear in a short time, or may continue, though diminished in intensity, for many days, and even for weeks; it is seldom, however, that the functional disorder exceeds in duration two or three days, and in general it disappears before that length of time has elapsed. The stupor is seldom complete; the patient can perhaps be roused, though with difficulty, so as to answer questions by a hurried monosyllable, or make signs in regard to the seat of pain, or for such things as he may suppose himself to be in need of. At first the circulation is weak; the pulse is fluttering, often intermitting, and scarcely to be felt in the extremities; the countenance is pale, and the surface cold; there is occasional vomiting, a symptom which seldom occurs when compression of the brain exists, and the breathing is difficult, though scarcely ever stertorous. The pupils are generally contracted, but not uniformly so; one pupil may be contracted and the other dilated; at first, they are insensible to light, neither dilating when in darkness, nor contracting further when the light is suddenly increased; not unfrequently a considerable degree of squinting exists.



The muscles are either much relaxed, or spasmodically contracted. After a time, the circulation is restored, and the heat of the surface returns, with more or less of regained sensibility. The pulse either becomes altogether natural, or else more slow or more rapid than in health. The circulation is then easily excited ; by even raising the patient in bed, the pulsations of the carotids are increased, in some cases, by fifteen or twenty beats. Sensibility returns, always very gradually, and in some cases more slowly than in others ; frequently the patient becomes quite collected after the lapse of some hours or a few days, but in other instances a degree of mental confusion remains for many weeks ; occasionally the intellect continues weak for the remainder of life.

When the insensibility has begun to diminish, the patient can be roused with less difficulty ; if pinched, he complains of it by uttering some inarticulate sounds, or by attempting to move himself further from the quarter whence he supposes the injury to come ; he answers loud questions, though with unwillingness, regarding the pain which he suffers, and points to the part where it is chiefly felt. As the stupor goes off, symptoms of inflammatory action, or a threatening of it in a greater or less degree, manifest themselves. The pulse becomes more rapid and sharp, the skin is hot and dry, the face is flushed, the conjunctiva is redder than usual, and the pupils are often much contracted : the patient is restless, and tosses about in bed ; mutters confusedly to himself ; often attempts to enact a part in some fanciful scene which he supposes to be passing around him, or talks



rapidly and incoherently concerning circumstances which have formerly occurred. His flitting ideas are often of an alarming nature ; he endeavours to get out of bed, and struggles violently if opposed. He frequently puts his hand towards his head, and gives other indications of suffering acute pain in that region, much increased by any movement of the part.

Such symptoms are often followed by vomiting and rigors, and too frequently by convulsions, more furious delirium, and coma. On examination after death, an increased vascularity of the cerebral membranes is observed ; there is an effusion of gelatinous-looking matter on the surface of the membranes, and in the cellular tissue beneath the arachnoid. In more advanced cases, thin patches of lymph, or more extensive strata of it, cover the arachnoid and the inner surface of the dura mater ; a puriform fluid is found effused between these membranes, and sometimes blood and matter are deposited in some part of the cerebral substance ; bloody serum is effused into the cavities, and at the base of the brain. The above symptoms and appearances sometimes follow injuries not at first thought severe, but are most frequently the result of such as are attended with læsion of the bone, or of the internal parts.

It is not at all improbable that concussion is produced after a manner somewhat resembling the following. The brain has a natural tendency to remain at rest, but is liable to be brought into a state of commotion by impulses on the cranium being communicated to it. When a slight blow is inflicted on the



scull, only a slight commotion of the brain is induced, the cranial contents are, as it were, slightly jumbled, and a temporary and trifling confusion of its functions follows. When, however, the stroke is more severe, the brain is separated from its cranial attachments, both at the point struck and at the part directly opposite,—it is thrown upon itself towards its centre ; its substance is thereby condensed, its diameter in the direction of the impulse is diminished, and a vacuity between the brain and cranium is formed at each extremity of that diameter. By post mortem examinations, it has been ascertained that condensation of the brain does exist in cases of severe concussion. Such commotion may be sufficient to cause instant extinction of life, or the brain may gradually resume its former condition, or the empty spaces may be occupied by effused blood or serum ; for a vacuum cannot long exist, and extravasation is extremely liable to occur in such cases, the blood-vessels being either compressed, stretched, or otherwise thrown out of their natural relations, along with the other cranial contents. Perhaps the brain does not recover itself gradually, but suddenly ; the impulse, which was at first directed from the circumference towards the centre, now acting from the centre towards the circumference ; and then the propulsions and recoilings may be repeated, though gradually lessening in their intensity, until the effect of the original impulse is lost, and all vibration consequently ceases. But concussion may be caused by an impulse received not on the cranium, but on some other part of the body, as when a person falls from a considerable height



and alights on the feet or buttocks; and in such a case also its effects may be in a similar way communicated to the brain, and may produce equally violent effects, without there ever being any appreciable læsion of the cerebral matter.

The circulation may be merely disturbed, or laceration of the brain may occur with slight extravasation of blood into its substance. In many fatal cases no change in the state, either of the vessels or of the cerebral substance, is perceptible on minute examination; and again, many patients are supposed to labour under concussion only, in whom fracture of the base of the cranium, or extravasation of blood on the surface, or into the substance of the brain, are discovered after death. It is always difficult to distinguish between the effects of mere concussion and those of compression of the brain by extravasated fluid; for, in the greater number of cases, the symptoms of both affections are blended together. In both there is insensibility from the first; but if an interval of sensibility occur, diagnosis is rendered more easy and certain, it being a fact well verified by experience, that the state of stupor which precedes the return of correct intellectual function is the effect of concussion, and that there is every reason to believe that the insensibility into which the patient subsequently sinks, is caused by compression of the brain; if compression existed from the first, the stupor might not be of longer duration than if it were the effect of concussion, but its stillness would not be interrupted by any restoration of mental exercise, however short.



Remarkable effects sometimes result from commotion of the brain ; the patient may suffer loss of vision or of hearing, either partial or complete ; or partial paralysis may occur, as of the muscles supplied by the portio dura. In many cases such affections may be supposed to arise from compression of nerves, or other læsion subsequent to and caused by the effects of concussion, and probably connected with fracture of the base of the cranium. Again, it occasionally happens that the senses are rendered more acute than previously, and of this I shall mention an example which came under my own observation. An old nurse sustained fracture of the vertex, with slight depression of the broken part, in consequence of some rubbish having fallen on her from a considerable height. Stupor, along with the other symptoms of concussion, was the immediate effect of the injury, but disappeared in two or three days. Her hearing, which previously to the accident had been long so obtuse as to render it necessary for her to discontinue her employment, became so intensely acute, that the most trifling noise became a source of pain. She gave immediate orders for the clock to be stopped, the ticking of which annoyed her greatly. Her hearing gradually became of the natural intensity, and continued perfect. In this case there can be little doubt that restoration of a sense which had long remained dormant arose entirely from cerebral commotion, for no discharge of blood or other fluid occurred from the ears, by which cerumen accumulated in these organs might have been displaced.



*Treatment.*—Whilst the circulation remains depressed after injuries of the head, or of other parts of the body, it is a common practice to abstract blood; but it is one which cannot be too much reprobated, for it is attended with great risk, and can be productive of no benefit; the feeble remains of vital power, whilst struggling as it were against the depressing cause, may by depletion be quickly annihilated, when the vigour which they still retained might have been sufficient, if encouraged and supported, to overcome those effects of external injury which had so far reduced them.

When a patient is seen insensible, it is highly proper and necessary to examine carefully the trunk, head, and limbs, in order to ascertain whether either fractures or displacements have occurred; for it is by no means creditable to the care or science of a surgeon to be made aware of such accidents when the patient regains his senses, after the lapse perhaps of weeks, and when they can be remedied only with much difficulty.

In the first stage of concussion, as was already observed, the circulation is much weakened, and it is therefore necessary to adopt means for sustaining and strengthening it; and with this view, warmth is to be applied to the surface, more especially to the extremities and epigastrium, it being always weak in the latter situation, and mainly dependent on the gastric functions for its support.

When the powers of life appear to be failing, stimulants must be administered internally. Perhaps



the most convenient stimulus is ardent spirits, the only objection to its use being, that when imprudently given in large quantities, its effects, though at first stimulant, become sedative : it ought to be employed in small quantities, and at short intervals. Other stimuli, as preparations of ammonia, may be given by the mouth ; and much advantage will often be found to follow the employment of a turpentine enema, free motion of the bowels, as well as excitement of the system, being thereby procured.

Stimuli, however, should always be used with much caution and prudence, and never unless the train of symptoms, under which the patient is at the time labouring, fully warrant their exhibition ; and when the circulation is restored in the limbs, and is becoming throughout steady and more natural, all sources of excitement must be abandoned and carefully avoided, as there is considerable risk of reaction proceeding to too great a height. The patient is to be kept quiet in a darkened room, cold applications made to the head, previously shaved, and free motion of the bowels procured by neutral salts with antimony, or by other purgatives not of an irritating nature, and not given in such doses as to prove violently cathartic. Enemata are in some cases preferable, and are always a valuable adjunct, to the employment of purgatives by the mouth ; they procure evacuation from the larger intestines, in which fæculent matter chiefly accumulates, and, with the addition of assafoetida and turpentine, their salutary effects prove more important than those of mere evacuants



The latter ingredient would seem, by its local stimulus, to impart energy to the bowels sufficient for the correct performances of their functions, while the former tends to allay spasm and irritation, both locally and generally.

If the circulation becomes unduly excited, abstraction of blood from the system, in sufficient quantities and at proper intervals, is absolutely necessary ; and the depletion must be regulated by the symptoms and circumstances of each case. The action will in general be more speedily and effectually moderated by one copious bleeding at the commencement, than by repeated bleedings to a less extent. An easy and open state of the bowels is of much importance in the excited stage. Mercurial preparations are sometimes of use, being found to possess, in some degree, the power of preventing lymphatic or other effusions on the cerebral membranes.

In cases where insensibility continues after the arterial excitement has been subdued, counter irritation on the head or the back of the neck is often useful, as the application of blisters, or the rubbing in of antimonial ointment ; these being supposed to act by causing an unusual influx of blood to the surface, producing a change in that fluid by the copious purulent, serous, and lymphatic secretions from the irritated part, and thereby diminishing the distended and engorged state of the internal vessels, which might produce considerable compression of the brain.

If, at a late period in the case, the powers of life begin to flag, stimulants must be again had recourse



to, and may now be pushed pretty freely, there being less risk of inordinate action ensuing, and much reason to fear that life will be prolonged only by the continued use of powerful means for the excitement of the system. Nor ought the surgeon to cease stimulating though the vital powers continue to diminish in spite of the treatment, and though the circumstances of the case may be so hopeless as to lead him to suppose that death cannot be further delayed; for many patients, who would otherwise have necessarily perished, have, by the continued use of stimuli, recovered their sensibility, and been ultimately restored to health.

*Separation of the Dura Mater* from the cranium, with more or less extravasation of blood between, sometimes takes place as a consequence of blows on the head, even though not severe. The blood may be absorbed, or an unhealthy abscess may form between the bone and membrane, attended with violent, dangerous, and, if neglected, fatal results. The internal mischief is not without external marks of its occurrence. If the scalp is undivided, a puffy tumour forms; and, when it has been injured, the wound degenerates, its surface is pale, and the discharge gleety, and the exposed bone appears white and dry. It is also preceded by general disorder of the system, by restlessness and fever; there is sickness, occasional vomiting, shivering, pain of the forehead and back of the neck; in some cases, delirium and convulsions, and perhaps partial paralysis, and ultimately coma. All



these symptoms, however, may exist without indicating precisely either the existence or the site of abscess, as I experienced in the following cases.

A middle aged man was brought intoxicated into the Royal Infirmary with a lacerated wound of the scalp, over the upper part of the occipital bone, on the *right* side of the mesial line. For thirteen days after the accident he did well, walking about the wards in good health, with the wound healing kindly ; but on the fourteenth he became affected with hot skin, restlessness, slight incoherency, severe pain in the head, and intolerance of light, with a full, but not quick pulse. A vein was opened, but after three ounces of blood had flowed, he was seized with rigors, vomiting, and violent convulsions ; and these symptoms again occurred after the application of leeches to the head. The pain of head and shivering continued, notwithstanding he had been bled to sixteen ounces on the 15th. Rigors returned at various intervals, and stupor supervened and gradually increased. He became delirious on the 18th. A considerable part of the bone was exposed and dead, and there was a puffy swelling of the scalp around the wound. On the 19th he lay insensible. A portion of the dead bone was removed by the trephine, and the dura mater was found covered with lymph, but no appearance of effused blood or pus could be perceived. He suffered little from the operation, but continued insensible, passing his urine and fœces in bed, with dilated pupils, quick breathing, and subsultus tendinum : his pulse, which had previously never been



above 80, now became 100. He died on the morning after the operation. On dissection, the right hemisphere of the brain was found of the healthy appearance; but four ounces of pus lay over the *left* hemisphere, between the dura mater and arachnoid, which latter membrane was of a granular appearance; there was also a small sloughy spot of the dura mater over the left anterior lobe.—A woman, aged 40, fell down and sustained a wound of the scalp on the upper part of the occipital bone on the left side; she suffered but little from the accident, and continued to live freely and irregularly. Seven days after the injury she was seized with shivering; and on the ninth day she lay comatose, voiding her fœces and urine involuntarily. The wound was pale and gleety, and the surrounding scalp puffy; the bone was bare and white; pupils dilated; pulse 80. The trephine was applied, and fluctuation felt beneath the exposed dura mater, which was otherwise unchanged in appearance; the membrane was divided by a crucial incision, but only a small quantity of bloody serum escaped. Shortly after the operation she became quite sensible, but again sunk into a state of stupor, with slightly stertorous breathing and contracted pupils. However, all traces of coma disappeared next day, and she recovered soon and perfectly, apparently without having received either benefit or injury from the operation of trephine.

*Purulent Collections under the Cranium, between*



the bone and dura mater, are not of very frequent occurrence, when symptoms are well watched and treatment properly conducted. But they certainly may and do occur, and usually at a considerable period after the accident : many such cases are related by the older authors. Their attendant symptoms are materially different from those of extravasated blood ; in the latter case, all the symptoms of compression ensue immediately after the effusion has occurred, and that is generally very shortly after the receipt of injury. But matter is seldom, if ever, formed till after a considerable period has elapsed ; and is not attended with symptoms of compression suddenly supervening, but is preceded by restlessness or febrile excitement ; and in the later stages only of the affection do the symptoms of cerebral compression manifest themselves. By the external injury, those blood-vessels by which the dura mater is attached to the scull, and by which it communicates with the pericranium and more external parts, are lacerated, or otherwise materially injured, inflammatory action is excited in the connecting medium, unhealthy suppuration ensues, and by the accumulation of matter, the membrane is completely separated from the cranium, and generally participates in the morbid action. It may ultimately slough and give way, and the matter will then be effused internally. A similar process goes on in regard to the bone and its pericranium, a tumour forms externally, and the bone, being deprived of its supply of blood, necessarily dies, either in part, or throughout its



whole thickness. And when an external wound exists, the altered appearance of the bone, with the sloughy state of the detached pericranium, gives evident warning of the mischief which is proceeding internally.

The general symptoms of suppuration are the same, whether the collection forms in the substance of the brain, or on its surface. Perhaps the symptoms are not so severe, nor the collection so speedily fatal, when in the substance of the brain, as when situated immediately under the bone, or at the base of the cranium. The external marks already mentioned, are generally indicative of the site of such internal collection, but not uniformly.

Formation of matter in the diploe of the scull, in consequence of external injury, is of rare occurrence ; and when it does occur, somewhat similar symptoms and appearances ultimately ensue as when the suppuration commences between the bone and dura mater.

Sometimes the abscess under the bone is of a chronic nature, as in the following case :—The patient, a boy, *æt.* 11, received a blow on the vertex, after which a puffy tumour formed in the injured scalp, and was freely incised. He afterwards became subject to epileptic fits, which were relieved by copious evacuation of matter from the wound. Exfoliation of the cranium occurred ; one small sequestrum was separated, which involved the whole thickness of the bone, and a collection of matter between the dura mater and scull cap was thereby exposed. The contained matter was evacuated, and the wound was



carefully dressed, with the view of procuring adhesion between the membrane and bone, but without effect. The dura mater was ascertained to be extensively detached around the opening; it was necessary to remove a large portion of bone by means of the trephine and cutting pliers, and then the dura mater soon became united with the integuments of the head. A considerable time afterwards, the patient complained of severe pain in the back of the neck; an abscess formed in that situation, and pointing under the right scapula, was opened. Weakness of the right arm and of the inferior extremity suddenly supervened, and the patient gradually sunk. On examination after death, the cervical portion of the spinal cord was found much softened, with infiltration of purulent matter into its substance. The deficiency in the cranium was supplied by a firm ligamentous expansion, to which the dura mater and scalp adhered firmly.

*Of Compression of the Brain.*—Compression is produced by extravasation within the cranium of blood or other fluid, by the lodgement of a foreign body on the surface of the brain, or in its substance, or by displacement inwards of portions of the cranial bones; and these causes are usually the effects of external injury. It may either follow the injury instantaneously, or supervene some time thereafter. Many examples have occurred of a patient, at first insensible, with symptoms of concussion, having had the functions of the brain restored almost entirely,



and again having relapsed very quickly into a comatose state, in consequence of extravasation of blood. The whole circulation is at first lowered by the shock of the commotion, and the fluid scarcely flows in the cerebral vessels ; but on its restoration, blood is poured out from the lacerated vessels, or from those which have been so injured in their coats as to be unable to withstand the increasing impulse of their contents. As ~~was~~ already observed, the symptoms of compression are often mixed up with those of commotion, but, when an interval of sensibility has occurred, mistake in diagnosis can scarcely occur. Compression is attended with slow, stertorous breathing ; a distinct slow pulse ; a relaxed state of the limbs, features, and sphincters ; and dilated pupil. Total insensibility to external impressions attends compression of the brain, whatever the cause of it may be. These symptoms may, and do sometimes, gradually disappear after a time. But they may continue unabated, and the patient may gradually sink under them. Or, again, his dissolution may be preceded by excited circulation and furious delirium, the vital powers recovering from their first depression, only to become roused into violent and destructive action, again to sink to a still lower ebb, and be ultimately annihilated. Extravasation is most commonly met with on the lateral parts of the brain ; and the coagulum is perhaps extensive, reaching to the base of the scull, in consequence of rupture of the middle meningeal artery, with or without fracture of the parietal bone.

Little or nothing can be done in cases of compress-



ed brain from extravasation. We possess no means of preventing the effusion, and though we did, the mischief has generally taken place before the patient can receive assistance. Again, the site of the extravasation can seldom be ascertained; and, should that objection to the propriety of surgical interference not exist, still the coagulated blood cannot be evacuated even after extensive removal of the bone. If the coagulum is small, it may be gradually and wholly absorbed, or the brain may become accustomed to the pressure of what remains. It is the surgeon's duty to take means for averting inflammatory action, and to subdue or moderate it when it has been excited. The symptoms arising from displaced bone may be relieved by surgical operation; but we must premise some observations on FRACTURE, before speaking of the treatment necessary in such cases. *Edw.*

At an early period of life the bones are soft and elastic; they yield readily under external violence, and it requires a great and direct force to produce fracture of them. Late in life, when the diploe disappears, the external and internal tables come in contact; the bone is brittle, and solution of continuity in it is easily effected. And it is wisely so arranged, for thus in the recklessness of childhood and youth, severe blows on the cranium, which are then of so frequent occurrence, are seldom attended or followed with danger; whilst the aged are taught by experience to avoid the unfortunate consequences so apt to result from even a slight blow on the then



brittle cranium, by cautiously preserving themselves from exposure to violence.

Solutions of continuity in the cranium, caused by external force, are either attended with depression or not. Fissures, mere capillary rents in the bone, may take place at the part of the cranium which is struck, or on the side opposite to that to which the force is applied. They will be found either short and limited by sutures, or extending in different directions through several sutures, as from the vertex to the base of the skull, and terminating perhaps in the foramen magnum. Fissures in the upper part of the cranium are of themselves attended with comparatively little danger; they produce no claim to attention, and really require none. But the force which gave rise to the injury of the bone may have disturbed the internal parts; and though the patient may have recovered from the first shock and the immediate effects of the violence, severe and dangerous consequences often result, and at a late period from the infliction of the injury.

Fractures of the base of the skull are the result of great force applied to the lateral parts of the head, to the vertex, or to the base itself through the spinal column. A blow inflicted by an obtuse body on the top of the head whilst it is at rest and fixed, has the effect—by producing expansion of the lateral parietes, and forcing the base down upon the upper part of the spinal column—of breaking up the connexions of the bones at the base, which is the weakest part of the cranium, and splintering them to a greater or



less extent. Again, if a person falls from a height, he perhaps alights on some part of his trunk, as the buttocks, and this coming to a state of rest, whilst the head is still in projectile motion, the spinal column is driven towards the cavity of the cranium, and the same effects are thereby produced as in the preceding instance. Or the patient alights on his head, and the base of the cranium is then impinged upon by the weight of the whole trunk, as well as by the force of the projecting power, and in this case also the base is frequently broken up. Concussion has resulted from falls when the person has alighted on his nates or feet; but the symptoms attendant on fracture of the base are more generally those of compression of the brain. In this accident the bones are seldom displaced to any great extent; the dura mater is generally lacerated, its blood-vessels, and frequently its sinuses, are wounded, and blood is consequently effused at the base of the brain, which is the most important part of that organ. The upper part of the brain may bear pressure to a considerable degree without bad consequences ensuing, but compression at the origins of the nerves is always highly dangerous and generally fatal. Bleeding from the nose, mouth, and ears has been considered, when attended with other circumstances and symptoms evincing a receipt of violent injury and consequent cerebral disturbance, as decisive of fracture at the base having occurred. But we find that such bleeding happens in slight injuries unattended with any circumstances or consequences to induce a belief that



so serious an injury has taken place : and again, in cases where dissection has shown most extensive fracture of the temporal, sphenoid, and æthmoid bones, no blood had issued from their external openings. Fracture of the base of the skull generally proves fatal, but many cases are met with in which there is reason to believe that it has taken place, and yet the patients recover, perhaps with partial paralysis. Of this I lately met with a good example in the case of a girl seven years of age, whose head had been squeezed between a wall and the back of a cart, and thereby considerably flattened. She lay insensible for several days, with all the symptoms of compression, and with blood flowing in small quantity from the nose, mouth, and right ear. An extensive abscess formed over the right temporal bone. She ultimately recovered, but remained affected with paralysis of the right side of the face and amaurosis of the left eye ; sensation in the paralysed parts being quite perfect.

Fractures of the upper part of the cranium are generally attended with displacement to a greater or less extent, and with wound of the cranial coverings. The size of the depressed portion, the depth to which it is displaced, and the extent of wound, will depend upon the nature and intensity of the force applied. Fractures, with depression of a considerable portion of one of the flat bones, are sometimes unattended with any alarming symptoms. The effects of the injury soon disappear, and even in cases where the depression has been very considerable, and where,



from the escape of brain, it was evident that both this organ and its membranes had been seriously injured, no bad symptoms have occurred to retard the patient's recovery. Symptoms of compressed brain, however, may generally be expected to attend depression of any considerable portion of bone below its natural level. Still the brain may become accustomed to the pressure, and the symptoms may gradually subside without surgical interference. And if the indications of compression are not very alarming, the coma not very profound, a little delay is allowable, means being taken to avert inflammatory action: for danger is not imminent, the cure may not be expedited by operative aid, and there is chance of injury resulting from rash interference.

But it is in general necessary to remove the cause of the symptoms, to elevate the depressed bone, and take away those portions which may be detached.

It has been said that we must be regulated in our proceedings very much by the existence or not of external wound; that we must be cautious in cutting down upon fractures of the cranium where there is no wound, and so converting a simple into a compound fracture. In fact, so much is the danger increased by the existence of wound, that the symptoms must be very urgent indeed which would demand division of the integuments in order to admit of examination of the fracture, the application of the trephine, or the elevation of the bone; whilst, on the contrary, if the fracture is exposed by the accident, very slight symptoms will fully warrant performance



of the operation of trephine. In other words, it is said that simple fractures should be left to nature, unless under very urgent and alarming circumstances, and that compound ones ought almost always to be interfered with. But the facts are otherwise. The greatest danger of compound fractures of the cranium does not arise from the admission of air. It is not the wound of the scalp, but the mechanical irritation of the brain and its membranes that proves dangerous. Injuries of the cranium inflicted by sharp bodies, such as divide the scalp and cause compound fractures, are generally attended with splintering of the internal table, and require the trephine. The existence of this sort of fracture of itself, without a single bad symptom, without any present disturbance of the sensorial functions, is a sufficient warrant for the application of the trephine, so as to permit the removal of the detached portions of the inner table: and this should be done before inflammatory symptoms have shown themselves. The brittleness of the internal layer of the skull is well known. In fractures inflicted with sharp and pointed instruments, as a bayonet or pike, the corner of a sharp stone, or the heel of a horse's shoe, the external opening is often very small, it is a mere puncture; in the bone there is a central depression, from which fissures proceed around in a radiated form, and hence the accident has been termed punctured, or starlike fracture. But though the external wound is apparently insignificant, the vitreous table is extensively separated, and, perhaps, broken into in-



numerable minute and sharp spiculæ. These sharp portions are driven down upon the dura mater, and by them the membrane is often severely lacerated. If these are not removed soon after the accident, inflammatory action is almost invariably lighted up on the surface of the brain; and we cannot expect to allay or avert such action by general antiphlogistic means, however energetically applied, so long as their exciting cause remains. It is in such cases, I repeat, that the operation of trephine is imperiously called for. Sometimes, however, patients are found to recover from punctured fracture of the cranium, without the operation having been performed, as in the following case, the only one so terminating which I have met with:—On the 4th September, I visited a gentleman, aged 35, who had received a punctured fracture of the cranium, on the 29th of August; a heavy fork had fallen from the top of a haystack, and struck him on the upper part of the head. Immediately after the accident, he became confused, but not insensible; he lost the power of motion in the right lower extremity, but almost instantly regained it. Next day the right arm became weak, and when I saw him, he was almost wholly unable to move it; he could not bend his fingers, nor raise the arm, and retained but very slight motion in the elbow joint. There was a small wound of the scalp, nearly healed, over the posterior part of the left parietal bone, close to the sagittal suture, and nearly midway between its two extremities. A probe passed down to, and through the bone; and there was slight swelling of



the scalp around the wound. He had felt pain in the right ear, and in the forehead whilst stooping, for some days after the accident. No blood had ever escaped from the ear. A fit of shivering occurred on the night following the injury, but never returned. He soon recovered completely.

I subjoin a case of an opposite description. A coachman was knocked down, late on a Saturday night, and fell with his head on the corner of a stone at which masons had been recently working. After being carried to his lodgings, he recovered from the stupor produced by the combined causes of liquor and blows; and next morning he went to have his head dressed by an apothecary, who extracted a fragment of a stone with difficulty from the wound of the head. The patient then drove a party to church, and probably drank some more whisky during the day. He afterwards felt indisposed, and was seized with sickness and shivering in the afternoon. On Monday he was in a violent fever, and I saw him in the evening. He had been delirious, but was now lying in a state of stupor. There was a hole in the right parietal bone, capable of admitting the point of the little finger, and many loose fragments of bone were felt lying on the dura mater; a trephine was applied, and numerous spiculæ removed. Afterwards the circulation became much excited, he was bled copiously, and antimony was exhibited in nauseating doses, but he died early on Wednesday morning. On dissection, there were found marks of violent inflammatory action on the surface of the hemispheres.



The vessels were unusually numerous and highly engorged, and lymph and pus were effused in considerable quantity, the arachnoid was opaque, and the cerebral substance was somewhat softened. Had the operation been performed at an earlier period, there is every probability that the inflammation, which proved fatal, would have been averted, as in the following instance:—A quarryman received a blow from a sharp stone of considerable size, which rolled down a precipitous bank, and struck him on the vertex. He lay insensible for half an hour, but recovered, and followed his occupation during the rest of the day. In the evening he came for advice. There was a small wound in the scalp, and the subjacent bone was fractured in the same manner as in the former instance, but he felt no uneasy symptoms whatever. The consequences likely to result from such an injury, and the necessity for trephining, were represented to him; he agreed, and the operation was performed on the spot. Many sharp fragments of the inner table were extracted; he proceeded home, never had a bad symptom afterwards, and consequently required no treatment save dressing of the wound.

The operation, if undertaken early, will, in all probability, succeed in averting future evil, more especially if the dura mater be not wounded. As a proof of the unfavourable nature of this latter circumstance, I give the following case:—A young man, aged 18, received a kick on the forehead from a horse, September 9th. He remained perfectly sensible, and did not fall to the ground. Shortly after, he was



seized with vomiting, which recurred at intervals; his pulse was regular, but feeble; pupils dilated. On the centre of the forehead, there was an irregular wound, which extended to the root of the nose; and on introducing the finger, the os frontis was found fractured, and a small portion of it comminuted and depressed. The trephine was applied, and several detached portions were removed, with some difficulty, from beneath the undepressed portion of the bone. A spicula had lacerated the dura mater, and penetrated the substance of the brain, to the depth of half an inch; on removing it, a small portion of cerebral matter escaped. The fracture extended apparently in the direction of the right orbit. In the afternoon, the pulse was sixty-four, of good strength, and the pain in the wound had slightly increased. He was bled to fourteen ounces, and ordered the antimonial solution. Afterwards, the pain of the head increased, the pulse rose, the scalp around the wound became the seat of puffy swelling, and several small abscesses formed: the antiphlogistic regimen was rigorously followed, and the abscesses were freely opened as soon as they began to form. On the 21st, a portion of the brain had sloughed, and there was some appearance of fungus cerebri; an incision was made into a swelling over the right temporal muscle, and  $\bar{3}$ viii of blood allowed to flow. On the 22d, several portions of brain were discharged, and the pulse was 100, and intermitting. Next day, he was delirious, and a hernia cerebri protruded, of a sloughy appearance, and considerable size; pulse 142. Soon after-



wards, he became comatose; and died early in the morning of the 23d. On dissection, the integuments and pericranium surrounding the aperture, in the frontal bone, were found much thickened, and infiltrated with pus and serum. The dura mater at the wound was of a sloughy appearance. There was great effusion of purulent matter, under the dura mater, investing the right hemisphere of the brain; the corresponding tunica arachnoidea was thickened and opaque; and between it and the pia mater there was considerable deposition of lymph and pus. The fungus was collapsed, of a dark colour, soft consistence, and connected with the anterior lobes; the surrounding cerebral matter was much softened, and mixed with pus. The fracture extended through the orbital plate of the right os frontis, over which lay two small spiculæ of bone; and a similar fragment was situated over the right optic nerve.

Many cases illustrating the danger of punctured fracture might be related, but are unnecessary, in as much as they would lead to the mere repetition of those facts which have been already stated.

*Wounds of the Brain.*—Laceration of this organ to a slight extent, with more or less extravasation of blood, often takes place, without external wound, and when the patient has symptoms of concussion only. In such cases, the blood may be absorbed, and the læsion repaired, without permanent impairment of the sensorial functions. Wounds of it, along with fracture of the scull, are often very extensive; and



portions of its substance may be either severely injured, or entirely separated. Loss of substance, even to a considerable extent, in the upper part of the hemispheres, may occur, without bad symptoms or consequences ensuing. The exposed surface of the brain granulates, and is healed as other parts of soft structure. Generally, however, untoward symptoms result sooner or later in such cases. Hæmorrhage occurs from the injured part, and a clot protrudes from the external wound. Or the cerebral substance in the neighbourhood of the wound softens, and becomes converted into a semi-fluid mass, often mixed with pus; and a fungous growth, connected with the disorganized matter, gradually protrudes through the aperture in the cranium, and is repressed with difficulty. If removed by knife or ligature, it is rapidly reproduced. Pressure is the only means left by which to attempt its retardation; and it, too, is ineffectual; for if not very moderate, the effects of compression extend from the fungus to the whole of the brain, and an impairment of the sensorial functions in a greater or less degree necessarily results. The formation of such a growth is generally attended with shivering, sickness, and fever, by a weak, rapid, and irregular pulse; the strength declines, convulsions and delirium supervene, and coma terminates the symptoms.

*Perforation of the Cranium* is not often resorted to since the treatment of injuries of the head has become better understood. In former times, the operation of trepan was performed frequently, and many



seemed to rate the dexterity and science of a surgeon by the number of holes which he was able to bore in the skull of an unfortunate patient. It ought never to be performed, unless the necessity for, and the propriety of, the proceeding be clearly indicated. It used to be practised in a most unlimited manner for fissure : cracks were sought for with the greatest care, rules were propounded to enable the surgeon to distinguish fissures from the cranial sutures, and from furrows made in the bone by periosteal vessels ; and the trepan was frequently applied over each part of the fissure, however extensive it might be, the only apparent end of the operation being to widen very materially the solution of continuity in the cranium. It was also resorted to in cases of compression, with the view of discovering the effused fluid, and removing it ; but, as was already stated, it is unwarrantable in such cases ; and much more so in concussion, for which latter accident, however, it has been occasionally performed. I met with a case even lately, in which the patient was not much benefited by such active practice. The operation is of itself attended with danger, and likely, under many circumstances, to aggravate the patient's symptoms, and diminish his chance of recovery.

The cranium must be perforated, however, when the existence and site of abscess under the bone is distinctly marked : and in such cases the practitioner is much to blame if he does not give his patient a chance of recovery by the operation : many are lost by its not being performed, and the following case is a striking example of such negligent practice. A



young female fell from a great height amongst some rubbish, and sustained a severe blow on the left side of the os frontis, a considerable portion of which was thereby denuded. She seemed to be doing well for some time; but about the eighth day after the accident, pain in the head, with vertigo, rigors, and sickness, febrile excitement, and a white and dry state of the bare portion of the bone, supervened. She was depleted copiously, but notwithstanding all the symptoms indicating formation of matter under the exposed bone were present, the operation of trephine was deemed inadvisable. Severe rigors continued; she became affected with spasmodic twitchings of the muscles of the face, and stiffness of the jaw, neck, back, and breast, and was, in short, allowed to die. On dissection, the dura mater below the diseased bone was found separated to a very considerable extent, and the cavity was filled with thin purulent matter: the abscess extended along the superior longitudinal sinus, and communicated with this vessel through an ulcerated aperture; the canal was filled with pus, as far as its junction with the transverse, near which point its cavity was obstructed, and the abscess limited by a firm plug of lymph. A small abscess had formed between the bone and pericranium, above the extensive collection within; the internal table of the diseased bone was fractured and slightly depressed, and its fractured edge was rough, sharp, and projecting.

But the operation may sometimes fail to prove beneficial; the brain may have become diseased, as



well as its membranes, or the patient may not recover from the irritation caused by the abscess, and the depressing tendency of the antiphlogistic treatment which had been put in force previously to the formation of matter. But still there is a probable chance, after the collected matter has been evacuated by the operation, of the dura mater granulating, the cavity filling up, the membrane becoming adherent to the cranium around the aperture, and the patient regaining his former health and vigour.

If, after removing a portion of bone on account of symptoms of suppuration in that situation, the dura mater be found adherent, and of a healthy appearance, the surgeon is scarcely justified in going deeper in search of effused fluid: the evils liable to result from wounds of the dura mater have been already mentioned, and illustrated by an example.

The operation of trephine must also be resorted to in cases of punctured fracture. One perforation will generally be sufficient to enable the surgeon to remove the detached fragments of the inner table.

In fractures with depression, when the brain is oppressed and its functions suspended, means must be taken to elevate the displaced portion or portions to their natural level, and so remove the pressure. For the accomplishment of this purpose, it may or may not be necessary to divide the integuments. If they are entire, which is rarely the case, a crucial incision must be made, or one in the form of the letter T, and the flaps raised so as to show the extent of depression. No portion of the integuments ought to be cut away; the preparatory process of *scalping*,



formerly in use, has been abandoned as cruel and unnecessary. If a wound already exists, but is not sufficiently large, it may be dilated in such a direction as appears most likely to facilitate the after part of the proceedings. The elevation can often be then effected by the judicious application of the lever, its point being carefully placed under the depressed portion, and the sound part of the bone being made the fixed point on which the instrument acts. Those depressed portions which are completely detached, must be removed; but those which adhere, either to the dura mater or to the scalp, ought to be left after having been raised to their former sites, as they will furnish a large contribution towards the filling up of the deficient parietes. Reparation of the skull, when a small portion is removed, or when a single narrow fracture exists, is effected by bone; but when the opening is large, the deficiency is always repaired by a dense ligament, to which the dura mater and integuments adhere. By employing a small saw—represented in both ancient and modern surgical works—so as to widen the fracture, or remove a projecting corner of bone, sufficient room may be obtained for the introduction of the lever. In old subjects, the bones are brittle, and a small corner may be readily removed by plyers, or cutting forceps, so as to allow the depression to be raised.

But it may be necessary, in order to elevate portions that are wedged under the sound part of the cranium, to take away a considerable portion of the latter. One or more circular pieces must be removed by the trephine, and it may perhaps be necessary to cut out the



parts between these apertures by means of the straight-edged saw. The size of the crown of the trephine must be varied according to the object which is in view. The trepan is now disused, and the trephines best suited for the purpose are those fluted on the side of the crown, with the perforator made to slide and fix by means of a proper screw. The centre pin, or perforator, is fixed on a sound and firm part of the bone, and the edge of the crown made to project slightly over the fractured margin. A few turns will suffice to fix the instrument. The saw is then made to turn steadily and lightly, pressure being made when the instrument is moving from left to right, until a pretty deep sulcus is made. The centre pin is then withdrawn, the saw being sufficiently retained by its own groove. The centre pin can scarcely be used at all in children, the cranium being at that age soft and thin. I once had occasion to operate with an old-fashioned trepan, at a distance from town, on a child with abscess under the bone, occasioned by a punctured wound from the point of a spinning top. The centre pin was long, very sharp, and screwed in; and, if it had been used, would have perforated skull, dura mater, and nearly half an inch of the brain, before the saw could have come in contact with the bone. I was obliged to use the crown of the trepan, without a centre pin.

In patients at the middle period of life, a different feeling and sound is communicated to the operator after having cut through the outer table of the skull. Whether this change is experienced or not after getting to some depth, he ought to



proceed cautiously, moving the saw lightly, quickly, and sharply, in the direction of the teeth, and using no pressure. The operator should not be hurried, for he is apt to do harm if he is ; there is no inducement to make great haste, for the patient does not suffer much, if any, pain. After every two or three turns of the saw, it is prudent to examine the track with the flat end of a probe, or with a toothpick. If the perforation is found to be completed at any point, then the instrument is to be inclined to those which are undivided ; and the fluted crown allows of this being done with great facility. After the circle of bone is separated on all sides, it is to be removed by forceps, or by means of the lever ; and the sharp points ought to be taken from the edge of the perforation by means of the latter instrument, otherwise the dura mater may be fretted and torn when following the natural motions of the brain. The lever must be strong, and simple in its construction. And after a sufficient space of bone has been removed, its point is to be introduced cautiously under the part that requires elevation ; the edge of the sound bone at various points affords a fulcrum, and by persevering and steady efforts, the object of the operation will be accomplished. The dressing of the wound should be simple ; the integuments are made to cover the aperture, or as much of it as possible, and due support is given by compress and bandage. The after treatment must be varied, and conducted according to circumstances. It may become necessary to repress the granulations, or else to soothe the wound and abate inflammatory action in the sur-



rounding parts. Perhaps incisions may be required to prevent the formation of matter, and destruction of the cellular tissue and of the tendinous expansion, or to evacuate fluid already secreted. The patient's strength may require support. He may stand in need of stimulants; or, on the contrary, the most active means may be required to subdue vascular action, and to prevent the evil consequences which would result to the important parts within the cranium from such overaction.

DISEASES *of the* SCALP.—*Porrigō* is an affection of the scalp, frequent in young subjects. The appearances vary from superficial and circular spots to eruption of pustules, followed by troublesome and extensive ulceration. The discharge from the sores accumulates on the surface, and hardens into thick and adherent crusts. Even the slightest forms of the affection are contagious. Though the hairy scalp is the part usually affected, yet the greater portion of the face is sometimes completely encrusted, and spots appear on the neck and trunk. The hair changes its colour, becomes weak, falls out or breaks across, and frequently disappears entirely at the affected parts. Baldness sometimes occurs in patches, without any apparent eruption having preceded it. In cases where much ulceration exists with acrid discharge, eruptions frequently appear in various parts of the body to which the discharged matter has been applied. The lymphatics often become enlarged, and not unfrequently suppurate, in



the neck, axillæ, or groins. The general health is materially impaired, especially in those cases which have been of long continuance, and in which the lymphatic system has ultimately become affected: in such, the patient, if very young, not unfrequently sinks under the disease, after a long and lingering illness; the mesenteric glands having become enlarged, and the process of nutrition being consequently interrupted, and the whole system having become enervated from the long continued local irritation.

The disease has been divided into various kinds, into the larvalis, furfurans, lupinosa, scutulata, decalvans, and favosa. The P. Larvalis is peculiar to infancy, and the part affected is generally the upper portion of the face. Numerous pustules appear on a reddened base, give way, and discharge a viscid fluid, which concretes into thin crusts. Fresh pustules appear, the discharge increases, the crusts become thicker, and in some instances envelope almost the whole countenance. When the crusts separate, the exposed surface appears inflamed and furrowed, and generally desquamates. Thus the disease usually terminates; but it not unfrequently commences afresh, and the crusts are renewed. From its occurring at an early age, it is apt to be followed by serious consequences, when neglected or of an obstinate nature, for the system is then ill fitted for withstanding much irritation.

The P. Furfurans is generally met with in adults, more especially in females, and is confined to the



scalp. Small pustules appear, as in the former instance, but the discharge is trifling, and the excoriation slight: thin concretions are soon formed, and are detached in the shape of numerous delicate laminae. Pustules frequently reappear, and the encrustation and exfoliation are repeated. The surrounding parts are the seat of disagreeable itching, and the hair either falls off entirely, or becomes thin and changes its colour.

In *P. Lupinosa*, the pustules appear in small and separate clusters, on which are formed dry and circular crusts, firmly adherent, of a yellowish colour, with elevated edges, and sometimes containing a white scaly powder in their depressed centre. The patches seldom exceed a sixpence in size, are generally situated on the head, but sometimes form on other parts, and are usually of an obstinate nature. The intervening cuticle often degenerates into a thin white encrustation, and generally exfoliates. The hair changes, as in the preceding instance.

The *P. Scutulata* is usually situated on the scalp, forehead, and neck, occurs chiefly in children, and consists of distinct pustular clusters, the discharge from which hardens into crusted patches of an irregularly circular form. Fresh crops of pustules appear, the discharge becomes more profuse, and the crusts thicken, the affected surface is extended, and the whole head is sometimes involved. The hair is in general completely destroyed, and the affection proves highly unmanageable, sometimes continuing for several years. It terminates in separation of the



crusts and cuticle, and in renewed growth of the hair.

The term *Porrigo Decalvans* is applied to simple baldness occurring in irregular patches, with unusual whiteness and smoothness of the exposed integuments. No eruption is apparent. The baldness sometimes extends over the greater part of the head, and usually occurs in early life.

*P. Favosa* may occur on any part of the body, but generally commences on the scalp, thence extending to the face and neck. Large soft pustules, slightly flattened, and with an irregular margin, appear on a slightly inflamed base. The patches, which are numerous, generally unite and form encrustations, which compose a dense and continuous covering over a large surface. The discharge is profuse, acrid, and offensive; pediculi are often generated in numbers, the hair is mixed with the unseemly paste, and the surrounding parts are much excoriated. After separation of the crusts, the surface sometimes desquamates, and afterwards assumes its natural appearance; but in other instances ulceration occurs, and the lymphatic glands inflame and suppurate. The disease may occur at all ages.

Even the mildest form of the disease is extremely troublesome, and got rid of with difficulty: it may at one period appear to be decaying, and shortly afterwards reassume its former condition. In the early stages of the disease, when the parts are irritable, the applications ought to be emollient and soothing. The surface ought always to be kept as



clean as possible by frequent ablution with soap and water, and should be closely shaved. In the more advanced stage, the hardened crusts should be removed by means of poultices and warm fomentations, and then the hair should be cropt as short as possible. Afterwards various applications may be employed : as Unguentum nitratis hydrargyri mit.—Ung. Picis—Ung. picis c. sulphure, in the proportion of equal parts—Ung. picis c. oxyd. arsenici, in the proportion of gr. vi of the latter to ʒi of the former—or an ointment may be used composed of ʒii of the cocculus Indicus with ʒi of lard. The dressings should be applied at night, and washed carefully off in the morning, and an oil-silk cap should be worn during their application. When the disease has begun to decay, the parts may be bathed with a lotion of the nitrate of silver, or of the sulphate of copper ; and in the slighter cases it will be sufficient to wash the parts frequently with soap and water, always keeping the hair short. It is almost needless to remark, that the general health should be all along carefully attended to : in many cases, the patient is feeble and cachectic, requiring nourishing diet, tonics, a healthful atmosphere, and gentle exercise.

*Inflammation of the Scalp* occurs either spontaneously, or in consequence of external injury, though slight : and is generally met with in those who have lived freely and irregularly, and are of a bad habit of body. It is more dangerous than inflammation of any other part of the surface, on account of the sym-



pathy and connexion which exists between the parts affected and those situated internally : frequently, at an early stage of the affection, delirium occurs, with violent fever. In slight cases, in which the external surface merely is affected, there is little swelling, and but little pain or fever. But when all the pericranial coverings are involved, the symptoms are uniformly severe. The swelling is high and puffy, and extends to the eyelids, to the face, and, in some cases, even to the neck : the constitutional symptoms run high, and there is considerable risk of the patient dying comatose. If he recover, and if the disease is little interfered with, but allowed to take its own course, much sero-purulent fluid is infiltrated into the cellular tissue, which generally perishes by sloughing along with a greater or less portion of the tendinous expansion. Often a large abscess forms, separating perhaps one half of the scalp, and bulging over the ear.

The constitutional treatment must vary according to the nature of the symptoms which present themselves ; in some cases showing great vascular excitement, and in others bearing unequivocal evidence of general debility from the first. In slight cases of the local affection, it is sufficient to relieve the tension, and abstract blood and effused serum by means of a few punctures, and afterwards to use warm fomentation. More violent cases require free incision in the direction of the occipito-frontalis muscle, and thus only can destruction of the parts be averted ; the incision must necessarily be deep, for the scalp is



often swollen to the thickness of two or more inches. When a depot of matter has formed, it must be evacuated early, otherwise there is a risk of the bone becoming extensively denuded and exfoliation ensuing.

*Chronic thickening of the Scalp* is a consequence, by no means unfrequent, of slight injuries in those of strumous habit, but may also occur without any assignable cause. In delicate subjects it is often attended with chronic periostitis of other bones besides those of the cranium. The patient perhaps complains of pains about the shoulders, in the tibiæ, femora, the tuberosities of the ischia, the sternum, the cervical vertebræ, or in the clavicles and ribs. He cannot bear pressure on some points without suffering the most excruciating agony. The pain is also much increased by motion of the parts, as by coughing when the ribs are affected. Such painful affections of parts external to cavities are often mistaken for diseases of the internal organs, and are treated as such by violent bleedings, purgings, and starvation, to the still farther impairment of the patient's constitution. The symptoms are frequently and correctly attributed to exposure to cold and moisture, sleeping in a damp bed, sitting with wet clothes or on cold ground, &c.; but such affections are very apt to occur in those whose constitution has degenerated into that peculiar cachectic state formerly mentioned, after mercurial courses, whether short or severe; or in those who for some real





or fancied derangement of the digestive organs have persevered in swallowing, for months or even years, the universal panacea of some practitioners, Plummer's or blue pill. The bones and their coverings, of even the best constituted, can scarcely resist a perseverance in such a method of cure, falsely so called.

The swelling of the scalp is often general, and is slightly œdematous ; some points are more elevated than others, feel soft, and are the seat of extreme pain when pressed upon. But such affections frequently flit from one part to another ; what was most unsound, at one time, recovering itself, and painful swellings attacking that which was comparatively free of disease. The same holds true in regard to the other bones at the commencement of the affection ; but when much change of structure takes place, then the pain and swelling become fixed. The pains are most severe during the night, being then so violent as to deprive the patient of rest, and even prevent him from placing his head on the pillow : they abate towards morning, and remain tolerable during the day. They are always aggravated by change in the atmosphere from dryness to moisture, and the prevalence of easterly winds in this part of the island is peculiarly distressing to patients afflicted with such diseases. The swelling is composed of thickened and vascular periosteum with œdematous integuments. The bone too is often increased in size, and condensed, from continuance of increased vascular action ; and its surface is roughened in conse-



quence of its texture being opened out, and new bone having been deposited. Death of portions of the bone often follows, either spontaneously, or after slight bruises received during the continuance of the disease. The patient's health becomes undermined by want of sleep and continual suffering; and he may at the same time have relaxation of the mucous surfaces, with increased discharge from them, produced by the same cause as occasioned the affection of the coverings of the bones. He may be subject to a relaxed or ulcerated state of the throat, increased or caused by the slightest exposure; and may have hæmorrhage from the nostrils, copious expectoration, mucous stools, &c. The periosteal affection alone is a troublesome and serious complaint.

When the pains are fixed and violent, we are sometimes obliged to give small doses of the murias hydrargyri at first, even though there is reason to think that mercurial medicines, perhaps imprudently or carelessly administered, have brought the constitution into its present morbid condition. The good effects of this medicine are well marked and speedy. The patient is freed from the nocturnal pain, gains flesh, and the swellings subside. It ought not to be resorted to, however, unless in severe cases, when the disease cannot otherwise be successfully combated; and when used, it should not be continued longer than is necessary for the removal of the more urgent symptoms: when the pains begin to yield, it is time to discontinue the medicine. Great care is necessary on the part of the patient; he must industriously



avoid exposure to moist atmosphere, and ought to be well and warmly clothed, wearing flannel, chamois leather, or both, on the trunk and extremities. A patient treated with muriate of mercury is perhaps more subject to recurrence of the affection, after imprudent exposure, for a considerable time afterwards, than if simple and less powerful means had been employed. A cure can often be effected by the exhibition of the compound decoction of the woods, with or without antimony. Moderate diet and strict abstinence from wine and other internal stimulants should be enjoined; and the patient, soon experiencing the good effects of temperance, is exceedingly willing to restrict himself to a somewhat antiphlogistic regimen.

In cases of violent fixed pains, with swelling and threatening of matter forming, incision may be sometimes practised with relief to the patient, but is not to be had recourse to unless there is a risk of the bone suffering. Local abstraction of blood is advantageous, and may, if necessary, be followed by counter irritation, as the application of blisters or sinapisms. Friction with stimulating substances, or with opiate liniments, is often useful when the disease begins to yield, the pain and puffiness of the parts being thereby dispelled. The hair should be kept short during the cure, and ought not to be allowed to grow till the scalp is firm and sound.

The disease is often so far advanced that, in spite of the most active treatment, abscess forms in one or more points; and, on the matter being evacuated,



the bone is found denuded. *Exfoliation* is then inevitable.

Exfoliation generally follows denudation of the bone by accident, but not uniformly. When the periosteum is stripped off by violent injury, the bone in some cases does not lose its natural colour; granulations arise from the exposed part, and it again becomes covered without any part of its substance having been destroyed. Again, careful removal of the periosteal covering, as in excising a tumour or ulcer by the knife, may be followed by death of the outer table of the scull; small portions only separating in some cases, whilst in others a large part of the bone perishes. The cranial bones may in part become dead throughout their entire thickness and separate, either after a severe bruise, or in consequence of inflammatory action following injury or arising from disease. The process of separation is either speedy or tedious, according to the vigour of the constitution. The deficiency is repaired, in a great measure, from the subjacent bone, when its whole thickness is not thrown off. But when the breach is complete, the surrounding parts assume the reparative action: the granulations from the dura mater and integuments coalesce, and a dense membrane fills up the space.

The denuded bone should be kept covered and moist, and for this purpose lint frequently wetted with tepid water is the best dressing: spirituous or greasy applications can do no good. A free discharge for the matter should be afforded, and the wound kept clean. If the exfoliation goes on slowly,



perforation in the dead bone may be made at different points down to the living parts, with the view of expediting the process. Exfoliations are sometimes retained by surrounding granulations overlapping their edges and confining them in their situation ; or are fixed by atmospheric pressure, after separation has taken place from the parts underneath by the action of the absorbents, in the same way as a boy's leathern sucker becomes firmly fastened to the stone to which it is applied. In such circumstances a small screw may be fixed into a perforation carefully made in the bone, and thus the dead part may be lifted out without pain or difficulty, when otherwise it might have lain for many weeks, keeping up the discharge. The powdered red precipitate of mercury may be occasionally sprinkled on the parts surrounding the dead portion, in order that the granulations embracing it may be destroyed, and the part more completely detached. The general health must be all along carefully attended to. Sarsaparilla with guiac, sassafras, mezereon, &c. is often useful, more especially if pains in other parts continue to annoy the patient. Under such medicines he in general improves very rapidly in appetite, flesh, and strength.

The scalp is sometimes, though rarely, the seat of malignant *ulcer*. In the early stage the ulceration is not of great extent, and affects only the soft parts ; perhaps it is confined at first to the common integument, but is extremely apt to extend to the deeper layers which invest the cranium, and even to the



bone itself. It is by no means uncommon to find the cranium very extensively diseased, though the affection originated in the superimposed soft parts. Such ulceration of the bone is of a peculiarly destructive nature ; it is a disease of the osseous tissue, corresponding to the most malignant ulceration of the soft parts. The bone around the ulcerated cavity is spongy and soft, its margin is irregular, and bristles with numerous spiculæ ; the centre is composed of soft morbid deposit, entangling small portions of bone which have become detached, and flabby lifeless granulations shoot from the distempered mass. Such disease, when the patient does not soon succumb to its virulence, advances to a frightful extent, affecting a large surface, destroying the whole thickness of the bone, and even exposing the internal parts. In a case of this description which lately occurred in the Royal Infirmary, the anterior half of the cranium was totally destroyed, the left orbit contained a putrid mass of the disorganized eye mixed with pus and bloody fluid ; the dura mater was exposed, and sloughed at several points, and the unhealthy discharge from the parts lodged on the surface of the brain. In malignant disease of the scalp, as of other parts, the lymphatics become secondarily affected : the absorbents feel hard and thickened, the glands in the neighbourhood enlarge and ulcerate, and the sore thereby formed soon assumes the characters of decided malignancy,—hard everted edges, an angry surface, and fœtid thin discharge.

Before the disease has become very extensive in



the scalp, and when it is still limited to the superficial parts, it may be removed by the knife; the incisions being made at a considerable distance from the margins of the ulcer, so that those parts which may be supposed to have assumed a disposition to malignant action, may be taken away along with the ulcer. In more advanced cases, it may be necessary that the incisions should extend in depth to the bone; and it may be prudent to insist on a portion of the bone exfoliating, the periosteum being removed, and some potential cautery applied to the exposed surface,—as the alumen ustum, oxydum hydrargyri rubrum, &c. The actual cautery cannot be applied with safety to the cranium. Even where the integuments only are removed, and that to a small extent and in a proper form, it is vain to think of approximating the parts and procuring union by adhesion; the wound must granulate. There is no difficulty in suppressing hæmorrhage; either ligature or temporary pressure may be employed according to circumstances. Mild dressings are to be applied, and proper support afforded. The parts should be kept clean, and for that purpose the surrounding scalp must be shaved repeatedly.

*Tumours of Scalp.*—Tumours of a sarcomatous nature are seldom met with in this situation, but the adipose are not so unfrequent. The latter are easily removed, being seldom of large size, and their attachments being loose, unless when they have been irritated by accident or maltreatment. When sar-



comatous growths do occur, they are to be excised, with those precautions which were formerly mentioned when treating of tumours generally.

Vascular growths not unfrequently form in the scalp, and attain considerable size ; in general they are either congenital, or the degenerations of *nævi materni*. They may be so extensive as to forbid surgical interference ; or they may be so indolent, may partake so much of the nature of simple varix, as not to warrant it. If active and small, they can be readily removed by the knife, the incisions being made rapidly, and wide of the diseased structure. If the tumour be prominent and extensive, the employment of ligature is a more safe and equally effectual practice. One or two ligatures may suffice to encircle the swelling ; or, as in other parts of the body, it may be necessary to pass a great many double ones beneath the part, to separate their extremities, and to tie them to each other around the base of the tumour, the last being drawn so as to tighten all the others. Little benefit can be expected from tying, either at once or at different periods, the larger arterial trunks whose ramifications supply the diseased structure, the inosculation amongst the vessels around the tumour being so extremely free. But, in cases where the disease cannot be otherwise combated with any hope of success, ligature of the common carotid, on the affected side, may be tried as a last resource. The practice has proved successful in some cases of this disease, involving parts of the head and face to



such an extent, or in such a situation, as to forbid any attempt at *removal* of the growth.

Encysted tumours frequently form in the scalp, and, if undisturbed, become large; they seldom occur singly. The disease appears in many cases to be hereditary, and it frequently happens that several members of one family are at the same time afflicted with it. The contents of the tumours vary as to consistence, but are generally atheromatous. The cyst is thick, and loosely connected with the surrounding cellular tissue; but as the tumour increases, the adhesions often become firm and intimate, more especially towards the skin. When the tumour is of small size, it is unnecessary to adopt any preparatory measures for its removal, not even to shave the scalp. The swelling is transfixed, in the direction of the fibres of the occipito frontalis, by means of a curved sharp-pointed bistoury, and its internal structure is exposed by the knife being carried upwards. The soft contents are evacuated, and the sac is easily extracted by means of common dissecting forceps. The integuments are then laid down and retained in apposition, no sutures being necessary, and in many cases the wound heals by adhesion; sometimes a small coagulum forms between the edges of the wound, and is detached some days afterwards; then slight suppuration ensues. In larger tumours, however, a straight and narrow knife is perhaps the most convenient instrument for accomplishing removal. The part is transfixed, and in most cases it is necessary to take away an elliptical portion of



the integuments, a part of the cyst corresponding to which is of course simultaneously removed; the remainder of the sac is pulled out by the forceps. If the adhesions at certain points are firm, they may be touched with the extremity of the knife, so as to expedite the extraction; and if after the operation there is reason to believe that the whole of the secreting surface has not been taken away, a pointed piece of caustic potass may be applied to the suspected parts. If the tumour is very large, the cyst can often be removed without difficulty unopened, sufficient integument being left to cover the exposed surface. In consequence of such operations on the scalp, erysipelas often supervenes, and precautions ought therefore to be adopted to prevent its occurrence, by keeping the patient's bowels freely open, confining him to moderate and mild diet, and avoiding exposure to moist atmosphere and easterly winds.

Osseous tumours of the cranium seldom attain any great size, and are in general neither troublesome nor dangerous. Small ivory exostoses are the tumours most frequently met with in this situation, and require no treatment whatever.

Tumours of malignant character occur, though rarely; commencing either in the diploe of the scull or on the surface of the dura mater, soon enlarging, and involving the parts around. Two or more sometimes form in one patient; they are attended with excruciating pain, and rapid destruction of the bone, and are followed by extinction of life either at an early or remote period. They are entirely beyond



the reach of Surgery ; as are also those tumours, occasionally met with in children, which project through the cranial sutures and contain fluid ; such are analogous to the disease named spina bifida, hereafter to be spoken of.

I may here remark, that puncture of the brain, with the view of abstracting fluid in chronic hydrocephalus, is, in my opinion, unwarrantable, and likely to accelerate the fatal issue.

#### DISEASES OF THE EYE AND ITS APPENDAGES.

*Of Inflammation and Abscess of the Lachrymal Passages.*—In former times, all affections of the lachrymal passages, and of the parts in the neighbourhood, were denominated fistula lachrymalis, and were all treated nearly in the same manner, by opening the sac, and inserting probes, knives, terebræ, scalpra, caustics, and red-hot irons ; the anatomy of the various parts being then ill understood, and the opinions as to the origin and nature of the diseases being founded on erroneous theories regarding the defluxion of acrid humours, formation of imposthumes, fungous growths, &c. The term, however, which was indiscriminately applied to all diseases in the inner corner of the eye, accompanied with derangement of the lachrymal secretion, is now confined to a distinct form of disease, as will afterwards be mentioned.

Inflammation sometimes occurs in the loose cellular tissue *covering* the lachrymal sac,—whilst that ca-



vity remains free of all disease,—and is attended with some obstruction to the passage of the tears in their natural course, on account of the eyelids becoming swollen, from an extension of the inflammation. The morbid action resembles erysipelas in its nature, and usually terminates in unhealthy suppurations; thin purulent matter lodges in the opened out cellular membrane, a soft boggy tumour is formed, and the superimposed integuments become of a bluish colour, as in the case of other scrofulous collections.

Though the affection is at first unconnected with the lachrymal sac, this organ may ultimately be involved. It may become the seat of a like unhealthy inflammation, and matter may consequently form within its cavity; or, on account of the pressure from copious deposit in the external parts, the parietes of the sac may ulcerate before outward evacuation takes place from the anterior part of the swelling. Thus, the cavities of the lachrymal sac, and of the external abscess, will communicate with each other. If, after an external aperture has been made either by nature or by art, any doubt exist as to whether the sac is involved or not, such doubt will soon be removed by dexterous use of the probe.

In the treatment of this affection, it will be necessary, at the commencement, as in all other local inflammatory diseases, to attempt the accomplishment of resolution, by attention to the general health, local abstraction of blood, and warm fomentations. When matter has formed, it ought to be evacuated as soon as possible by a small incision, as there will then be



less risk of the deeper parts becoming secondarily affected; or if the integuments have sloughed, and the matter has been discharged spontaneously, the natural opening may be enlarged either with the knife, or with the caustic potass. If it be discovered that the lachrymal sac is opened into, the same treatment is necessary as if it remained entire; the matter is to be allowed free exit, and granulation encouraged; and, in most cases, the aperture in the sac is soon repaired, and the parts heal as quickly and soundly as if the disease had been confined to the external cellular tissue. Light dressing during the cure, preferable in all cases, is more especially necessary in this situation.

*Of Inflammation of the Lachrymal Sac.*—When the lachrymal sac becomes inflamed, it enlarges considerably; the swelling is small, hard, circumscribed, deeply seated, and extremely painful, more especially on pressure. At first the integuments are of their natural appearance, the increased action being confined to the sac, but they are soon involved, and often to a considerable extent; they become red and swollen, and as the surrounding parts are affected, the swelling increases. In some cases, the eyelids, the caruncle, and the conjunctival covering of the eye, participate in the inflammatory action. The inflammation is in most instances caused, or at least preceded, by some obstruction in the nasal duct, in consequence of which, the tears are interrupted in their natural course downwards, and either accu-



multate in, and distend the sac, or flow over on the cheek, the puncta lachrymalia remaining open. After increased vascular action has been produced, the lachrymal secretion is increased to a greater or less degree, and much inconvenience is caused to the patient by the profuse discharge following an unnatural course. When inflammation is intense, lymph is effused into the passages, producing obstruction sometimes complete. The mucous lining of the nasal duct becomes swollen, from the vascular excitement, either throughout its whole extent, or at one point only; and in either case the flow of the tears must be interrupted, either partially or wholly, according to the degree of swelling. The vitiated secretion of the part may also contribute towards narrowing the canal, by lodging and concreting there. But a more complete and permanent obstruction is formed by effusion of lymph, under or on the mucous lining, as happens in other canals of similar construction: And in this case also, the stricture may be partial or complete, according to the quantity of effused matter, and the extent of surface affected.

As the inflammation abates, mucous fluid is copiously effused from the surface of the sac, and the swelling increases, though the pain is less. The collected fluid may be partially evacuated through the puncta, either spontaneously, or in consequence of the patient instinctively pressing with his finger on the swollen part; or the puncta may be obstructed by the same causes as the nasal duct, and then the discharge of the fluid is prevented in both directions; it consequently



accumulates still more, and causes greater bulging. Fluctuation is perceptible, and the collection protrudes outwards and forwards, being least resisted in these directions. It is seldom that the puncta are obstructed, and consequently the swelling does not attain any great size, the sac being relieved by some of its contents always flowing upwards, after a certain degree of distension. As the inflammation farther subsides, the mucous secretion diminishes, and the accumulation and swelling are less : in fact, the patient may at this period prevent a tumour from forming in the corner of his eye, by from time to time pressing gently on the sac, and forcing the lachrymal secretion upwards, as it begins to accumulate. This state of matters may continue for a long period, without causing much inconvenience, and getting neither better nor worse ; the patient is merely obliged to apply his finger and handkerchief more frequently to his eye than would otherwise be required. In almost all cases, the obstruction of the nasal duct is complete, or nearly so, and consequently the fluid cannot pass downwards into the nose, though it may occasionally appear to do so, on account of the discharge from the schneiderian membrane being increased at the same time with that of the lachrymal sac. The ductus ad narem, though wide in the skeleton, is naturally of very limited dimensions, and is in consequence readily made impermeable to mucous fluid, by even slight thickening of its lining membrane.

It has been already observed that the above-men-



tioned condition of the parts may continue for a considerable period ; but in other cases purulent matter soon forms within the distended sac ; or, at least, the contents of that organ are so altered in colour and consistence, as to resemble intimately purulent fluid. The secretion may or may not be pus, probably it is not in some cases ; but as the decision of this point is unimportant practically, the description of it as purulent can scarcely be objected to. In most cases, when the puncta either are or become clear, no suppuration, or deterioration of mucus into fluid like pus, occurs ; merely chronic distension of the sac continues, the patient being able to avert incited action, by occasionally squeezing out the contents, and thereby removing tension. There is merely Epiphora ; or, as it is otherwise called, *Blenorrhæa*, or *Stillicidium lachrymarum*. The last term is by some applied to increased lachrymal secretion, without affection of the sac, the tears being secreted more quickly than the puncta can carry them away, and consequently running over on the cheeks and excoriating the surface, and producing an irritable condition of the eye. The simple epiphora may be of long duration, yet the parts are extremely liable to assume inordinate action, in consequence of slight injury, or exposure to cold ; thus suppuration will ensue.

When purulent matter forms, fluctuation becomes more distinct, the pain increases, and there is slight headach and fever. The integuments inflame more and more, and, if the case is neglected, ultimately



give way by sloughing. A small ragged opening, often indirect, is formed, and the contents of the sac are not thereby all discharged; the thinner fluid only escaping, whilst the more viscid remains, and clogs the aperture. The swelling is not much diminished; the margins of the aperture thicken and become indurated, the purulent contents of the sac are gradually discharged, and tears afterwards flow through the opening. The parts are now in that condition to which the term *Fistula lachrymalis* is with propriety applied. The swelling of the canal may gradually subside, and the tears resume their wonted course, and the opening may then contract, and the parts cicatrize; but frequently the fistula remains open for a long period, gradually diminishing in diameter, and only a small passage, almost imperceptible, ultimately remaining, through which a few globules of lachrymal fluid are occasionally discharged. Sometimes the fistula closes entirely without the obstruction of the nasal duct having been removed, and the lachrymal sac remains in consequence distended; then the tears or mucous, either clear or turbid, can generally be squeezed through the puncta.

It frequently happens that the meibomian glands are the seat of morbid action, along with the lachrymal passages; their secretion is changed, becoming in some cases thick and caseous, in others puriform. By some, affection of the meibomian glands has been considered as the cause of inflammation and abscess of the lachrymal sac. This opinion, however, cannot be agreed to, for the diseases



are not always co-existent; and besides, the affection of the surface of the lachrymal sac and ductus ad narem is as likely to be the consequence of morbid action, extending upwards from the nostrils, as of morbid secretion from the eyelids blocking up and irritating the puncta and the lachrymal passages. Disease of the meibomian glands in the under eyelid often exists along with disease of the lachrymal passages, but the latter is generally the primary affection; the conjunctival covering of the eyelid is at the same time inflamed, swollen, and often granulated.

In some cases of abscess in the lachrymal sac, before the integuments give way, the subjacent bone becomes diseased in consequence of the pressure of the confined matter; portions are necrosed, and after their separation, considerable deformity is produced. The exfoliation is often very tedious, and is attended with discharge of foetid thin fluid from the nostril, and from the ill-conditioned lachrymal fistula.

Fistula lachrymalis is often merely one of the symptoms of disease in the bones of the nose, with obstruction of the nasal duct,—as in patients who have suffered from mercury.

*Treatment.*—In the treatment of epiphora or blephorrhœa—that is, chronic collection of a mucous fluid in the lachrymal sac, with weeping of the eye—a primary object of attention is the state of the general health. In general, the habit of the patient will be found weak, and if not decidedly strumous,



at least inclining towards that diathesis. Then the digestive organs must if possible be brought into a vigorous state, by tonics and nourishing regimen. The local treatment chiefly consists in applying stimulants to the internal surfaces of the palpebra and lachrymal sac. For this purpose, solutions of stimulating and astringent substances, termed collyria, and various ointments, are employed. At first they ought to be used of rather a mild nature, and their stimulating power must be afterwards increased gradually. The applications are placed between the eyelids, and becoming mixed with the natural secretion, pervade the diseased surfaces ; and being taken up by the puncta lachrymalia, are afterwards conveyed into the sac. It was formerly the custom to inject the fluids into the sac ; but this is unnecessary so long as the puncta and canaliculi remain pervious, and the permeability of these can be readily ascertained by means of a small probe. Permanent pressure on the sac can be productive of no good effect, and is extremely liable to do harm.

Introducing minute gold probes through the puncta has been much recommended, but in the generality of cases can be of little service. The probes are too limber for removing mechanical obstruction from thickened and hardened mucus, or for affecting in any way the contracted or strictured duct. But passing of the probe may tend to remove the irritability of the passage, as in the urethra, and thence some relief may follow. Much dexterity is required in using either the probe or syringe. The puncta are



often very small, and it is in general necessary to dilate them by means of the point of a common pin before any instrument can be introduced through them into the sac. The point of the probe being introduced into the punctum, either superior or inferior, must first be carried towards the nose for about 2-10ths of an inch, the instrument being lightly held betwixt the fore and middle fingers of the right hand. It is then directed downwards and backwards. Care must be taken to prevent entanglement in folds of the membrane. Should obstruction be felt, the instrument is withdrawn a little, and then carefully and gently carried in the right direction. The small syringe is managed with one hand, whilst with the forefinger of the other, the punctum not occupied by the pipe is compressed.

Neither can much or any benefit be expected to follow attempts to force obstruction in the lachrymal passages, by the weight of a column of mercury. A plan of dilating and rectifying the nasal duct by styles introduced through the puncta has been proposed, but scarcely deserves to be mentioned as a means of cure.

When suppuration is threatened, with increase of the swelling, inability of the patient to empty the sac by pressure, redness of the integuments, &c., an early opening should be made into the tumour, in order to prevent further and more serious mischief. A small opening into the sac cannot be productive of so much injury as forcible dilatation of the canaliculi, followed by and causing ulceration. The point of a straight



narrow bistoury is to be entered into the sac, and carried on into the nasal duct, the knife being pushed downwards, backwards, and a little inwards, in the direction of that passage. The point to be punctured can always be readily ascertained by feeling for the firm ligament which attaches the orbicularis palpebrarum to the nasal process of the superior maxillary bone, as the upper orifice of the ductus ad narem is situate immediately below this tendon; by introducing the knife below the ligament, and within the sharp edge of the orbit, and then carrying it forward in the direction already mentioned, the surgeon cannot fail to enter the nasal duct. The knife should be followed by a probe, and ought not to be entirely withdrawn till the probe is fairly lodged in the duct, otherwise the surgeon will experience much difficulty in the after proceedings. If the knife be not pushed into the duct, a blunt instrument can scarcely be introduced afterwards. Some force is required, but is not hurtful, provided it be made in the proper direction, so as to remove the obstruction in the duct without injuring the bones and other parts in the neighbourhood. After the operation, some drops of blood should escape from the corresponding nostril, showing that all is right in the passage; or the patient being made to expire forcibly, the nostrils being at the same time compressed with the fingers, air, blood, and mucus are forced through the opening made.

Many and various modes have been pursued with a view of securing a pervious state of the nasal duct.



Instruments of different kinds have been introduced through the puncta, through the opening in the sac, and through the termination of the duct under the spongy bone, and have been retained for a longer or shorter period, according to the fancy, or theory, or plan of the surgeon. The first of the methods of introduction is abandoned, as already stated. By the ancients the passages in fault were got rid of altogether, being either cauterized or destroyed by escharotics.

The passing of probes into the duct from its lower aperture is useful in removing trifling obstructions caused by concretion of deteriorated mucus, or slight thickening of the lining membrane, and in chronic dilatation of the sac with probable contraction of the duct. But at the same time, it is an operation requiring much dexterity, and which ought not to be attempted till after much practice on the dead body. The first introduction of the instrument is always the most difficult, from obstruction by a valvular projection of the membrane at the lower orifice, the use of which in the healthy state of the parts must be apparent. Destruction of it renders after introduction of instruments much more easy. Following the probe with catgut bougies properly curved, has been practised in some instances with considerable success.

But the preferable practice is making an opening into the sac, and then introducing instruments from the upper orifice of the duct; more especially in cases where the swelling and pain are considerable. The instruments employed for dilatation of the pas-



sage are tubes and styles. The tubes are made either of silver or gold, of equal calibre throughout, and of the same length as the passage. At first their size is necessarily small, but is afterwards increased so as to fully distend the duct. For some time after their introduction they cause much irritation; this gradually diminishes, and the wound heals over them. But, according to my experience, their effects are not satisfactory. The irritation which they at first occasion generally subsides, but abscess again occurs, with much swelling, and it becomes necessary to remove the foreign body. Again, the tube sometimes becomes obstructed by thickening and concretion of the discharge, and then, when it is necessary to remove it, the process is found to be by no means an easy one; a free incision is required; a screw must be fastened into the tube, or when that cannot be accomplished, the body must be laid firmly hold of with strong forceps, and altogether the extraction is always very painful, and often extremely tedious. In short, the practice of introducing tubes does not appear to be founded on sound surgical principles.

After extensive and impartial trial of both the tubes and style, I decidedly prefer the use of the latter. On the point of the bistoury being fairly lodged in the lachrymal duct, a probe is passed along it; the knife is then withdrawn, and the passage is gently dilated by the probe. The probe again is followed by the style, which should be made of silver or pewter, of the same thickness throughout, of



the same length as the duct, and with a flattened head placed obliquely to the body of the style. The size of the style should be at first small, and gradually increased. The irritation caused by the first introduction is in many cases very severe, but the parts soon accommodate themselves to the presence of the foreign body; the pain and swelling diminish, as also the discharge. If a large style be pushed forcibly in at first, violent inflammatory action will ensue, and much mischief may be produced. After irritation has gone off, the tears pass readily down into the nose by the sides of the style, according to the laws of capillary attraction, little or no fluid escapes from the external opening, the wound contracts around the instrument, and, its head being covered with black wax, no deformity is produced. The instrument should be removed from time to time, cleaned and replaced. When, by the continued use of styles gradually increased in size, the duct has been dilated to its full extent, and appears restored to a sound condition, the instrument may be withdrawn, and afterwards introduced only occasionally. The external aperture, which has become fistulous from the long presence of the foreign body, then begins to contract, and on its completely closing, the tears continue to follow their usual course, and the disease is overcome. But sometimes a small fistulous aperture remains, and there appears to be a disposition towards a renewal of the affection; in such a case, a small style, not exceeding a thin gold probe in diameter,



should be introduced every evening ; this causes little or no inconvenience to the patient, and ensures the permeability of the canal.

Such is the method which will obtain a permanent cure, and which, in my opinion, is preferable to the use of tubes. If these are to be employed, they should, as already mentioned, be of equal calibre throughout, and not gradually diminishing towards their lower extremity ; the external opening must not be allowed to close for a considerable time after the introduction of the instrument ; and the tube must be kept pervious for some time by a style introduced through it. But by these means, which are essential for the success of the practice, the main advantage of the use of a tube, viz. little irritation being produced at first, and the parts being allowed to close soon over it, are completely done away with.

The practice of perforating the os unguis never can be required ; it is cruel, unnecessary, and unsurgical.

Sometimes the lachrymal passages are entirely destroyed. In such cases, it has been found that no inconvenience arises from obliteration, as the lachrymal gland ceases, in a great measure to secrete fluid, and the conjunctival secretion, after having performed its office, evaporates from the surface. In truth, the lachrymal gland always enjoys long periods of repose, and is only called into active exercise of its functions occasionally, as the eye in its ordinary condition is sufficiently lubricated by secretion from its conjunctival covering.



The treatment of fistula lachrymalis, as has been well remarked by an eminent author, must be varied, and regulated according to circumstances ;—by the degree of obstruction in the duct, by the state of the coverings of the sac, of the sac itself, and of the subjacent bone, and by the general state and habit of the patient.

Of *Encanthis*, a tumour, situate in the corner of the eye. The caruncula lachrymalis appears to be the original seat of the disease, at least it is involved at an early period. The growth is at first small, and appears to be simple enlargement of the caruncle ; it is of a reddish colour, and its surface is studded with numerous granulations. It often attains a very considerable size, and, on account of its propinquity to the lachrymal passages, is accompanied with watering of the eye, the puncta being either involved in the growth, or compressed or displaced by it. Sometimes the whole inner corner of the eye, from the margin of the cornea to the inner junction of the eyelids, is occupied by the granulated swelling ; and in such cases it is not uncommon for the tumour to extend itself outwards, in the form of a lunated appendage, on the under surface of each lid ; thereby the motions and functions of the ball are much impeded, and a prominent deformity is occasioned. In most instances the growth seems to be a simple enlargement of structure, and is of a benign nature ; but sometimes it is firm, hard, of rather a livid hue,



with a smooth slimy surface, and is decidedly malignant,—enlarging, and gradually involving the surrounding parts.

Cancerous ulceration, attacking and destroying the eyelids, and the parts around the ball of the eye, often commences in the situation of the caruncle, or in a wart on the edge of the lid. Cancer, though a rare and uncommon disease of the eyeball, frequently seizes on the appendages of the eye, extending rapidly in all directions, and often completely detaching the ball by ulceration. Warty tumours also occur on the conjunctiva of the lids, or of the ball, and are inconvenient as a source of much irritation to the neighbouring parts, even though of a benign nature in themselves.

Extirpation, by means of a small pointed knife, or curved scissors, is the only means to be relied on for the cure of such warty tumours, and of encanthis. The growth must be fixed and pulled outwards, with a small hook, and carefully dissected away, the eyelids, and if necessary, the ball of the eye, being kept fixed with the fingers, or by means of a speculum; the fingers are generally sufficient and more convenient than any instrument. If, from the appearance of the parts, and from induration surrounding the tumour, malignant action has evidently taken place or is dreaded, then the incisions must be made wide of the base of the swelling. For malignant, open, and extensive ulcerations, nothing can be done farther than to allay the pain, and soothe the constitu-



tional disturbance. On the whole, encanthis is a rare disease ; however, I have seen, and operated in, several instances of it.

*Encysted Tumours of the Eyelids.*—These occur beneath the conjunctival lining of either the upper or under lid, but most frequently in the former. They form rapidly, but seldom attain any considerable size ; and may be found to contain, along with glairy fluid, a mixture of pus, or curdy matter. The contents, however, are generally glairy, rarely atheromatous. The cysts are very thin and adherent, and the tumour projects externally, forming a dusky red elevation of the integuments. They cause considerable deformity, watering of the eye, and stiffness and difficulty in moving the lids. On everting the eyelid, the contents of the tumour are seen shining through the distended conjunctiva, and present a bluish appearance. They are seldom single, may attain a considerable size if not interfered with, and are not remediable but by operation. It is improper to attempt their extirpation from without, as there is a certainty of cutting completely through the eyelid, the inner covering of the cyst being merely attenuated conjunctiva. The lid is to be everted, and an incision made into the prominent and thin cyst with the point of a cataract knife ; the contents can then be readily scooped out with the end of a probe. It is impossible to dissect out the tender cyst entire, and when this is attempted, the cure can seldom be permanent. If, after incision and discharge of the



contents, nothing farther is done, the disease will certainly return, from the remaining cyst reassuming a secreting action. The only effectual and radical cure is the application of a finely-pointed piece of caustic potass to the interior of the cyst, after discharge of the contents and cessation of bleeding. The cyst is thereby completely destroyed. A slip of soft lint, dipped in oil, is interposed betwixt the lid and eyeball, for an hour or two, in order to protect that delicate organ from the caustic. The wound suppurates and heals kindly, and no mark is visible, the incision having been made from within. I have had no instance of return of the disease since adopting this practice. And I have operated on many which had been previously treated by other and ineffectual means.

*Closure of the Eyelids*, may be either congenital, or a consequence of injuries, as burns of the parts. The closure may be complete or partial. In general it is partial, though perhaps extensive; and the adhesions can be readily separated by the point of a knife, a small probe having been previously introduced beneath; or a small and narrow probe-pointed bistoury may be conveniently used for the purpose. In the after treatment, it is, of course, necessary to prevent the lids from again adhering, by insertion of dressing between them.

*Ectropion*, or eversion of the eyelids, may be produced, merely by swelling of the conjunctival lining



protruding the lid: or the lid may be relaxed, and the conjunctiva may swell in consequence of repeated inflammation of the parts, caused by frequent and careless exposure; or the disease may be the result of contraction, by cicatrization, of the integuments of the face, as after burns, or extensive superficial wounds in the neighbourhood of the eye. The affection may exist to a greater or less degree, being in some instances scarcely visible, and not troublesome, whilst in others, the eyelashes lie on the upper part of the cheek, and the swollen granulated conjunctiva is exposed. The lower lid is generally the one which is affected; the disease may exist in both eyes, or only in one. In strumuous habits both are frequently affected in a slight degree; and the upper lid, too, is sometimes turned a little outwards. When eversion is of long continuance, and complete or almost so, the conjunctival covering of the ball of the eye, and of the cornea, becomes dry and wrinkled; in short, the membrane completely changes its character, and becomes cuticular. In a lad who laboured eleven years under eversion of the upper and lower lids—arising from abscess and exfoliation of the external angular process of the os frontis, following a blow received when a boy—the conjunctiva was hard, wrinkled, scaly, and exactly similar to cuticle; and this change of the membrane also extended over the whole cornea. The surface of the eye had lost its lustre, and vision was much impaired, the patient being able to distinguish only very bright objects. By such cases, continuity of the conjunctiva with



the outer layer of the cornea is beautifully demonstrated.

Great inconvenience is caused by the state of eversion ; the surface of the eyeball is subject to inflammation, in consequence of being insufficiently protected ; the change of its investing membrane is a serious evil ; and in some cases the cornea becomes extensively ulcerated, unusually vascular, and opaque.

When the conjunctiva only is in fault, the deformity is slight, and the state of matters is readily ameliorated by excision of the relaxed portion. This is done by sharp curved scissors ; as the wound gradually contracts, the eyelid is drawn inwards, and on cicatrization taking place, the parts have become restored to their healthy condition. Care, however, should be taken that too much of the swollen conjunctiva is not removed, otherwise the subsequent contraction may cause inversion of the lid. Combined with the above practice, relaxation of the lid itself will in many cases be remedied, by removal of a portion of it in the form of the letter V, by means of a sharp-pointed bistoury ; the edges of the incisions are afterwards put together by a point of interrupted suture. When eversion arises from a cicatrix of the integuments, the part in fault may be divided ; but a temporary benefit only can be procured. For during the healing of the wound, the parts again contract, and though a portion of the conjunctiva is at the same time removed, the contraction internally will hardly counteract that which is going on externally.



*Entropion*, or inversion, may consist either in turning inwards of the cilia alone, without change of position in the eyelid, or in inversion of the lid itself; both kinds are sufficiently common. The disease generally takes place during inflammation and swelling of the conjunctival lining of the lid. During violent inflammation of the lid, the conjunctiva and integuments are much swollen, and bulge out externally; by the projection the margin is forced mechanically towards the ball, and entropion takes place. But in this state of matters, should the lid be by any chance everted, and not replaced, then the bulging is from the conjunctival surface, and prevents the margin from regaining its former site, and permanent eversion or ectropion occurs. In fact, inversion and eversion, like phymosis and paraphymosis, exist from the same parts being put in different relation to each other. More permanent entropion is caused by the contraction which follows removal of tumours from the under surface of the lids, or destruction of large portions of the conjunctiva. The disease is most frequently met with in the upper lid. Great irritation is caused by friction of the hairs and edge of the lid on the sensible surface of the eyeball. Inflammation is frequently kindled, and kept up by the continued irritation; it is accompanied by its usual distressing symptoms when seated in that organ, and too often followed by a greater or less number of its untoward consequences. But all these evil effects may occur, without any change in the position of the edge of the lid, from irregular growth of the



cilia. Sometimes only one or two hairs are at fault ; in other instances, the half of the eyelash grows inwards ; and sometimes there is a double row of cilia ; one set being in the usual position, while the other projects against the eyeball. If proper means are not taken to remedy the evil, and moderate the irritation which it produces, the cornea becomes thickened and changed in structure ; and vision, at first impaired and indistinct, may be entirely lost.

The symptoms may be for a time palliated by plucking out the faulty hairs, abstracting blood from the loaded vessels, and subsequently using ointments or collyria,—the best of which, perhaps, is the solution of nitrate of silver. In some cases it may be necessary to employ counter irritation, as blistering the nape of the neck ; and in all, the general health must be strictly attended to. Other means may be required, and will be mentioned when treating of chronic ophthalmia.

The permanent cure of the disease is effected, either by removal or by destruction of the roots of the cilia. The whole edge of the eyelid, or the offending part of it, is removed with a sharp narrow bistoury, the operator steadying the parts by laying hold of the cilia with the fingers of his left hand. It is necessary to remove the mere edge only, the cilia and their roots, and not the whole of the tarsal cartilage, as has been proposed. Or the hairs may be extracted by good forceps, such as are used for securing arteries, and a heated needle passed into the canals which contained them, so as to destroy the secreting part, and prevent their regeneration.



Inversion of the lid, from contraction of a cicatrix in the conjunctiva, may be counteracted, by destroying with caustic, or removing with cutting instruments, a portion of the outer integuments, corresponding to the internal cicatrix. Forceps with broad points are used for taking up a fold of the skin, and an oval portion is then excised with a knife or scissors, cutting instruments being less painful and more precise than caustics; of the latter, the sulphuric acid has been particularly recommended for this purpose. The contraction of the wound releases the cilia from the power of the internal cicatrix, and the parts are restored to their healthy state.

The term *Pterygium* is employed to denote a thickened and vascular state of part of the conjunctiva. The diseased portion is generally of a triangular form, commencing at the inner corner of the eye, extending towards the cornea, gradually diminishing in breadth, and terminating in a sharp apex, either at the margin of the cornea, or somewhere between its margin and centre. The thickening is seldom great, but the vessels which traverse the thickened part are numerous, enlarged, and tortuous—are, in fact, varicose. The base of the pterygium is always on the circumference of the eye, generally at the inner corner, and its apex is seldom, if ever, situate beyond the centre of the cornea: frequently the sclerotic conjunctiva alone is affected. The motions of the eye are little disturbed by the disease, but vision is materially impaired when a con-



siderable part of the cornea is covered. Pterygium is in general single, but sometimes, though very rarely, there are two or more pterygia on one eye ; and in such cases the patient's vision is seriously affected, in consequence of the apices of the different pterygia uniting and coalescing on the cornea, and investing the greater part of that organ with a thick and dark shade. When several occur, they sometimes unite throughout their whole extent, and cover the half or more of the eye ; and to this form of the disease the term *Pannus* has been attached.

When the pterygium is of considerable size, extending over the cornea, the only remedy is excision. The apex of the web is laid hold of and pulled outwards by forceps or a hook, and the whole diseased part is then carefully dissected off with scissors, the incisions commencing at the apex, and being carried on to the base. The wound gradually contracts, and though an opaque cicatrix must form on the corneal surface, the speck is of much less dimensions than the space formerly occupied by the pterygium. If the web be thin and not exceedingly vascular, it may be sufficient to make a semicircular section of it transversely, by means of a hook and scissors, between its base and the margin of the cornea ; its growth is thereby arrested, and there is a probable chance of its beginning to diminish, and ultimately disappearing. When it is small, and so situate as to cause no impairment of vision, it is prudent and good practice not to interfere with it at all.



DISEASES OF THE EYEBALL are numerous, and various in their nature. Some are acute, others chronic; and their attack is either sudden, or slow and insidious. Most of them are attended with pain and other annoying symptoms, and some cause loss of vision. Some are cured by internal means; others require surgical operations; and the cure is either complete and permanent, or palliative and temporary. Some destroy the organ, and others, still more malignant, cause extinction of life. All require much attention and care.

Of *Ophthalmia*, or Inflammation of the Eye. The symptoms and appearances of ophthalmia vary much according to the particular texture or textures affected. They require to be minutely attended to, that the treatment may be varied in such a way as to obviate any bad consequences which may be threatened. The great importance of the organ, and the danger to its structure and functions which is likely to occur from any other termination of the affection than resolution, must never be lost sight of.

We shall first treat of inflammation of the more external parts of the ball, an affection less dangerous than inflammation of the interior, but at the same time of more frequent occurrence, and produced by slighter causes.

Inflammation of the *conjunctiva* occurs in many individuals during very warm and sunny weather. At such a period, the eye is often excited by reflection of intense light from the surface of the earth;



and is irritated by sudden exposure to a degree of light to which it has not been previously accustomed. Different directions of the sun's rays, and different kinds of light, seem to exert different influences on the organ. The rays are most hurtful when they do not fall in a perpendicular direction on the eye, but slopingly or horizontally. Strong light from the moon, and light reflected from scarlet, are also particularly injurious. Undue exertion of the eye weakens it, and renders it prone to become inflamed. The eyes of children are often violently inflamed, in consequence of imprudent exposure to light before they have been gradually accustomed to its stimulus. Again, inflammation is caused by imprudent exposure to cold, of the eye directly, or by exposure of other parts causing suppression of their discharges, whether natural or not. Inflammation of the conjunctiva often follows suppression, however occasioned, of the menstrual or hæmorrhoidal discharges, as also suppression of discharges from the urethra, from the schneiderian membrane, or from behind the ears. Irritations in the neighbouring parts, as in the mouth during dentition, may also excite the disease. Immediate irritations, however, are the most frequent cause, as the lodgment of extraneous bodies on the surface of the organ—particles of sand, dust, snuff, pepper, or gunpowder, minute insects, loose or inverted eyelashes. By the presence of such substances, the eye is often kept in a very irritated state for a long period. Violent conjunctival inflammation is sometimes produced by contact of go-



norrhœal matter through carelessness. Occasionally metastasis of inflammation takes place from one eye to another ; so that a person may be seen one day with severe inflammation of the right ; and on the following day with a similar affection of the left, and the right entirely free from disease. Another cause, sometimes met with, of inflammatory action in the conjunctiva, is the lodgement of large foreign bodies in the orbit, with or without destruction of the eye ; as splinters of wood, straws, rusty iron nails, sharp portions of stone, &c. penetrating the globe of the eye, or parts in the immediate neighbourhood. Upon removal of the cause, the redness, discharge of tears, pain, &c. sometimes subside without inflammation having been established, the vessels of the part regaining their contractility ; but if the cause is continued for any considerable time, the effects do not rapidly abate. Wounds and other injuries of the organ are generally followed by inflammation. But a simple clean wound or puncture made with a fine instrument, as in many operations, and in a favourable constitution, frequently produces little or no excitement of the part. The degree of excitement must of course depend upon the nature of the wound, the structure of the parts involved, the lodgement or not of the body by which the wound is inflicted, and many accidental circumstances. The eye may be injured by acids or by lime, and the textures acted upon chemically ; again, the membrane may be wounded by pieces of hot metal, and then the destructive action is both chemical and mechanical ; in both cases



active inflammation of the injured conjunctiva is kindled. The state of the patient's constitution modifies very much inflammatory action of the eye, however induced ; and it has been observed, that dark eyes bear injury or incited action better than those of a light hue. Not unfrequently conjunctivitis is a secondary affection, accompanying eruptile diseases, as measles or smallpox.

In considering the disease, it is necessary to keep in mind the loose connexion of the membrane with the subjacent parts, as well as its own texture and functions.

In conjunctival inflammation, the patient first feels a degree of pain and stiffness in moving the organ ; and has always a feeling as if a foreign body were present, whether such is the case or not. There is also a degree of itching with a sensation of fulness in the part, and this is followed by redness of the membrane, becoming more and more intense. If the disease gain ground, the colour changes to a darkish-brown or bluish hue. To the redness succeeds heat, with profuse and hot lachrymation. Then swelling supervenes, often to a great extent : the vessels, both veins and arteries, are much gorged, and effusion of serum or blood takes place into the loose cellular tissue which connects the conjunctiva to the sclerotic.

In some cases, the effusion in this situation is very considerable ; lymph as well as blood is deposited, and a bulging forwards of the conjunctiva is produced : the stretched membrane becomes thickened, of a raw granulated appearance, and a bright scarlet hue, and



the cornea appears sunk in the midst of the swelling, and almost hid by it ; this state of matters is termed Inflammatory *Chemosis*, and only occurs when the excitement is very intense.

Blood is frequently effused beneath the conjunctiva in small quantity, in consequence of a bruise or other injury of the eye,—from violent exertion, as during coughing,—or from a less degree of inflammatory action than in the preceding case ; but the swelling thereby occasioned is comparatively trifling, and the effusion is in general speedily absorbed. To this affection the term *Ecchymosis* is attached.

In inflammation of the external parts of the eye, the redness begins from the margins of the organ, and gradually diffuses itself towards the cornea ; such is not the case in inflammation more deeply seated. There is intolerance of light in a slight degree, and the patient is inclined to keep the eyelids shut. At first the discharge from the conjunctiva and meibomian glands is increased and changed, and flows occasionally over the cheek, producing a scalding sensation ; when the eyelids are at rest, as during the night, they become glued together by the viscid fluid from the meibomian follicles. But if the inflammation increases in intensity, the discharge is arrested. Even in external inflammation there is more or less constitutional disturbance, proportioned to the violence of the action and the irritability of the system. In most instances the patient complains of headach.

The above symptoms subside along with the inflammation ; but, if this has been at all severe or



protracted, distension of the vessels to a considerable degree continues, and the ophthalmia becomes chronic. A dark redness of the globe, with swelling, increases perceptibly; and the discharge is profuse and altered in quality. The pain subsides, and is not equal or constant. This change from acute to chronic takes place at various periods of the affection, according to the intensity of the action, the nature of the cause, and the irritability of the constitution. And again, the second stage of ophthalmia may revert to the first, acute inflammation being rekindled by fresh irritation of the organ.

*Purulent* Ophthalmia most frequently occurs in warm climates, and is attended from the first with profuse puriform discharge from the conjunctiva. In the natural state of the organ, the conjunctival discharge is pellucid, and so small in quantity as to be indiscernible; but in this disease it possesses all the external characters of pus, and is secreted in large quantity. The affection commences generally in the under eyelid, with a feeling as if sand or mud were lodged in the eye. The parts swell very much, and the eyelids become more or less inverted, in consequence of serous effusion into their cellular texture. Frequently the patient experiences an exacerbation of the complaint about three or four hours after each meal. Though the disease usually commences in the conjunctival lining of the eyelids, the external coverings of the ball are often secondarily affected. In some cases the ball becomes the seat of lancinating pains, its coats give way, the



humours are discharged; and the eye sinks with immediate relief to the patient from the more urgent symptoms, but at the same time with irreparable loss of vision. In other instances the effects are less injurious to the structure of the organ, but equally so to the sense of vision: the cornea becomes dull, and ultimately opaque, or ulcerates, or partially sloughs; the swollen conjunctival surface of the lids is covered with granulations, and secretes a copious puriform discharge, with or without eversion, according to the degree of swelling. At first the lids are more or less inverted on account of œdematous swelling of the cellular tissue; in the latter stages, they are everted by thickening and turgescence of the conjunctiva. This membrane is at first villous and of a dusky-brown colour, relaxed, and its vessels enlarged and loaded; afterwards it becomes hard, almost warty, and ulcerated, and continues to discharge puriform fluid. The latter state of the lining of the lid produces disease of the cornea, opacity of a greenish colour, or an ulcer with intolerance of light, and other symptoms of disorganization proceeding in that tissue. The disease is supposed to be contagious, and was the scourge of the British army for many years after the campaign in Egypt. In that country it seems to be caused by exposure to cold and damp during the night, and the intense rays of light during the day, more especially when these causes act on eyes which have not been accustomed to such vicissitudes. After its invasion, it is communicable to others by contact of the morbid secretion; and in individuals who have once been affected, the disease



is very apt to recur when they are crowded together in unhealthy situations.

A disease of equal malignity, and resembling in all respects the Egyptian ophthalmia, occurs from the application of gonorrhœal matter to the conjunctiva, or on sudden suppression of the gonorrhœal discharge, metastasis of the action then taking place from the urethral membrane to the conjunctiva: the eye is seldom saved from the destructive effects of the violent inflammation which follows the contact of the morbid fluid.

Children are not unfrequently the victims of purulent ophthalmia—the *ophthalmia neonatorum*. Immediately after birth the conjunctival lining of the eyelids seems unusually red and turgid, and a great degree of swelling soon takes place, so as to render separation of the eyelids very difficult. Occasionally eversion of the lids occurs, when the child cries, from sudden and forcible contraction of the strong external fibres of the orbicular muscle. In general, the lids soon relapse into their former situation, but sometimes the eversion remains if the internally projecting tumour of the conjunctiva is allowed to become still more swelled from strangulation, caused by the outer margin of the reflected lid. The inflammation spreads over the ball; and in general, the swelling of the conjunctiva, being greatest at the circumference of the eye, bulges out the eyelids, and turns in their margins. Puriform matter is secreted copiously, and is confined, more especially when, from inattention, the margins of the lids are allowed to become



glued together. They often adhere so firmly as to require a very considerable force for their separation, and when opened, the matter gushes out as if from the cavity of an abscess. From confinement of the matter the inflammation is still more increased, and the cornea is involved. Whitish specks form on it, or it ulcerates, and the ulcers make their way into the anterior chamber of the eye; or portions of it slough, causing partial loss of the organ and openings into the chamber, in consequence of which the aqueous humour is discharged, and the cornea sinks and becomes flaccid. In many instances the cornea becomes opaque, changed in texture, and increased in thickness, so as to form a convex projection from betwixt the eyelids, termed *Staphyloma*; the sclerotic coat also is occasionally affected in a similar manner. A frequent cause of purulent ophthalmia in children is imprudent exposure of the eyes to strong light, the parent or nurse not remembering that the organ must be gradually accustomed to the stimulus. Exposure to cold may also induce the inflammatory action. The application of leucorrhœal or gonorrhœal matter to the eyes of the child, whilst passing through the vagina of the mother, is perhaps the most common cause of the disease. A very unhealthy state of the constitution accompanies the affection; the scalp and other parts of the surface are frequently covered with eruptions.

*Inflammation of the Cornea* supervenes on simple conjunctival inflammation, and frequently on the



purulent. The vessels of the part, both veins and arteries, previously carrying colourless fluid, become much dilated, and are filled with red blood. Writers on ophthalmic surgery, in their rage for refinement, speak of three kinds of this inflammation—inflammation of the external or conjunctival covering, of the middle tunics or cornea propria, and, lastly, of the third coat, the capsule of the aqueous humour: such distinctions, however, are found to effect no good practical end, and it is unnecessary to follow them. One particular layer of the cornea may be first attacked, but the whole structure soon becomes involved. The inflammation generally commences in the conjunctival covering. Vision is necessarily much obscured from even slight inflammatory affection of the cornea. Part only of the organ may be affected, but frequently the whole is involved. Sometimes only one or two vessels remain dilated, but still they, passing over the centre of the cornea, render vision indistinct. Opacity of the cornea, to a greater or less degree, always attends dilatation of its vessels.

In inflammation of the internal and middle tunics of the cornea, most of the enlarged vessels which traverse it are seen to be continuations of those in the sclerotic coat, and are smaller, more numerous, and less apparent than those of the conjunctiva. The cornea and the sclerotic immediately surrounding it frequently appear to be almost entirely covered with meshes of their capillaries. At first the whole cornea has a clouded appearance, but as the disease advances, portions become distinctly opaque, and at these points



either lymph or pus is effused. Sometimes matter collects between the laminae, distends them, and, causing ulceration, discharges itself either into the anterior chamber or externally. Inflammation of the cornea arises frequently from lodgement of a foreign body in it: and *ulcers* of it are often produced by a similar cause. If the extraneous matter is not removed soon after its insertion, nature commences her endeavours to detach it, and the process employed is ulceration. Sometimes, however, a sac is formed around the foreign body as in other parts, and no ulcer is produced.

Ulceration of the cornea also takes place in order to afford an exit to matter formed between its layers deeply or superficially. Deep abscess of the cornea is by no means a rare consequence of violent inflammatory action in the part. A minute opaque spot is at first seen; this extends, assumes a yellow colour, and does not change its situation on the head being moved. The internal lamellæ may ulcerate in consequence of the pressure, but this seldom happens; the matter is discharged externally. Suppuration in this situation is attended with much pain. Abscess of the surface of the cornea is of more frequent occurrence than one more deeply seated; from its external covering yielding readily to the pressure of the accumulating matter, it generally assumes a pustular form. The fluid in such cases is sometimes absorbed, and no vestige of disease remains in the part; but more frequently the apex of the



pustule gives way, and an ulcer is the consequence. A similar result takes place if an artificial opening is made for evacuation of the matter ; and it may be considered as a good rule in practice not to interfere with collections in the cornea, as there is a probable chance of the matter being absorbed and the cornea regaining its transparency, while it is certain that breach of its surface in such cases, though made by the most delicate instrument, will give rise to ulceration.

*Pustular Ophthalmia* is at some seasons frequently met with : small pustules, sometimes numerous, form on the conjunctiva, whilst that membrane is turgid and its vessels dilated ; the sclerotic conjunctiva around the cornea is their most common situation, but sometimes almost the whole conjunctival surface appears studded with them. When the cornea is affected, the pustules frequently give way, and produce ulceration ; and when the pustules are numerous and surrounded by much vascularity, the part becomes opaque as well as ulcerated. In weak constitutions ulcers of the cornea occur from slight causes,—exposure to strong light, intemperance, inverted or irregular ciliæ, a granulated state of the lining of the lids, or from momentary irritation of the part by extraneous matter. The ulcer appears at first circular, but during its progress it often becomes of an irregular form ; its surface is depressed and ragged, and can readily be seen by directing the patient to fix the eye, and then looking at the part from one side.



The edges are elevated, and the surface, which is of an ash colour, discharges an acrid colourless fluid, as in similar affections of all surfaces that are covered with a delicate, tense, and exquisitely sensible expansion. Sometimes the ulcer is very minute and superficial, and enlarges very slowly, if at all ; but in other instances it extends rapidly in depth and size, with great pain and irritability of the organ, and intolerance of light ; occasionally their increase is expedited by partial sloughing. At first, when the ulcer is minute, the part often retains its natural transparency. But as the disease advances, when the sore spreads superficially either by the sloughing or the ulcerative process, or by both, the cornea becomes opaque, often to a considerable extent, around the ulcerated part ; and if the ulcer extends deeply, so as to perforate the tunics, the aqueous humour escapes, the iris falls forward, and the pupil becomes distorted ; in either case vision is impaired or destroyed. In some cases great relief follows discharge of the humour, and the consequent flaccidity of the cornea, the ulcers seeming to have been prolonged and irritated by the fullness of the chamber.

*Abrasion* of the conjunctival covering of the cornea is produced by accident, or follows incited action of the vessels. The abraded surface either ulcerates, or contracts and heals kindly, with or without opacity of the part. Breach of surface in the cornea,—whether an ulcer, an abrasion, or a raw surface caused by the giving way of a pustule, or of a small abscess,—is constantly liable to irritation, on account of not



being protected by mucous membrane and mucous discharge; even the contact of the tears irritates, and keeps up inflammatory action in the membranes. When the ulcerative process ceases, lymph is effused, and a greyish halo forms around the sore; the ash colour of the surface of the sore disappears, and is succeeded by florid granulations, extremely minute, which fill up the cavity: cicatrization follows in due time, with subsidence of all the symptoms and appearances of inflammation. There remains, however, an opaque speck of a pearly hue corresponding to the sore, but occupying rather less space. When the cornea is perforated by ulceration, the sore sometimes shows no disposition to heal, becoming a fistulous aperture through which the aqueous humour is from time to time discharged: by this condition of parts vision is much impaired, the cornea being always more or less flaccid.

The pearly speck which remains after cicatrization of a corneal sore is termed *Leucoma*, and is permanent. It is generally of an uniform colour, but occasionally a black speck is perceptible in some part of it. For when an ulcer lays open the anterior chamber, part or the whole of the aqueous humour is evacuated, and the iris falls forward; and a portion of the iris falling into the opening, provided this is not in the centre of the cornea, closes it up, and becomes adherent to that part. If the opening is large, the prolapsus of the iris is considerable; and in some cases, this membrane, being pressed on by the humours, is forced through the opening in



the form of a small bag. This change of position is termed *Hernia* of the *Iris*, and the dark sacculated portion of the iris which projects from the surface of the cornea is called *Myocephalon*, from its resemblance to the head of a fly. The myocephalon may remain for a considerable time, or may sphacelate and drop away. The pupil is thus rendered irregular, is perhaps nearly obliterated, or is drawn down behind the opaque part, and thereby rendered totally useless to the patient. The impairment of vision caused by Leucoma depends on the size and situation of the speck. The disease is irremediable, though the thin cloudy opacity, which frequently surrounds the leucoma, may be dissipated. The operation of artificial pupil is sometimes required in order to afford a degree of vision in this affection of the cornea,—as well as in the speck of a similar appearance occasioned by effusion and organization of lymph betwixt the deep lamellæ of the cornea, and which is termed *Albugo*.

Albugo occurs during the intensity of inflammatory attacks. It also is surrounded occasionally by thinner opacity, but not depressed and unequal on the surface as leucoma sometimes is. Large and tortuous vessels are generally seen passing into albugines, but meshes of dilated vessels are seldom present. When the affection is recent, it sometimes disappears under proper treatment, especially in young subjects; but the albugo is by no means so readily removed as the *Nebula*, or thin cloudy opacity which is the frequent consequence of obstinate chronic dilatation of the conjunctival vessels. Nebula is superficial, and



consists of mere thickening of the conjunctival covering from lymph having been effused; it impairs vision, but does not destroy it, for the affected part remains semitransparent.

In strumous constitutions specks of the cornea are often accompanied with ulceration of the edges of the palpebræ, and destruction of the ciliæ—the *ophthalmia tarsi*. The margins of the eyelids are red and slightly tumid, and discharge an acrid fluid; the ciliæ are matted together; pustules form at their roots; the bags which secrete them are laid open and destroyed, and they consequently fall out. The affection is often of long duration, and may be in part prolonged by vitiated secretion from the meibomian glands. During its progress it excites very considerable irritation in the whole eye, and, as has been already stated, opacities of the cornea not unfrequently accompany it. Veins become enlarged, and varicose on the conjunctiva, as also their minute ramifications on the clear part of the ball; small reddish lines appear on the cornea, and around them is “diffused a thin, milky, or albuminous humour,” which destroys its transparency at that part. Such spots may be solitary or numerous, and darken the cornea either partially or entirely. They are always surrounded with a fasciculus of enlarged veins.

In elderly people, a dim, opaque ring, of a greyish colour, sometimes encircles the margins of the cornea, and is called *Arcus Senilis*.

Sometimes the cornea presents a *spotted* appearance; and this state of the organ is generally attended with obstinate inflammatory action in the part. The



affection, however, is rare. I have seen several instances of it: in one, both corneæ were spotted, and sight was almost destroyed, without much irritability of the organ. The disease yielded to external stimulants, and the internal use of the muriate of mercury

The cornea may sometimes be rendered dim by *overdistension*, the aqueous humour being unusually copious

Occasionally *sloughing* takes place in the cornea from overaction. It is dangerous to the structure and functions of the organ, according to the extent to which it occurs.

*Ossification* of the cornea is said to take place, but few cases are on record, and these were in very old people.

The cornea sometimes becomes *conical* to a great degree in persons considerably advanced in life. The cone has its apex in the centre of the organ, seems thick and crystalline when viewed laterally, and when looked on from the front has a sparkling appearance. In some cases it is opaque in the centre, and occasionally its surface is irregular. Vision of objects at any distance is very indistinct; those placed within an inch or two of the eye are most distinctly seen, especially if looked on through a small aperture. The disease usually affects both eyes. The patients cannot judge accurately of distance, and see objects multiplied and disfigured.

*Staphyloma* has been already alluded to as an occasional consequence of purulent ophthalmia in children.



The cornea is thickened, prominent, and opaque; and in most cases vision is either much impaired or entirely lost. The prominence varies in different cases, being sometimes very little elevated beyond the natural state of the part, while in other instances it protrudes from between the eyelids. After having attained a certain size it often becomes stationary; but very frequently it continues to enlarge gradually. When the prominence is large, much inconvenience arises from the eyelids not being allowed to close; and the eye, being thereby deprived of its natural covering, is extremely liable to become inflamed from external irritation. When one eye is affected with staphyloma, the other sooner or later becomes similarly diseased.

Dropsy of the anterior chamber, or *Hydrophthalmia*, occasionally takes place in persons of weak constitutions. The aqueous humour is either secreted in greater abundance than it usually is, or absorption is diminished. The cornea gradually accomodates itself to the increase of the fluid behind, and becomes wider and more prominent, but retains its transparency; in looking at the eye, the anterior chamber is seen evidently enlarged, and occasionally the aqueous humour is of a turbid appearance. There is little or no pain in the eyeball, but the patient complains of an annoying sense of fulness and tension in the part. In consequence of the vitreous humour also accumulating, the whole organ is ultimately enlarged considerably, and its motions are thereby much impeded. At first, vision of near objects is impaired, whilst the patient



sees very distinctly those placed at a distance ; ultimately sight is entirely lost.

*Exophthalmia*, or protrusion of the eye, attends the preceding disease, and is also a consequence of various other morbid actions in the globe and its neighbourhood.

*Treatment of External Ophthalmia and its Consequences.*—The exciting cause, if such exist and can be discovered, ought in the first place to be removed. The surface of the organ and of the palpebræ should be carefully examined, either with the naked eye or with a magnifying glass, in order to detect any small extraneous body which may be lodged in the part. In examining the inner surfaces of the palpebræ, it is necessary, to produce complete eversion, to bring the parts completely into view ; and the most convenient method of accomplishing this is to lay hold of the ciliæ between the finger and thumb, and reflect the lid over a silver probe placed along its base. This is the more necessary, as small particles of foreign matter lodge more frequently on the palpebral conjunctiva than on any other part. If a particle of glass, metal, stone, &c. be discovered, it should be gently removed by the flattened extremity of a silver probe, or by a scoop, a fine needle, or a delicate brush. In some cases washing the surface by means of a small syringe, filled with a bland fluid, is extremely useful ; as when an impalpable powder has been thrown into the eye, and can with difficulty be removed, in consequence of spasmodic contraction of the



eyelids preventing exposure of the parts. The application of an emollient poultice, with the addition of hyoscyamus, is beneficial when it has been found impossible to remove the whole of a fine powder. When particles of lunar caustic have, by accident, come in contact with the eye, they are to be removed, as soon after insertion as possible, by a fine hair pencil dipped in oil or fresh butter,—not in water. Small, loose bodies are generally carried, by the increased lachrymal secretion, along the sulcus formed by the apposition of the eyelids, to the inner canthus, and there discharged. And in order to favour this natural process for removing extraneous matter, the patient should be directed to keep the eyelids shut, and as quiet as possible, to cover them with his hands, and to blow his nose forcibly; thus the greater number of the extraneous particles will be got rid of; those which remain lodged in the membranes must be speedily removed by those artificial means which have been already enumerated. If entropion is the cause of the inflammation, the eyelashes are either plucked out, or completely destroyed by removal of their roots. The inflamed organ should be carefully protected from the stimulus of strong light; the patient is to be placed in a darkened room, and the eye protected by a thin green shade. The shade, however, may be worn too long, so as to induce an extremely weak and tender state of the organ.

If there be good grounds for believing that the incited action has been caused by suppression of any discharge, that should be encouraged to return, and



the cause of the suppression must be avoided. If a gonorrhœa have been suddenly arrested by the employment of stimulating injections, these must be instantly discontinued; and some have even gone so far, in such cases, as to introduce bougies impregnated with gonorrhœal matter, in order to procure a renewal of the discharge. In cases of suppression of purulent discharge from the ears, or the surrounding parts, followed by external ophthalmia, a blister or sinapism should be applied in the neighbourhood of the part from which the discharge formerly issued. When the menstrual evacuation has been arrested, leeches and fomentations should be applied to the pudenda, or around the anus, and emenagogues administered internally; the patient should be placed in a quiet and well ventilated apartment, and kept free from any emotions of the mind, more especially anger; children ought to be kept out of the way, all noise and other sources of irritation avoided, and the patient's wishes immediately complied with, never thwarted.

If the incited action in the eye do not subside, as it often will not, on removal of the exciting cause, recourse must immediately be had to very active means for its subjugation; for in no other organ does inflammatory action proceed more rapidly to an unfavourable termination. By timely use of antiphlogistic means, these consequences of external ophthalmia, which we have already treated of, may be avoided; and with respect to most of them, it is much better to prevent their occurrence, than combat them after they have been allowed to take place.



The eye is more valuable to a great proportion of people than a limb ; and the surgeon is very culpable if not master of this part of his profession, and able to undertake the management of every disease and accident to which the eye is liable. “ In all cases of inflammation the general treatment is the same ; but each variety requires peculiar attention during the cure depending on the structure and function of the tissue affected.”

In the *first stage* of external ophthalmia, active antiphlogistic measures must be put in force. In full habits, and cases of intense action, general bleeding must be employed, even to deliquium, from the veins of the arm or of the neck, or from the temporal artery,—and repeated, if necessary, according to circumstances. Blood is sometimes abstracted by cupping from the temples or the nape of the neck ; but it is a painful and uncertain mode of emptying the vessels. Local bloodletting, in many cases, suffices to moderate the action ; in all it is most beneficial and important, after the employment of general depletion. The application of leeches to the inner canthus, is the most effectual method of abstracting blood locally, as at that point the venous return is made from the eye ; if placed on the temples they can produce very little benefit ; if on the outer surface of the eyelids, ecchymosis follows, on account of the extreme looseness of the cellular tissue in that situation. Or the angular vein, at the inner canthus, may be opened with a lancet, and a considerable quantity of blood thereby abstracted from the seat of



the disease. Leeches applied to the conjunctiva of the lower lid are sometimes advantageous ; but leeching and scarification are more useful in the chronic stage : and the latter is injurious in acute ophthalmia. Saline purgatives, and antimonial medicines, a very material part of the antiphlogistic regimen, must not be omitted. Enemata, with occasional pediluvia, are much recommended by some continental writers. In bilious habits emetics, followed by mercurial purges, will be found very useful. With respect to topical treatment, warm applications are found to afford decided relief in the first stage, and are in consequence generally used. By some, however, cold water, or water with vinegar, is applied from the first. Poultices, whether warm or cold, prove annoying from their weight. Warm fomentations, simple or anodyne, are preferable, and may be repeated according to the feelings of the patient ; or the eye may be exposed to the steam of water.

When by these means the violence of the symptoms has abated, as usually happens in the course of a very few days, the organ must be gradually accustomed to its natural stimulus, light. The shade must be discontinued, and the room no longer darkened ; and now leeching and scarification of the conjunctival lining of the eyelids become of great service. The lid is everted in the way formerly described, and freely incised with a sharp lancet : and it ought not to be replaced immediately, lest the bleeding should thereby be impeded ; but the incised surface must be left exposed for some time, and the blood taken



up with a piece of lint as it flows. If the parts are allowed to take their natural position, the blood immediately coagulates, in spite of fomentation. The incisions are subjected to uniform and firm pressure, and only a few drops escape. Evacuation from the vessels is to be followed by gently stimulating or astringent applications, so as to produce contraction of the still dilated, though partially emptied vessels. Various collyria may be employed for this purpose. Solutions of the sulphate of zinc, of muriate of mercury, of sulphate of alum, of acetate of lead, or of the lapis divinus—wine of opium—the citrine ointment, or the unguentum oxydi hydrargyri rubri, &c.—or stimulating vapours of various kinds; camphor is a good addition to many of the applications. The collyria may be cold, or slightly warmed; and may be dropped into the outer canthus,—flowing over the eye, and escaping by the inner canthus, according to the natural course of the fluids of the eye; or they may be inserted at the inner canthus, the head being immediately afterwards inclined so as to allow the fluid to pass towards the external canthus; or they may be applied by means of an eyeglass. Warm fomentations, and other relaxing remedies, however useful during the first stage, are worse than useless, are hurtful in the highest degree, when the affection has passed into a chronic state; as also are anti-phlogistic means, and exclusion of light, remedies so essentially necessary in the first stage.

In ophthalmia, attended with profuse *purulent* discharge, the structure of the eye is in great danger



of being destroyed, from the intensity of the action, and its liability to extend to the deep parts of the organ; the most active practice is required from the first. Copious general depletion, *ad deliquium*, must be quickly had recourse to; and the patient must be freely purged, and kept in a state of partial nausea for some time, by exhibition of antimonials. After general bloodletting, the repeated application of leeches to the inner canthus is necessary, in order to empty sufficiently the vessels of the part. Infusion of tobacco—solutions of acetate of lead, and nitrate of silver,—ether and laudanum, have been used as applications to the eye from the very commencement of the affection; but the propriety of the practice appears very questionable. Blistering the nape of the neck proves highly beneficial, after the employment of the antiphlogistic measures; and in many cases, it is necessary to keep up discharge from the blistered surface for some time. On subsidence of the violent symptoms, the swelled conjunctiva is to be attacked with escharotics and stimulants, as the *nitras argenti*, *sulphas cupri*, or various collyria: then only can such applications be advantageous; at an earlier period they must do harm. They repress the exuberant granulations which may have formed, or may be forming, on the conjunctiva of the eyelids, promote contraction of the dilated vessels, diminish the relaxation of all the tissues, and stimulate the now dormant action of the part into a healthy state of excitement. Gently stimulating collyria may be afterwards injected betwixt the lids, by means of a small syringe. In granulated conjunctiva, it is in



general necessary to remove a greater or less part of the diseased membrane, by escharotics, the knife, or scissors; and after this has been accomplished, it is well to encourage bleeding to a slight extent. In removing part of the palpebral conjunctiva, care must be taken to avoid injuring the cartilage of the tarsus; and in the lower lid, not to take away too large a portion, lest entropion should occur during cicatrization. In hospital practice, the infected should be separated from the healthy; and promiscuous use of towels and sponges must not be allowed.

In *Purulent Ophthalmia of Children*, antiphlogistic means must be pursued, if the patient is seen during the first stage of the disease; but children do not bear depletion well. After the discharge is established, the surface of the eye must be kept free of matter, by frequent injection of a bland, tepid fluid; and stimulating collyria should be applied three or four times a-day.

When *Inflammation of the Cornea* is established, it is exceedingly difficult to procure contraction of the vessels. Active antiphlogistic measures must be employed in the acute stage; and in the chronic, stimulant applications are to be had recourse to. When a large plexus of vessels remain dilated on the part, the most effectual method of removal is to divide them, as they ramify on the sclerotic, by means of scissors, or a fine knife, and afterwards to employ stimulating applications.

*Pustules* on the sclerotic, or palpebral conjunctiva, are to be opened with a finely-pointed bistoury; or



they may be touched with caustic, night and morning. When situate on the cornea, they must be left to nature.

The irritability of *Ulcers* on the cornea is diminished by the application of nitrate of silver, in solution or substance. If in solution, the application is used in the same way as the collyria, in the proportion of three grains of the nitrate to the ounce of distilled water; if in substance, a portion, finely pointed, is gently applied to the sore, which may be afterwards besmeared with a little oil or simple ointment, in order to confine the action of the nitrate to the ulcerated part. It is not necessary, but on the contrary hurtful, to rub the nitrate freely on the sore; a very slight application is sufficient to coagulate the secretions on the part, and form a covering for protection of the surface. In two or three days afterwards, when the temporary covering has become detached, and when the irritability of the sore has in consequence returned, it will be necessary to repeat the application, but not till then. On each application, and few are in general required, the sore is found reduced in size considerably. The collyrium nitratis argenti is very useful in many obstinate cases of affections of the eye and eyelids, the strength of the solution having varied, according to circumstances, from two to ten grains to the ounce.

In *Albugo* and *Leucoma*, proposals have been made for excising, scraping, or perforating the opaque part; but the cure by such means is worse than the disease, as a raw surface is left larger than the previous opacity, and the cicatrix which must



inevitably form, also occupies a larger space, and is equally opaque. Leucoma and albugo are incurable diseases, though the opacities may become somewhat thinner, by natural processes, after the lapse of a long period. *Nebulæ*, however, are often removable. During the treatment of them, or rather before beginning to treat them, it is of the utmost importance to attend to the state of the rest of the surface of the eye, and of the lids and eyelashes. Stimulating substances are to be applied to the thin opacities, such as powders of calomel, aloes, glass, sugar, &c., or stimulating ointments, or lotions. These, however, are often of no avail, unless the dilated vessels, when such exist, are divided, or a portion dissected out; afterwards stimulants will be efficacious, and must be used assiduously. The vessels may require to be divided again and again.

In *Ophthalmia tarsi*, gently stimulating ointments or lotions are to be used, and in obstinate cases much advantage will result from the application of blisters behind the ears and to the nape of the neck, or from the insertion of a seton in the latter situation. In children it is necessary to correct the state of the bowels, scarify teeth, and remove other irritating causes to which that tender age is liable.

*Sloughing* of the cornea should, of course, be prevented, if possible, by subduing the incited action before it has attained such intensity as to overcome the power of the part. The slough is slow in separating when the constitution has been much weakened, and sometimes stimulants, both external and internal, are required to hasten the process of separation. When



the surface has at length become clean, the same treatment is required as to an ulcer of the part.

In *conical cornea*, nothing can be done towards improving the form of the organ. But vision is rendered more distinct by the use of a double convex glass, so adapted that the patient looks through a very small aperture. If the surface, however, of the cornea be irregular as well as conical, no great benefit can result from such means.

When *staphyloma* is small, neither impeding the motions of the eye, nor preventing its being protected by the lids, no surgical interference is called for, as the loss or impairment of vision cannot be remedied, and as no other inconvenience than blindness is produced by the change of form in the part. But when the diseased cornea projects from between the eyelids, the prominence must be diminished, on account of the deformity which it occasions, and in consequence of the eye being deprived of its natural protection of the lids, and being thereby exposed to constant irritation. In such cases, it is necessary to take away a portion of the cornea, that the eye may be so diminished in bulk as to retract within the eyelids ; and the size of the part removed must be proportioned to the degree of protrusion. A cornea-knife is pushed into the prominence, and carried forwards so as to transfix the part, in a direction from the external to the inner canthus ; and by the knife being pushed on, with its cutting edge looking downwards, a flap of the cornea is made. This flap is then laid hold of



by means of forceps, and removed either with the knife or with scissors. The aqueous humour immediately escapes, and in most cases the chrystalline lens and vitreous humour are also discharged. The eye consequently shrinks, and retracts within the palpebræ. The cut margins of the cornea soon assume a reddish appearance—they form granulations, the wound contracts gradually, and ultimately closes; but the eye is necessarily much shrunk, and totally useless as an organ of vision. Generally suppuration takes place, causing complete disorganization of the parts; and the preceding inflammatory action may be so intense, and attended with so much constitutional disturbance, as to require active measures for its moderation. Deformity may be in a great measure removed by adapting an artificial eye to the shrivelled remains of the natural one. When it is necessary to remove only a small part of the cornea, the aqueous humour alone escapes, and during the cure of the wound the patient not unfrequently enjoys a tolerable degree of vision; but after the wound has completely closed, vision is again lost completely.

*Hydrophthalmia* also is a disease in which little hope can be entertained of materially benefiting the patient. In the slighter cases, in which no very annoying symptoms accompany the affection, vision may be improved by the use of optical instruments; and mercurial preparations may be employed in moderation, with the view of promoting absorption of



the superabundant fluid. And when the disease has made considerable progress, temporary relief may be obtained from puncturing the cornea at its lower part, so as to discharge the accumulated aqueous humour; but a cure can scarcely be expected from such a practice, however often the paracentesis may be repeated. In the worst cases the pain is so excruciating, and the system so much disturbed by the local affection, as almost to warrant the destruction of the organ, in order to relieve the patient; but after all, even such severe measures will most probably prove unavailing.

In *Exophthalmia*, the treatment must vary according to the circumstances which cause the protrusion of the eyeball.

*Of Internal Ophthalmia.*—Inflammation of the internal parts of the eyeball sometimes supervenes on conjunctival inflammation, and then the distinctive characters of the two affections are not perceptible. When inflammatory action attacks the deep parts primarily, the external ciliary vessels ramifying on the sclerotic coat are seen, enlarged, shining through the conjunctiva; and as they advance towards the clearer part of the eye, they form a reticulated zone, of a pink colour, near the margin of the cornea; but between the zone and the cornea a distinct white line is interposed. Then large, arborescent vessels soon appear on the white part of the eye, and from their being more superficial than the



first, and of a brighter hue, it is obvious that they belong to the conjunctiva. They also approach the clear part of the eye; and if numerous, obscure the former vessels—as also the red zone and white line—for they pass over them, and reach the corneal margins, and often go beyond it, in continuous ramifications. The sclerotic, in consequence, assumes a pink red colour, and the cornea becomes dim.

The iris may be primarily and principally affected, and if so, the disease is termed *Iritis*; but in most cases all the other internal parts suffer more or less. The iris changes its appearance, becomes of a dusky hue, either in part or throughout, and red vessels are distinctly seen in it; from grey or blue it changes to a greenish colour, and when formerly black or brown it becomes reddish. The size of the pupil diminishes, and the contraction is often irregular, when the inflammatory action is intense. The iris swells perceptibly, and the pupil loses its dark colour, or is almost entirely closed, either from effusion of lymph, or from inflammation and consequent opacity of the chrySTALLINE lens and its capsule. The iris projects forwards, and diminishes the capacity of the anterior chamber; the pupil is irregular and often assumes an angular appearance; and the irregularity becomes permanent from adhesion of the pupillary margin of the iris to the capsule of the lens, lymph being effused and organized, and forming a firm uniting medium between the parts. Occasionally adhesions form at the middle of the iris, and cause



so great contraction, as to give the pupil an appearance of being double. Of course irregularities of the pupil are most distinct, when the part is dilated, either spontaneously or by the application of belladonna. Pustules sometimes form on the iris, and not unfrequently it presents a granulated appearance. From the commencement of the inflammatory attack, the patient feels great pain in the organ and in the forehead, and there is great intolerance of light. There is a feeling of tension of the eyeball, followed by deep throbbing pain increasing every instant. As the disease advances, the cornea is rendered opaque by the fulness of the chambers, and the aqueous humour becomes turbid and of a milky appearance; or lymph is effused into the anterior chamber, and floats about in flaky portions. Occasionally the vessels of the iris are so distended as to give way, causing effusion of blood into the chamber, often in considerable quantity.

More frequently, however, puriform fluid is deposited, occasioning the appearance termed *Hypopium*. The pus is either fluid, or of a thick curdy consistence; when fluid and thin, it mixes with the aqueous humour, rendering it white and opaque; if of firmer consistence, it lodges in the lower part of the chamber, but changes its position, and mixes partially with the humour, on the head being moved; when dense and curdy, it remains separate from the humour, and its position is not altered by motions of the head.

During the progress of the inflammatory action,



all the symptoms increase ; the pain shoots to the top of the head, and is much aggravated by pressure on the eyeball. Of course vision is materially impaired. Constitutional disturbance always accompanies the affection, and exists in a greater or less degree according to the extent of the disease. The iris may be primarily affected, but the other textures, both external and more deeply seated, too often become involved ; and in aggravated cases the whole eyeball suffers. When the most internal parts, as the choroid coat, the retina, and the vitreous humour, are affected, sudden and bright flashes of light disturb the patient, whilst vision is rapidly lost, and for ever. Occasionally the intense overaction terminates in suppuration of all the affected textures, and the eyeball soon becomes completely disorganized.

In *Rheumatic ophthalmia*, the appearances of the diseased eye are similar to those in ophthalmia produced by any other cause. But the affection is accompanied with, and seems to arise from, rheumatic diathesis. There is pain in many of the joints, and frequently in the scalp and portions of the face, increased on hanging the head, and by pressing the parts. The pains are remittent, supervene at night, and subside in the morning. In general the ophthalmia is external ; but in severe cases the internal parts become affected, and the eye is sometimes lost by giving way of the cornea.

Internal ophthalmia is often occasioned by wounds inflicted either accidentally or by operation. Laceration of the iris in the extraction of cataract, or from



an improper performance of the operation on cataract with a needle, is by no means an unfrequent cause of the affection. Iritis often occurs during the exhibition of mercury in undue quantities, and is said also to be a symptom of syphilitic taint. It is, in many cases, preceded by cutaneous eruption, and seems to be the consequence of the eruption being repelled, or interfered with in its progress.

*Treatment.*—In the first stage of internal ophthalmia, active treatment, properly conducted, should be successful in averting the progress of the disease; in the latter stages, there is every chance of vision being entirely lost. The treatment must be actively antiphlogistic, consisting of general and local bleeding, the internal use of purgatives and antimonial medicines, and strict abstinence. A free use of mercury internally is said to check the disease, and, in its advanced stages, to procure absorption of effused lymph. But the inflammation can be subdued without the aid of that mineral, though its effects are often powerful; and a recollection of the bad effects which are so apt to follow its employment, renders a prudent surgeon cautious in having recourse to it. Mercurial ointment, with opium, rubbed on the forehead, immediately above the affected eye, gives great relief. The same relief follows friction with oil, in which the muriate or other salts of morphia is dissolved. When the incited action declines, the extracts of belladonna and hyoscyamus rubbed on the eyelids



and brow, procure dilatation of the pupil, and thereby tend to prevent its further contraction ; but whilst acute inflammation exists, the pupil is not dilatable ; and it is consequently an encouraging symptom when the pupil begins to yield to the influence of these medicines. In hypopium, it is sometimes necessary to evacuate the pus when effused in large quantity, in order to prevent the injurious effects that its pressure might occasion ; but if the quantity be small, there is a good chance of its being removed by absorption. In suppuration of the eyeball, whilst the other eye remains sound, it may be prudent to open the cornea, and allow a free exit for the matter, in order to prevent the healthy eye from becoming affected.

*Of Cataract*—or opacity of the chrySTALLINE lens and its capsule, attended with partial loss of vision. The disease is in general gradual in its progress ; but sometimes it advances rapidly, as when occasioned by a blow or wound. When slow, the opacity commences in the centre of the lens, and extends gradually towards the circumference. Before any change can be perceived in the organ, the patient sees objects as if covered with a mist or veil ; and as the opacity becomes distinct, vision is gradually impaired. During the day, vision is very indistinct, as the pupil is contracted, and the rays of light reach the retina only through the dim margins of the cataract, which are less opaque than the centre. But



during twilight vision improves, as then the pupil becomes dilated, and admits of transmission of light through a portion of the transparent vitreous humour, as well as through the semi-opaque margins of the chrySTALLINE lens: for a similar reason, it is also more distinct after the application of belladonna or hyoscyamus either to the eye or to its neighbourhood. In the ordinary state of parts, a clear, black ring is often visible around the opacity, either from the margins of the lens being unaffected, or from the posterior surface of the pupillary portion of the iris being pushed forwards by enlargement of the lens. Patients, having become aware of the great improvement of vision caused by dilatation of the pupil, are often contented to use narcotic remedies externally, such as belladonna or hyoscyamus, so long as they retain their dilating influence—and, strange to say, they do not soon lose it—instead of submitting to any operation. As cataract advances, even luminous bodies cannot be accurately distinguished, though the situation from which the light proceeds is perceived; thus the patient in a clear light may have an indistinct perception of a candle or window, and in some cases even of the bars of the window. The motions of the iris are not affected, unless, in rare cases, when the cataract is large and compresses the iris; or when the functions of the third pair of nerves have been in any way impaired; or when the iris has been the seat of acute inflammation.

Cataract may be confounded with other diseases



of the eye, as with amaurosis. But in amaurosis, opacity, when it exists, is deep, concave, greenish, or of a metallic appearance ; whereas, in cataract, it is of a more or less white colour, convex, and situate immediately behind the pupil.

Cataract may be *lenticular*, the lens being opaque whilst its capsule remains transparent. In such a case, the disease is slow in its progress, and the opacity uniformly commences in the centre of the lens, and gradually extends to the circumference. The degree of opacity varies in different cases, from cloudy dimness to complete whiteness. In general the predominant hue is white or greyish, but not unfrequently the opacity is of several colours, and occasionally of a mottled appearance. The consistence also of lenticular cataract varies, being sometimes fluid, occasionally extremely dense and almost osseous, but most frequently of *caseous* consistence. When fluid, the cataract is of larger size than the healthy lens ; when caseous, the part usually retains its former dimensions ; and when dense, the lens is often considerably diminished in size. The motions of the pupil are seldom, if ever, affected.

Cataract may be *capsular*, the capsule being opaque, whilst the lens either remains free of disease, or has been removed by natural or artificial processes. The opacity in this case does not always commence in the centre, but frequently begins at the margin, and is of a spotted or mottled appearance, and in general not uniformly opaque. No black ring around the



opacity is observed, though the pupil be dilated ; and the motions of the iris are sometimes slow. The opaque spots are said to move when the position of the head is changed. The anterior portion of the capsule, the posterior, or the whole may be affected ; but the anterior is the part which most commonly becomes opaque.

In many cases, both lens and capsule are affected, and then the cataract is termed *Capsulo-lenticular*. Most frequently the diseased lens, in such circumstances, is of fluid consistence ; and in many cases is spotted.

Portions of lymph, organized or not, lodged in the posterior chamber, have by some been termed *Spurious* or *Adventitious* cataract ; since, when the pupil is shut by such effusion, the appearances presented are somewhat similar to those caused by opacity of the lens, or of its capsule. Such deposits, however, can readily be distinguished from true cataract, being in general of a yellowish colour, in close contact with the posterior surface of the iris, and, when organized, often streaked with red vessels. Frequently, too, the pupil is irregular from adhesions between the lymph and the pupillary margin of the iris.

Cataract would, in some cases, appear to be hereditary, and frequently it is a congenital affection. In very young children, it may be caused by imprudent exposure to strong light. In adults, it often seems to be produced by the action of strong, reflected light, as by exposure to intense fires in forges, glass-houses, &c. or by a dependent position of the head,



accompanied with exposure to light. People advanced in life are most subject to the disease. It is not an unfrequent consequence of internal ophthalmia, and almost invariably follows the slightest wound, or most delicate puncture of the lens: it often occurs after slight injury of the lens or its capsule, inflicted during attempts to form an artificial pupil. Cataract may occur rapidly from extensive dilatation of the lenticular vessels; or from such an injury of the eye as causes laceration of the vessels supplying the capsule and lens, detaches them from their other connexions, and consequently leaves them without a nutritive source.

Cataract sometimes disappears spontaneously, being absorbed; but most frequently an operation is required to remove the opaque body from the axis of vision, though no hurry is necessary in having recourse to it. The chance of success from operation must depend very much on the state of the different parts of the eye, on the kind of cataract, and on the state of the constitution. Many remedies, external and internal, and mercury amongst the rest, have been employed with the view of dissipating cataracts; but all are of no use. An operation, of one kind or another, only can be relied on. And still, even in favourable cases, and in the best hands, the contingencies attending operation are so great, that success cannot be absolutely promised or expected. The mode of operating, and the kind of operation, must be varied according to circumstances; and great experience is required to determine the proper



course of procedure in each case. Steadiness is absolutely necessary both in the patient and the operator, so that proceedings may be carried to a happy conclusion. The operator must have a good eye ; a steady, light, and skilful hand ; a fine touch ; courage and caution—qualifications necessary in all surgical operations, and in none more so than in those on the eye.

When cataract is spontaneous, and vision not altogether lost, the patient being able to distinguish bright objects, though unable to direct his steps or follow his avocation—when the pupil is quite sensible to the application or abstraction of light, or to the use of belladonna or hyoscyamus—when all the external parts are sound, the cornea clear, the chambers of the proper size, and no reason to suspect that the retina is affected—prognosis in regard to the effects of operation is good. When, on the contrary, the organ or the constitution is not sound—when the patient is irritable in habit or temper, or subject to gouty, rheumatic, or catarrhal complaints—when headach has preceded the opacity, and vision is gone, or nearly so, with flashes of light seeming to pass before the eyes—the prognosis is very unfavourable. But even total blindness must not always be considered as an indication of operation proving useless, for sometimes the retina recovers its sensibility after removal of the cataract, and thus sight has been restored in very hopeless cases. There is no objection against operating, though one eye only is affected. By some, operation is recommended as prudent, with



a view of preventing the opposite eye from suffering by sympathy ; while others consider it more safe to refrain from operating, lest violent inflammatory action should follow, and, by extending to the other eye, cause disease there. However, when the cataractous eye does not present such appearances as forbid operation, I conceive it both prudent and safe to remove the obstruction to vision, provided after treatment is carefully attended to, and all untoward symptoms actively combated as soon as they appear. There is still a considerable difference of opinion on the subject, but the patient, being anxious to get rid of an inconvenience and deformity, often decides for the surgeon. When both eyes are cataractous, a question arises as to operating on both eyes at once. From my own experience I should say, that both eyes ought not to be operated on at one time : if they are, there is great risk of violent inflammation being established, and of the operation failing to restore vision. Immediately after one eye has been operated on, the other becomes very unsteady, and is altogether in an unfavourable state for operation ; and if interfered with, the chance of a happy result is but slight. But by operating on each eye at different times, much less risk is incurred, and the chance of success is doubled. Cataract may be operated upon at all ages, excepting infancy and the period of dentition. In congenital cataract the eyes acquire an uncontrollable rolling motion, and if operation be delayed till the patient has attained a considerable age, such motion cannot be afterwards prevented. In such cases, therefore,



the disease should be attacked as soon as dentition is completed, for then an operation can be undertaken with as little risk of injury to the organ as at a more advanced age ; and a child of twenty months or two years is unconscious of what is intended, and can be more readily secured than at an after period ; besides, education is lost if an operation be not done early.

Cataract is not remediable but by surgical operation. It may be removed altogether by incision of the tunics of the eye, and extraction of the opaque body ; or by the introduction of a needle, it may be displaced from the axis of vision, or so disturbed as to be acted on and removed by the absorbents.

Operation with the needle is more generally applicable than that with the knife, and is more easily performed. But much mischief may be done with the needle, if the operator be not both cautious and dexterous ; by unskilful use of it many eyes have been lost.

In all operations for cataract, the patient, having the eye which is not the subject of operation covered, is seated on a low chair, opposite and near to a north window, in order that clear light may be obtained. His head is supported on the breast of an intelligent assistant standing behind. The upper eyelid is raised by the assistant's fore and middle fingers of the left or right hand, applied so as to stretch the lid over the bulb ; and the other hand is placed under the patient's chin, to steady the head. The use of a speculum, for elevating the lid or fixing the ball, is



seldom admissible ; and if the eye be so unsteady or sunk as to require it, the surgeon ought not to attempt extraction. No one method can be exclusively followed ; by a man of judgment, experience, and skill, the operation will be varied according to circumstances.

*Operation with needles* is termed *couching* ; and the cataract may be either *depressed* or *reclined*. Depression is preferred by many good authorities in surgery. The needle is introduced at a line—or a line and a half, so as to avoid the ciliary processes—from the junction of the cornea with the sclerotic, towards the external canthus, and below the transverse diameter of the eye ; and the opaque lens, if solid, is entangled with the point of the instrument, and pushed into the lower part of the ball. Thus the opaque body is removed from the axis of vision, so as not to obstruct the passage of rays of light to the retina ; and, in successful cases, it is highly probable that the lens, after being detached and displaced, is altogether removed by the absorbents. Violent inflammation occasionally takes place after the operation, followed with destruction of the eye from supuration ; or the iris becomes paralytic ; or the pupil closes, and sight is gradually lost ; or the cornea becomes flaccid, with congestion of the vessels and turbidity of the humours. The needle should be of a conical form, thickest towards the handle, so as to prevent the humours from escaping during its introduction. It should also be straight, excepting a short curvature of its point, rather slim than other-



wise, and not longer than from an inch to an inch and a quarter. Belladonna should be used in all cases, previously to determining upon operation, in order to ascertain the state of the humours, the size of the cataract, and whether adhesion of the iris to the capsule of the lens exist or not. Dilatation so produced is allowed to disappear almost entirely before the operation is proceeded in. It is sometimes necessary to steady the eye by means of a speculum, and the wire one of Pellier is the best. By pushing the needle, held like a writing pen, gently forwards, and towards the inner canthus, in a direction almost parallel with the iris, its point is seen in the posterior chamber, opposite the pupil. The instrument is then fixed in the opaque lens, and the cataract is depressed obliquely downwards; the needle is disentangled by a gentle twisting motion, and then withdrawn in the same direction as it was entered. Before depressing, it is necessary to lacerate the capsule of the lens, and this is accomplished by giving the needle a rotatory motion, and moving its point in different directions; the anterior portion of the vitreous humour is at the same time disturbed. Laceration of the capsule may be too great, and allow the lens to escape entire into the anterior chamber; inflammatory action is in consequence excited, and subsides only when an opening has been made in the cornea, and the offending body extracted. If the cataract rise to its original situation on withdrawing the needle, it should be again depressed, and kept down by the instrument for a short time; and when the



needle is then removed, its point should be carefully disentangled. The lens is said frequently to regain its usual situation, a considerable time after the operation; but in many such cases, the opacity in the pupil is not occasioned by the lens, but by the capsule having become opaque. It is said to have arisen, when very solid, twenty or thirty years after depression; and that in many cases no absorption of it occurs. When the vitreous humour has become disorganized, the lens often floats about, rising and falling with the motions of the head.

In *reclination*, the point of the needle is placed on the upper and anterior surface of the lens, and by raising the handle and pushing the point slightly forward towards the inner part of the eye, the lens is removed from the axis of vision, placed inferior to it, and has the relative situation of its surfaces changed—its anterior surface becoming the upper; and the posterior the under—the superior, posterior; and the inferior, anterior.

Solid cataracts only can be depressed. When a cataract is fluid, it is sufficient to puncture, or lacerate slightly, the capsule; as then the opaque contents will be diffused through the aqueous humour, and soon removed by the absorbents. Should the capsule become opaque, after the removal of its contents, the needle must be at a future period introduced; the capsule is to be lacerated and reduced to minute shreds, so that it may escape into the anterior chamber, and be absorbed. In the soft or caseous cataract, displacement is not easily effected; and the



surgeon must rest satisfied with exposing a part or the whole of it to the action of aqueous humour.

The above operations may be had recourse to when—from diminution of the anterior chamber, adhesions of the iris, a morbid state of the pupil, and the temper of the patient—extraction cannot be attempted. When the cataract is small, it is immaterial how it is displaced; when large and solid, reclination is to be preferred. The operator is obliged to decide as to the mode of finishing the operation, after he has introduced the needle, and thereby ascertained the consistence of the cataract. If it is so soft as to permit the needle to move in all directions, it is impossible to displace it; it must be broken up and left in situ.

In the mode of operation termed *keratonyxis*, the needle is introduced through the cornea, about two or three lines from its margin, and the cataract is either depressed, or broken up for solution. The pupil is previously dilated by belladonna, and the dilatation should be continued for some time afterwards. The puncture may be made at any part of the corneal circumference; it soon heals, and leaves no scar. The operation can be performed without much disturbance of the organ, and is applicable when the cataract is fluid, or its consistence doubtful.

*Extraction*, in favourable circumstances, and in dexterous hands, is a beautiful operation, and most satisfactory; but ought not to be undertaken unless the surgeon has perfect confidence in himself. It can be resorted to only in adults, great steadiness on the part of the patient being absolutely necessary. The



case, too, must be judiciously chosen. The conjunctiva must be sound, and indeed almost no operation on the eye should be undertaken unless this membrane is in a healthy condition ; the cornea should be transparent in every part—the anterior chamber of a proper size—the pupil regular—the iris steady, and not protruded—and the cataract solid ; there should be no rolling motion of the eyeball, and no adhesions of the iris. I repeat, the iris should be steady, for a tremulous motion of it indicates disorganization and fluidity of the vitreous humour ; in such a case, the humour can with difficulty be prevented from escaping ; or the lens may fall into the bottom of the eye, and all efforts to remove it will then prove abortive. And though such descent of the lens should not occur, still the organ is in a very unfavourable state for operation, being apt to become affected with deep inflammation, followed by complete amaurosis, or by closure of the pupil. The patient is prepared for the operation by moderate living, and attention to the bowels, for some time previously ; and after the operation leeching may be necessary either as a precautionary measure, or when inflammation has occurred.

The operator is seated immediately before the patient, and so that his breast may be on the same level with the patient's head ; if not ambidexter, he may often be obliged to assume very awkward attitudes. The incision is made either in the lower or upper half of the cornea. The knife should have a very keen edge, and become gradually broader and thicker from its point backwards : in using a narrow instrument there



is danger of the humours escaping. The best knife is Beer's, well made. The light must be good, the patient's head completely steadied, the eye well fixed by the fingers of the assistant, and the other one covered by a bandage. No speculum should be employed, and the pupil should not be dilated by belladonna. The surgeon, supporting his elbow on his knee, or resting his fingers on the cheek of the patient, holds the knife like a writing pen,—in the right hand, if the left eye is to be operated on, in the left, if the opposite—and ascertains the steadiness of the organ by touching the cornea gently with the side of the knife. The cornea is punctured about a line from its margin, and near the outer extremity of its transverse diameter, the point of the knife being directed towards the centre of the eye, lest it should enter between the laminae. The knife is then passed through the anterior chamber, with its side parallel to the iris, and its point is brought out at that part of the cornea exactly opposite to where it entered: transfixion is thus completed, and by pushing the knife steadily forward without any sawing motion, a semicircular section is effected. As soon as transfixion is accomplished, the operator has complete command of the eye, and all pressure should be taken off—there is no further need for pressure by the assistant, he should now merely keep the eyelid raised. Should the edge of the knife not come easily through the cornea, its passage may be assisted by pressure with the finger-nail.

After the pupil has been allowed to dilate by covering the eye for a few seconds with the hand, the capsule



must be opened sufficiently for the escape of the lens. The eyelids are gently raised, a fine curved needle is introduced through the incision, and by it a crucial wound is made in the capsule. The lens is then either entangled in the point of the needle, and withdrawn ; or very gentle pressure is made on the globe, so as to force out the lens ; and should it not readily pass through the wound of the cornea, it can be removed from the anterior chamber by a small scoop. After removal, the eye is allowed to rest ; then careful examination is made, and if any opaque substance remain it is extracted by the needle or scoop. If the capsule is opaque, it must be taken away along with the lens. Before closing the eyelids the corneal flap should be carefully adjusted, and any matter lodged between the divided surfaces removed : loose eyelashes are to be taken away, inverted ones extracted, and the margin of the lower lid should be so placed as not to disturb the flap.

In transfixion, the point of the knife should not be brought out too low, nor too much towards the centre of the cornea ; and care should be taken to avoid entanglement of the iris. When the iris falls forwards so as to come under the edge of the knife, and be in danger of division should transfixion be proceeded in, pressure may be made on the cornea, so that the remaining aqueous humour may repress the iris from its untoward situation ; or the knife may be withdrawn and the operation delayed till the eye has become quiet, and the inflammation, if any, subsided ; or the incision may be completed with a blunt-



pointed narrow knife, or with probe-pointed scissors. Division of the capsule by the point of the knife during transfixion has been practised; but it is an unsafe, though dexterous, measure. In opening the capsule care should be taken not to separate its attachments, otherwise it will become opaque, and thereby passage of light to the bottom of the eye will be again obstructed. Neither should much pressure be used for extrusion of the lens; for in the case of a large and firm cataract, the iris may be lacerated, and the humours escape. When any of the vitreous humour has escaped in consequence of its cells having been broken down, and its tenacity diminished, the eye soon fills again, but good vision is hardly to be expected.

After the operation, applications to the eye should be very light; a rag dipped in cold water, and renewed occasionally, is sufficient. All stimulants of the organ, as light, should be avoided, and antiphlogistic treatment adopted. Should violent pain supervene, bleeding, both local and general, and other means for subduing inflammatory action, must be had recourse to. The eyelids should not be raised or exposed for at least three days, unless in extraordinary circumstances. Belladonna is of use when gradual contraction of the pupil occurs. In very favourable cases, vision is completely restored in the eye; in others, the functions of the two eyes do not correspond, and vision is confused; the patient requires to wear a convex glass before the one which has been operated on.

The operation of making an *artificial pupil* is far



from being uniformly successful, and ought not to be had recourse to unless vision is entirely lost, or so much impaired as to be insufficient for the guidance of the patient's steps. It is necessary on account of central opacity of the cornea—leucoma with entanglement of the iris—and entire closure of the pupil, or diminution of it with concealment of the remainder by corneal opacity. It may be required after badly performed extraction of a cataract, the iris being entangled in the scar of the incision at a distance from the junction of the cornea with the sclerotic; or on account of closed pupil from inflammation, when perhaps the cornea is all clear. The operation is varied according to the size of the anterior chamber, the presence or not of the chrystalline lens, the extent of sound cornea, and the condition of the iris. Interference is useless when disease of the retina is suspected, from the extent of the previous disease—from violent inflammation, with or without discharge of part of the contents of the eyeball. Three distinct methods of operation are pursued.

I. Simple division of the iris, or *corotomia*, may be practised when the iris is stretched, as after extraction. It is performed by introducing a small knife, like a needle, through the anterior or posterior chamber—the surgeon being in this regulated by the size of the anterior chamber and the presence or not of the lens—pushing its point through the iris, or cutting that membrane vertically or horizontally to an extent sufficient for the transmission of light. If the



anterior chamber be of its natural size, a small opening may be made in the cornea with a cataract knife, or a double-edged broad and thin one ; and through this opening small scissors may be introduced for division of the iris.

II. *Corectomia*, or cutting out a portion of the iris, so as to make the opening oval, square, or angular. This is performed by introducing, through an aperture in the cornea, scissors, and forceps, or hooks double or single—the latter to lay hold of the iris, the former to divide it. After the escape of the aqueous humour, a portion of the iris may be made to protrude ; and on the projecting portion being cut off, the membrane with a proper opening in it regains its natural situation, in consequence of discharge of the humour from behind. This operation is applicable only in few cases ; the whole, or the greater part of the cornea must be clear, and the anterior chamber not diminished in size, so that sufficient room may be afforded for the introduction of instruments between the iris and the concave surface of the cornea.

III. *Corodialysis*, or separation of the iris from its ciliary attachments, is the method most easily performed, and most generally applicable. The eye is fixed either with the fingers or with a speculum, and a curved needle, perhaps more curved than that usually employed for cataract, is introduced either behind or before the iris, and at the upper, outer, inner, or lower part of the ball, as circumstances may require. An artificial pupil at the lower part



is by much the most useful ; but if the lower part of the cornea is opaque, it must be made opposite to the inner or outer clear part. The point of the needle is entangled in the attached margin of the iris, and by raising the hand, quickly and partially withdrawing the instrument, the connexions are separated to a sufficient extent. Effusion of blood into the chamber, and to considerable extent, follows these proceedings, and it is only after its absorption that it can be ascertained whether benefit is likely to result or not. After all these operations, inflammatory action requires to be kept down by antiphlogistic measures, abstraction of blood, purgatives, antimonials, and perhaps mercury. It is questionable whether belladonna can be useful in preventing closure of an artificial pupil.

*Glaucoma*, or green cataract, is a disease of the hyaloid membrane and vitreous humour, probably depending on a varicose state of the blood-vessels. The pupil is not much dilated, but irregular ; and there is a shining appearance in the bottom of the eye, as in the ruminating animals. The lens becomes opaque and greenish as the disease advances, vision gradually diminishes, and the iris is immovable. After sight is lost, the patient has a perception of a luminous appearance in the organ when pressed upon. Both eyes are generally affected, one after the other ; headach, often violent, attends the disease ; many remedies, both external and internal, may be tried on recommendation, though



without effect : the disease seldom if ever admits of cure.

*Amaurosis* implies an impairment of vision more or less complete, arising from morbidity in the brain, in the optic nerve, or in the retina, whether consisting of change or destruction of structure, or derangement of function. Vision may be diminished or lost by organic disease in the coats or humours of the eye, or by morbid formations in the orbit ; but to such the term *Amaurosis* does not strictly apply. But after establishment of the disease, other textures of the eye may, and often do, become affected. Usually one eye at first is amaurotic ; but the other soon participates, and ultimately vision is impaired or entirely lost in both. The disease may occur idiosynthetically, or be symptomatic of other affections.

The general symptoms of amaurosis are the following. Headach is felt for some time, either constant, or (as is most commonly the case) occasional, and most severe in the forehead ; in many cases the pain is at times most excruciating. The eyesight gradually becomes weak ; distant objects are unusually obscure, or not at all observed ; and those which are near cannot be accurately discerned. For a short time vision may seem to be restored, but soon it diminishes more and more, all objects seem to be enshrouded in a mist, at first thin and shadowy, but gradually becoming opaque and impenetrable ; or a feeling is communicated of dark network obstructing the view. Unnatural impressions are made on the retina ; flashes of strong light, or luminous sparks, appear to dart



across the eyes ; darkened spots are seen where none exist ; gnats, flies, or other minute bodies, various in colour and brilliancy, seem to flutter before the face ; or a single dark speck intercepts the vision. Usually the pupil is dilated and the iris insensible to the stimulus of light ; and the former has not its natural translucent aspect, but is dull and cloudy. But the state of the pupil cannot be accurately determined in amaurosis, for not unfrequently it is much contracted, and in many cases the iris retains both its natural appearance and the full exercise of its functions. The disease either advances to complete blindness, or stops in its destructive progress, leaving the patient with vision impaired to a greater or less degree. When the disease is established, pain in the head and eyes usually either ceases quickly and entirely or gradually abates.

Amaurosis is sometimes temporary, occurring at regular intervals ; and during its accession it often varies in intensity. With some patients strong light is intolerable, and vision is best in the twilight ; others court sunshine, finding their eyesight thereby much improved ; accordingly the former are said to labour under nyctalopia, the latter under hemeralopia. Some can discern the shape of objects, but either have no perception of the colours, or mistake the individual colours ; others not only see all objects indistinctly, but conceive them distorted, double, or extensively multiplied ; in some one half of the object looked upon is obscured—and frequently there is strabismus, in consequence of the paralysis being only partial.



Organic amaurosis (that depending on organic disease) may arise from the change of structure consequent on inflammatory action in the retina, whether chronic or acute—from atrophy of that membrane and of the optic nerve—from extravasation into the substance of the nerve, or compression of it by morbid formations—from softening or suppuration of the nerve and its connexions—or from various diseases of the encephalon. Functional amaurosis may proceed from temporary plethora about the optic nerve and retina—from intense and long continued use of the organ—from derangement of the digestive apparatus—from general debility, however induced—from excessive influence on the system of poisons or powerful medicines—from concussion of the nervous and cerebral substance, or from long continued irritation in the neighbourhood of the eye. Amaurosis may also follow injuries of various kinds.

In the treatment of organic amaurosis but little can be done, and that little is unsatisfactory. In the functional form, however, vision may be improved, if not wholly restored, by removal of the exciting cause, and the carefully avoiding of such circumstances as seem to predispose to the affection. After due constitutional treatment, considerable benefit is often derived from counter irritation; and I have in many cases witnessed the good effects of blistering the temples and besprinkling the raw surface with the powder of strychnine,—a practice very far from nugatory. On removing the blister, the cuticle and lymphatic effusion beneath are carefully scraped away,



and from one-eighth to one-half of a grain of the powder dusted over the exposed cutis. The sprinkling is repeated daily, and the dose gradually increased. When the surface dries, a fresh blister is applied, and the use of the powder resumed. It may be employed, when gradually increased, to the extent of two grains on each temple; but if spasmodic twitchings and constitutional disturbance begin to show themselves, it must be immediately abandoned, and not resumed till after some days, and even then in diminished doses. In not a few cases, both of complete amaurosis, and of vision impaired to such an extent that the patient could merely distinguish light from darkness, I have by this practice succeeded in restoring the sight completely: in others, vision has been very much improved. Still, by far the greater number of amaurotic patients are incurable, and even those who have derived benefit from strychnine, are (I am strongly inclined to suspect) exceedingly liable to relapse.

*Wounds of the Eyeball and its neighbourhood.*—Wounds near the eye, though unimportant in themselves, require considerable attention, on account of the eye, or its appendages, being likely to suffer in consequence. Thus, transverse wounds of the forehead, or eyebrow, if their edges be not approximated accurately and soon, may cause prolapsus of the eyelids; or the eyelids may become swollen and turgid, or erysipelatous, in consequence of inflammatory action attacking the wound. When wounds of the



forehead are in a perpendicular direction, their margins are easily preserved in apposition, having little tendency to retract, and there is no risk of the relative situation of the eyelids being altered. If there be considerable loss of substance in the lower part of the forehead, from the nature of the wound, when inflicted, or from its having become the seat of unhealthy suppuration, on cicatrization of the part the eyelid will be drawn upwards, and perhaps more or less everted. There is reason to believe that a degree of blindness, and even complete amaurosis, has been caused by wound of the eyebrow, the superciliary nerve having been contused, wounded, or otherwise injured; or the functions of the eyeball may be disturbed by concussion from injury. Paralysis, also, of the levator palpebræ superioris, or of several of the muscles belonging to the eyeball, may follow injury of the forehead and neighbouring parts, from either laceration or concussion of the nerves. Wounds of the eyelids, particularly when neglected, may cause much change of relative situation in the parts, and thereby produce both inconvenience and deformity.

In wounds, such as those above mentioned, it is of great importance to bring the raw edges into contact, and retain them so; and in most cases, one or more points of interrupted suture are necessary. Adhesive plaster may be at the same time applied, but of itself is insufficient to effect permanent coaptation.

Wounds of the eyeball, however slight, require much attention, being inflicted on an important and highly sensible organ, and there being always a risk of de-



structive inflammatory action. If the breach of surface be clean, simple, and superficial, rest of the parts will in general be sufficient to effect a cure. Lacerated wounds, and such as penetrate into the interior of the eyeball, cannot be expected to heal without morbid action having been excited: inflammation must be anxiously looked for, and actively combated as soon as it appears. When a foreign body lodges in the wound, it must be early removed. But in certain cases it is imprudent to attempt extraction of foreign matter; as when a small shot, or other minute substance, has lodged in the interior of the eyeball. In such circumstances we can only adopt such measures as prevent and subdue morbid excitement. The organ may remain little disturbed for a short period, but violent inflammatory action soon occurs, and, though subdued for a time, again breaks forth, and, by its successive attacks, may ultimately destroy the eyeball. Frequently all endeavours to avert untoward results are unavailing, and the functions of the organ are more or less impaired—the cornea may become opaque, the iris may protrude, the pupil may become irregular, contracted, or obliterated—the crystalline lens may lose its transparency, amaurosis may occur from injury of the retina, the humours may be evacuated, and the eye sink in its socket. The entrance of a large foreign body into the orbit may displace the globe, and cause it to protrude between the eyelids; in such a case the body should be removed and the ball gently replaced: vision may be soon regained, but if the protrusion has been



such as to cause much stretching of the optic nerve, blindness more or less complete remains. Fatal effects may follow wound of the eye, on account of the foreign body, as a sharp-pointed instrument, penetrating the thin parietes of the orbit, splintering the bone, and injuring the brain.

*Orbital Inflammation.*—Inflammation seldom attacks the parts situated between the orbit and the eyeball; but when it does, the affection is very serious. The action is very acute, and proceeds rapidly to suppuration. The pain is excruciating, extends to the whole head, accompanied with a sensation of extreme tension in the orbit, and is much increased by the slightest motion of the eye: and from the matter accumulating around the ball, and being confined to the unyielding orbit by the dense fibrous expansion which extends from the margin of the orbit to the anterior surface of the eyeball, the globe is pushed forwards, and distends the lids. The palpebræ become erysipelatous, and swollen by serous effusion. Violent inflammatory fever occurs; and, as the disease advances, all the symptoms are aggravated, and become almost intolerable. The globe is farther protruded, and the retina is insensible to light. At length the accumulated matter makes its way to the surface, and is discharged, giving great relief to the patient, and permitting the protruded globe to regain its situation. The inflammation seldom extends to the eyeball.

In the early stage of this affection, the most deci-



dedly antiphlogistic measures are imperiously called for. When fluctuation can be felt, or when the symptoms indicate that suppuration has taken place, whether fluctuation is perceptible or not, an early opening into the affected part should be made through the dense orbital ligament. Thus a free exit is allowed for the matter, the patient is instantaneously relieved, and the extent of the local mischief is limited. It is unsafe to wait for the spontaneous evacuation of the matter; such a process is necessarily tedious; and before it has been accomplished, the orbital bones may have become diseased; they may have given way at certain points, and the matter may have escaped within the cranium. The artificial opening should always be free, and deep if necessary.

*Tumours in the orbit.*—Sarcomatous tumours occasionally form in the cellular tissue of the orbit. They occur at all periods of life, and may, by slow and gradual increase, protrude the eyeball, and disturb its functions; or their growth is rapid, and accompanied with great suffering. In some cases, the eye is protruded to a great degree, and by the extension of the optic nerve vision is impaired; in others, the patient is totally blind at the commencement of the disease. Yet the eye may be displaced to no small extent, without amaurosis following; the optic nerve appears to bear a good deal of extension, without disturbance of its functions. The majority of tumours in this situation are of rapid growth, their structure



is soft and medullary, they sooner or later furnish a fungus, and, though removed at an early period, are generally reproduced. The exophthalmos is often the first indication of such a growth, and it is sometimes greater in the early part of the disease than afterwards, when the fascia passing down from the edge of the orbit has given way. The malignant tumours are most frequently met with in childhood, though morbid growths of a bad kind form in the eyeball at different periods of life. They often follow the infliction of a blow or wound. The patient's sight speedily declines, without any known cause; there is pain in the forehead, temple, and eyeball; the ball protrudes, perhaps slightly, and at first is not otherwise changed; but on careful examination a dimness can be perceived deep in the eye. The opaque body approaches the pupil and fills it, and may in this state be mistaken for disease of the crystalline lens; but the tumour soon protrudes the iris, and fills the anterior chamber. It has an irregular surface covered with flocculi. Blood-vessels are observed ramifying on it, and by this it is distinguished from cataract, should the accompanying symptoms not have previously convinced the surgeon of the nature of the disease. If not interfered with, the cornea ulcerates, a fungus appears, often grows with great rapidity, and may either furnish not a drop of blood, or bleed profusely. The eyelids are œdematous and permeated by large venous branches. Abscesses form around; the lymphatics of the neck are involved; and the patient succumbs. The original tumour may pos-



sess the usual structure of medullary sarcoma, or may be of a melanotic nature ; or it is of harder consistence, containing cells filled with bloody, glairy, or other fluid. The whole coats of the eye are seldom involved, part remains sound, but compressed and disfigured by the morbid mass, and the humours are either absorbed or discharged.

Circumscribed tumours, exterior to the ball, and surrounded by a cellular cyst, may be removed by careful and cautious dissection, without injury to the important parts. A free incision is made along the edge of the orbit, in the course of the fibres of the sphincter oculi. The tumour is exposed, laid hold of with a hook or small vulsellum, and separated from its attachments by a knife, the edge of which is directed towards the new growth.—A man, aged 26, had laboured under blindness with exophthalmos for eighteen months. A tumour could be felt above the eyeball, and I dissected it out, along with the lachrymal gland, to which it adhered. It was of medullosarcomatous structure, and of the size of a plum ; at one point it contained a mass of coagulated blood. After its removal, the eye resumed its place and functions. The patient remains well ; but such favourable cases are rare.

If the affection be more extensive, it may be necessary to remove all the contents of the orbit : but in disease involving all the structures, there is little chance of the patient remaining free ; it almost uniformly returns, as also when it has commenced in parts of the eyeball. The optic nerve is often affect-



ed at an early period ; its cut surface is unsound, and from this springs a fungus which grows rapidly. But under many circumstances the surgeon is not only justified in removing the orbital contents, but called upon to do so. The operation, though cruel and painful, need not be tedious. The commissure of the eyelids is divided with the point of a bistoury, and the fore part of the ball laid hold of firmly and deeply with a vulsellum—that is, forceps provided with a double hook at each extremity of the blades. A straight bistoury is then entered at the margin of the orbit, pushed down to the base, as near as possible to the entrance of the optic nerve, and carried round the tumour rapidly, the blade being made to move more quickly than the point. The nerve is cut across, and after the removal of the morbid mass, the cavity is sponged out and examined. The lachrymal gland, and other soft parts, particularly if altered in texture, are raised with a hook, and removed by means of curved scissors. In young subjects, and in adults when the disease is far advanced, the parietes of the orbit are thin, softened, and attenuated by pressure ; the knife should therefore be used cautiously, and it is perhaps safer to finish excision with a narrow, curved, and probe-pointed bistoury, after having penetrated to the bottom of the orbit with a sharp-pointed knife ; all other curious and crooked knives are of no use. Bleeding is restrained by charpie pressed, firmly and quickly, into the cavity, and supported by compresses and bandage ; but before introducing the dossils, all



coagula and fluid blood should be carefully sponged out. Afterwards excited vascular action, with pain in the head and wound, may in some subjects require abstraction of blood, the exhibition of purgatives and antimonials, and immediate removal of the dressings, followed by fomentation and poultice. When matters proceed favourably, the charpie is removed gradually, as suppuration advances, and the granulations are supported with light dressing, either dry, or moistened with some slightly astringent lotion. The discharge may gradually cease, and the granulated surface cicatrize under the level of the eyelids; in such circumstances the deformity may be remedied, after the parts have become quiet, by the adaptation of an artificial eye of enamel, made so as to resemble exactly the other eye. It is worn without inconvenience, removed at night like artificial teeth or a wig, and cleaned and replaced in the morning. Such a substitute is also useful when the humours have been evacuated, or the organ destroyed, by injury or the effects of inflammation. Too frequently the morbid growth is reproduced and that rapidly. It may be restrained by escharotics, the red oxide of mercury, potass, acetate of lead, acids, or the actual cautery; but the patient is thereby put to much pain without a chance of ultimate benefit.

*Of Nasal Polypi.*—These tumours vary in texture and disposition, as formerly stated: but the soft mucous or benign polypus is fortunately by much the most frequent. Generally a great many coexist



in one or both nostrils, growing from different parts of the schneiderian membrane. Sometimes there is but one tumour, of a large size ; and in some cases a large cyst, containing colourless fluid, fills the nostril. When numerous, they are in different stages of growth, and generally adhere to the membrane by a narrow neck, though sometimes several are attached by the same pedicle. It is not uncommon to remove ten or twelve polypi, or even a greater number, before the nostril is cleared. The parietes of the narrow passage betwixt the anterior and posterior nares is their most common situation, though their bases may proceed from the cells of the superior spongy bone.

The membranous covering of the inferior spongy bone, or of the anterior cavity of the nostril, is often at the same time relaxed : indeed this of itself causes slight obstruction to the passage of air, and may be mistaken for polypus by the patient and the unexperienced. Projection of the cartilaginous septum to one side, with thickening of its covering, may also give rise to the same mistake. This formation is not uncommon, but almost uniform, and the projection is generally to the left side, with corresponding depression of the right ; the circumstance may perhaps be accounted for by the pressure of the thumb overbalancing that of the fingers, in the habitual practice of clearing the emunctory.

In polypus, the passage of air is obstructed, the patient feels as if labouring under a common cold—his head is stuffed : in cold and dry weather air



passes through the cavity, though with difficulty ; in a damp day the obstruction is complete. The tumour evidently increases, comes lower down, and even projects upon the lip. There is watering of the eyes, the lachrymal secretions being prevented from flowing into the nostrils ; and in cases of old standing, the patient is deaf from the pressure of the tumours on the extremities of the eustachian tubes ; this latter symptom is not constant, but depends on the position of the tumours. I recollect an old gentleman, an elder of the kirk, afflicted with nasal polypus, who for 30 years had not heard his clergyman, though for 20 years he had attended sermon regularly, and from a sense of duty ; on removal of the tumours, hearing was perfectly restored.

The nose changes its form, is expanded and flattened. If the disease is extensive, and particularly if the tumour is malignant, the bones are separated, the eyes are protruded, and pushed outwards ; indeed the face is so distorted, as to have been compared to that of a frog. Even in the benign form, when of long duration, great deformity of the features is produced, and the patient rendered very uncomfortable. Besides the symptoms already detailed, he suffers from acute pain in the forehead—he breathes loudly, and with difficulty, particularly when asleep—he has lost the sense of smell, and does not relish food or drink—and there is often profuse discharge of a dirty mucous fluid, both externally and into the pharynx.



Soft mucous Polypus may exist for many years, without depressing the palate, or projecting into the fauces. The anterior nasal cavity is its most frequent seat, and it widens and fills up the fissure between the anterior and posterior cavities; frequently it projects backwards, but is not visible, though it may be felt with the finger behind the soft palate. Its growth is slow. It may become malignant, as well as other adventitious structures equally simple; but such an occurrence is extremely rare. It may exist for many years, and, when at length removed, will be found of simple structure; and, if the operation be well conducted, no reproduction will take place. The tumours are supposed to be easily regenerated; but the truth is, that they are seldom eradicated completely. In general some are left, and, leaving the narrow space or cells in which they were confined, soon become fully developed—they expand, and speedily take the place of those which were removed. They can never be got rid of at one sitting, the operation requires repetition once and again, and of this the patient should at the first be made aware.

*Malignant* Polypi are met with in different degrees of advancement. Many are firm and fibrous, with an irregular surface and wide attachment—do not grow with great rapidity—furnish a sanious and bloody discharge, and give rise to painful feelings; if interfered with, their increase is accelerated. If removed completely, and escharotics afterwards applied, reproduction may not take place.

Tumours with broad bases, and of soft medullary



consistence, attended with extensive change in the structure of the membrane, and softening of the bones and cartilages, grow very rapidly, fill the cavities, and expand them. They show themselves on the face, through the nostrils—protrude through the floor of the orbit—get into the mouth behind the palate, through the tuberos processes of the superior maxillary bone—or project through the alveolar processes. The discharge from them is profuse and foetid, and in some cases blood flows in no small quantity. Such growths usually commence in one or other of the sinuses connected with the cavity of the nose—sometimes, though rarely, in the frontal sinus. When seated in the *antrum* maxillare, pain is experienced in the cheek for a short time, before swelling occurs. Soon the part enlarges, its coverings are thickened, the bony cavity expands, and the patient's sufferings are excruciating. The teeth loosen, and sanious matter is discharged from their roots. The tumour extends into the nostril, and soon runs the course already mentioned. Malignant disease sometimes, though rarely, commences in the anterior cavity of the nostril.

No satisfactory cause can be assigned for the appearance of either the benign or malignant form of polypus.

The nostrils can be readily cleared of benign polypi, but seldom completely by one operation: in several cases, wherein only one or two tumours obstructed the cavities, I have had no occasion to repeat my interference. If the attachments are broad and exten-



sive, a small curved blunt-pointed bistoury, or probe-scissors may be employed for their separation ; sometimes the tumours can be pushed off by the finger, or by a probe with a blunt and forked extremity ; then they either are blown out by the patient, or fall into the posterior cavity, thence into the pharynx, and are coughed up or swallowed. In cases such as are usually met with, forceps and a small vulsellum are the best instruments. The forceps should be about half the size of those generally used or sold by cutlers as polypus forceps. The patient is seated facing a good light, and the body of the prominent tumour is laid hold of by the vulsellum ; the forceps are then introduced, with the blades expanded, and carried backwards so as to reach its neck, which is firmly grasped by the instrument, and gently twisted, so as to separate its connexions with the membrane. No force, no jerking or pulling is allowable. It may happen even with the gentlest and most careful management, that a small fragment of bone comes away along with the tumour ; but this generally can or should be avoided : the cure is not rendered more certain by such an occurrence, as has been supposed. One tumour being thus detached, the same process is repeated with the others, till the cavity is cleared so far as hæmorrhage or the patient's fortitude will admit. Both nostrils, if, as is usually the case, both are stuffed, may be emptied at the first sitting, so as to enable the patient to blow through them. When the tumours filling the passage to the throat have been removed, so as to allow the ready egress and ingress



of air, and when the forceps can be passed along the floor of the cavity, and are expanded and shut without meeting any obstruction, examination is to be made with the finger. In those who have long laboured under the disease, the fissure between the cavities is so much expanded as to admit the little finger easily, and by it the situation of the remaining tumours is ascertained, and instruments guided to them.

After the operation the nostrils are stuffed gently with lint to prevent the access of cold air ; and if the hæmorrhage be profuse, long pieces of lint pushed well back will generally be sufficient to arrest it ; if not, the posterior cavity must be plugged from behind. It is prudent to prepare for the stuffing posteriorly in bad cases in which violent hæmorrhage may be expected. Instruments with springs, &c. have been contrived for the purpose, but are useless, and cannot always be had. A loop of thin flexible wire, or of thick catgut, is passed along the floor of the nostril, and on reaching the throat is caught by the finger, or by a hook or forceps, and brought into the mouth. A piece of strong thread is then attached to the wire or catgut, and the latter is withdrawn, one extremity of the thread hanging from the nostril, the other from the mouth. To the middle of the thread a piece of lint rolled up to the size of the point of the thumb is affixed, and this is pulled back into the mouth, and directed into the posterior nares with the fingers ; and by the pressure of these, and by pulling at the thread, the dossil is firmly wedged into the aperture.



Lint is preferable to sponge, as being more easily removed; the sponge swells, and is apt to produce inconvenience. The plug must be well proportioned to the opening; if too large, it cannot be lodged in its situation; if too small, it does not fill it, and may be pulled through altogether. It should be smaller, of course, for young subjects and females than in adult males. It may be necessary to close both in this manner, when both are bleeding profusely, or when they communicate through an aperture in the septum. The anterior cavity is then closed with lint, and the hæmorrhage, however violent, is completely commanded. The posterior plug is removed on the second or third day by pulling the oral extremity of the thread, and, if need be, by pressing through the nostril with a strong probe. Plugging may be required in epistaxis from other causes, when other means, as cold applied to the surface of the body, and astringent injections to the part, have failed; the latter remedy is not much to be depended upon.

The operation for polypus may be repeated when the parts have recovered, and the pain and discharge ceased. Ere then the patient again finds himself unable to propel air easily through the nostril, and on examination, greyish, shining tumours are again visible. The same process of extraction is repeated until all are eradicated. Escharotics may be then applied with some advantage, but must be used with caution, and not of too active a nature; nitrate of silver and the red oxide of mercury are



those commonly employed. But it is questionable whether these applications have any effect in preventing the future growth of the tumours.

The malignant form of the disease, even in a very early stage, is unmanageable; the tumours, if removed, are speedily reproduced, and the fatal termination may be accelerated by the interference. I have removed tumours from the antrum maxillare, and from the frontal sinus; but the parts became soon occupied by morbid growths of a more formidable character than the preceding; the membrane and bone appear to assume a disposition to generate such, and the fungus protrusions cannot be kept down with eschorotics, nor with the actual cautery; nor, after free removal with cutting instruments, have escharotics, however freely applied, any effect in preventing the inherent disposition to the disease, and preventing its recurrence.

The antrum, when filled with such tumours, is easily laid open. The cheek is divided perpendicularly from over the inferior orbital foramen to the mouth, and the soft parts are dissected from off the bone. The cavity may then be exposed by means of a small trephine: but this instrument is scarcely ever required, the parietes being so softened as to yield easily to the knife; piers or cutting forceps may be useful in enlarging the cavity. By the guidance of the finger, the attachments of the morbid growth are separated with a blunt-pointed bistoury; and a scoop is used to turn out the diseased mass. The root of the tumour is then touched with a red-



hot iron, and by this implement, or by dossils of lint, the hæmorrhage is easily arrested. But such operations, considering the result of those which have been practised, are scarcely justifiable.

It has been proposed to remove the tumour, along with its investment—to separate and dissect out the superior maxillary bone. It is a very severe operation, and one which puts the patient's life in imminent jeopardy, from profuse hæmorrhage or constitutional disturbance. In one case, the surgeon began the operation after having tied the common carotid of the affected side, but, having made the incisions of the cheek and palate, was obliged to desist on account of the violent bleeding; eight days after, the common trunk of the temporal and internal maxillary was tied on the opposite side, and the incisions repeated, but the result was the same; the growth increased, and the patient perished. The disease is very insidious in its progress, and has gained much ground before the patient becomes alarmed and applies for surgical aid. The parietes of the antrum are expanded and softened; the tumour has projected behind through the tuberos process, upwards through the plate of the orbit, or inwards to the nostril; and has contaminated by its presence and contact all the neighbouring parts. Then removal of the maxillary bone, or of all the bones in that side of the face, can be of no service. The disease is seldom if ever seen by the surgeon early enough to admit of any operation being practised with the least chance of ultimate success. At a sufficiently early period, the removal of the bone—of the pari-



etes of the cavity containing, and from which the tumour has grown, must without doubt afford a better chance, and is, in every point of view, to be preferred to the old operation of what was called trephining the antrum. I have seen the operation performed for this soft and malignant growth; portions of the bone and tumour crumbled under the fingers of the operator—the operation was harsh, painful, and appalling—the case hopeless. Execution of the manual part is not attended with serious difficulty, and it can seldom be necessary to tie arteries previously. To expose the bone, the cheek is divided from the angle of the mouth to the origin of the masseter, and a second incision made from the inner canthus to the edge of the upper lip near the mesial line, detaching the alæ of the nose from the maxillary bone.

The flap of the cheek thus formed is dissected up, and the nasal process of the maxillary bone and the body of the os malæ are divided with a saw, or with strong cutting pliers. An incision having been made through the covering of the hard palate, near the mesial line, a small convex-edged saw is applied to the bone; and the alveolar process is cut through by the pliers, after extraction of the middle and lateral incisors. The bone is then pulled downwards and forwards, and its remaining adhesions separated by means of the knife or pliers. This last part must be accomplished rapidly, so as to reach the vessels, and arrest the hæmorrhage. During the progress of the operation, cut branches of the facial and temporal are commanded by ligature or pressure, and the vio-



lence of the hæmorrhage is moderated by pressure on the carotids. After removal of the bone, the deep vessels, branches of the internal maxillary, are secured either by ligature, or by firm pressure with charpie or dossils of lint. The facial flap is replaced, brought together over the charpie by which the cavity is filled, and united by interrupted or convoluted suture. Cures by such proceedings, in such cases, are reported; the patients do not always die immediately after the operation; but there is reason to complain of want of candour as regards the ultimate result.

The disease, it is said, has been arrested by ligature of the common carotid; the allegation is not borne out by facts, nor is it easy to discover on what principle the practice was adopted. Such a result is not to be expected *a priori*, nor to be believed without farther trial; and these trials are not likely to be made.

The antrum is liable to become the seat of other tumours beside the preceding. It may be occupied by osteosarcoma, commencing either there, or in the alveoli and extending upwards. The tumour feels hard, as if bony, is evidently circumscribed, and presents the usual characters of osteosarcoma in other situations. It has not that disposition to involve neighbouring parts, hard as well as soft, but may remain long without extending farther than the superior maxillary bone, and occupying only a part of it. In such a case, excision of the maxillary bone is warrantable, and ought certainly to be performed; for when



the disease is seen early, there is no risk of the parts being extensively contaminated, and though the morbid growth is not of inveterate malignity, yet it cannot be considered benign, and if allowed to remain may degenerate into one of a worse character. Though not uncommon in the lower jaw, it is rare in the upper. I have only met with one instance of it in the latter situation. The patient was a female, about twenty-five years of age. The tumour was of four years duration, and its origin was attributed to a severe bruise of the cheek. The teeth had loosened soon after the injury, and the disease commenced in the gums. When she applied, there was a hard prominent swelling in the forepart of the maxillary bone, and a firm tumour involved the gums on the same side, and a part of the hard palate: the disease had made much progress during the previous six months, but was evidently not of so malignant a nature as the soft tumours which originate in, or early involve, the cavity of the antrum: at first it had been of the nature of epulis. I removed the bone in the same way as already described, and had the satisfaction to find the disease completely taken away. The hæmorrhage was restrained by compression behind the angle of the jaw during the incision, and not more than  $\bar{z}$ iii of blood were lost. The bone, when cut into, presented the appearances of genuine osteosarcoma; at one or two points, softening had begun, and pus been deposited. The external wound healed by the first intention, and the internal cavity granulated kindly. The patient remains perfectly free of



disease, and bears little mark of so serious a disease or severe operation.

*Of Inflammation, Abscess and Ulceration of the Nose, and Cavities connected with it.*—Inflammation may be excited in the nose by external injury, as a bruise, or fracture, or displacement of the bones. The acute symptoms are swelling and discoloration of the integuments, turgescence of the schneiderian membrane, which covers the septum naris and the turbinated bones, and consequent obstruction to the passage of air. Unless active measures are pursued, abscess follows, with greater swelling and obstruction; and extensive loss of substance, with deformity, may ensue. Unless the acute symptoms, the short duration of them, and the rapid supervention of tumour be considered, the swelling may be mistaken for polypus.

The septum suffers more than other parts of the nose, from the concussion produced by a blow, and is in general more seriously affected by the morbid action which is induced. Matter is effused beneath the membrane, in one or both sides, usually in both, and tumours are thereby formed, which project into the cavities of the nostrils; when attentively examined, fluctuation is felt, and if the affection has existed for a considerable time, the abscesses are found to communicate with each other, the septum having been absorbed or necrosed at one or more points.—An individual received a severe blow over the extremity of the ossa nasi, and a slight wound was produced. The breathing soon became obstructed,



by swelling in the nostrils, and great pain in the part was complained of. A large tumour formed on the septum, and completely filled the cavities; it was opened, and a great quantity of matter evacuated. The septum was destroyed by ulceration to a considerable extent, and a slight falling down of the middle of the nose followed. Such cases are of common occurrence.

Independently of any vice in the constitution, *ulceration* of the nostrils may be induced by injury, and proceed until great ravages are effected, if the treatment be not properly conducted.—A young gentleman, playing at ball, was struck accidentally on the nose with the flat part of his companion's hand. Inflammation took place, externally and internally, and the passage of air was obstructed; abscess formed, and the matter was evacuated spontaneously; extensive ulceration ensued; the cartilage and bone became affected, portions of them separated, and a bloody foetid sanies flowed from the nostrils. All the cartilaginous, and part of the bony septum were destroyed; the morbid action ceased after having continued for a long time; but the organ was curtailed, sunk on the face, and altogether much deformed.

The alæ, as well as the septum, may suffer from external injury, indeed the whole cartilaginous part of the nose may be destroyed.

Incited action must be subdued by abstraction of blood from the external parts, or from the schneiderian membrane, leeches being applied in sufficient numbers, and repeated. Should suppuration not be



prevented, the abscess, particularly when internal, must be early opened; the surgeon is to blame, if the patient, having been under his care from the first, sustains any deformity. If abscess has formed on both sides of the septum, each must be opened freely; afterwards hot fomentations are to be used, and the cavity should be frequently cleansed by the injection of a bland and tepid fluid.

*Intractable ulceration* of the nostrils, is often induced by trifling irritations or injuries in constitutions, either originally unsound, or rendered so by imprudent conduct; slight blows on the prominent part of the organ produce swelling with discoloration, and that is followed by abscess and ulceration. Internal ulceration is frequently caused by the continued use of snuff, or the presence of other irritating matters,—by irritation communicated from diseased gums or alveoli, or from decayed or crowded teeth, particularly the incisors of the upper jaw—by stumps in any part of the mouth, or the pivoting of artificial teeth on them—by introducing the dentist's perforator, with a view of destroying the nerve of a tooth. I have seen ulceration, and loss of substance, arising from each and all of these causes.

The ulceration occasionally commences, even in young subjects, in a wart or fissure on the integuments of the nose or upper lip; it thence extends to the alæ and floor of the nostrils; the cartilages, and even the bones, are destroyed; the discharge is thin, acrid, bloody, and foetid, and the action is with much difficulty controlled. The disease is met with of various degrees of severity and malig-



nancy ; it may cease spontaneously, may appear to be arrested by constitutional and local treatment, or, resisting all means employed against it, goes on consuming portions of the face, both hard and soft ; destroying the nose, lips, and eyelids, and ultimately the bones in their neighbourhood. Horrid cases are occasionally met with, in which scarcely the vestige of a feature is discernible—the patient is nourished, and life, which cannot be enjoyed, is protracted by food conveyed over the root of the tongue, through funnels or tubes. *Noli me tangere*, and *lupus*, are names applied to the advanced stages of the disease.

*Ozæna*, which denotes the internal ulceration of the nose, or rather the discharge indicating such, is generally of long continuance. The discharge is at one time profuse, at another scanty ; sometimes it ceases almost entirely, but the accompanying fœtor, of a most disgusting nature, is still perceptible on approaching the patient, or coming within the influence of the air expired over the diseased surface ; the stench is particularly offensive when portions of bone are separating. The bones may die either from inflammatory action in them running high, or from being uncovered and deprived of support by ulceration of the investing membrane. In many cases, the disease is not arrested till the cartilaginous and bony septum, the turbinated bones, the hard and soft palate, and frequently the alveoli, are completely destroyed. The patient, if he live, is in a miserable plight ;—his countenance is deformed and ghastly ; the situation of the nose is occupied by a large dark



and foul sore ; the discharge is profuse and weakening ; the expired air is as a pestilence to himself and those around ; speech is almost unintelligible ; breathing is difficult ; the strength is gradually exhausted ; and the spirits sink under the harrowing impression of misery. All these ills result more frequently from the injudicious employment of mercurial preparations than from any other cause. In almost every instance, the predisposition to such frightful ulcerations has been induced by the use of mercury, and can readily be traced to it. Exposure to atmospheric changes, during or after the exhibition of mercury, may render the mucous surface and the coverings of the bones more susceptible of the disease ; that medicine may be given with the utmost precaution, but for long after the constitution cannot shake off its influence ; and too frequently more of the poison is administered for disease produced by it. Ulceration of the tonsils, and other parts in the fauces, often co-exist with disease of the nostrils.

Ulceration of the nostrils is arrested with difficulty. It cannot be expected to cease till dead parts have separated, become loose, and fall out, or are removed by art. Portions of the bones, forming the floor of the nostril, can often be removed, when dead, through ulcerated apertures in the palate ; whilst others are brought away through the nostrils, there being generally sufficient space allowed for their discharge—the nasal cavities being laid into one by destruction of the columna, and more or less of the septum. Occasionally the ossa nasi, or parts of them, escape



through an opening in the superimposed integuments; sometimes they cannot be discharged otherwise, as in the following case:—Matter had come to the surface over the nasal process of the frontal bone, an incision was made for its evacuation, sequestra were found loose, and some extracted; one was pushed down with the view of pulling it through the nostril, but this was found closed from the effects of smallpox.

Various applications to the ulcerated cavities are employed. Injections of spirituous and aromatic lotions are used to wash away the discharge and correct the foetor, as diluted tincture of myrrh, tincture of aloes, a lotion of the sulphate of zinc, solutions of the chlorates of lime or soda, &c. Applications, soothing or stimulant, are made to the exposed sores according to their appearance and disposition. When the ulcer is of an angry and irritable aspect, it is to be touched lightly with the nitrate of silver, in substance or solution, and then covered with a bread and water poultice. Fowler's solution of arsenic is useful in some cases, when the object is to clean or destroy the surface; this is also effected by a slight application of the potass. Black wash sometimes agrees well, as also a liniment of olive oil and lime-water, with citrine ointment (three parts of the former ingredients to one of the latter), or the sulphate of zinc lotion. When the sore is very indolent, showing no signs of granulation, it may be touched occasionally with spirit of turpentine, either pure or combined with alcohol, and afterwards covered with an ointment composed of ung. ceræ and spir. terebinthinæ; under this ap-



plication ulcers often heal, after having resisted all others. But nitrate of silver applied gently, and repeated at the interval of two or three days, will, in the majority of cases, be found the most efficient remedy. Constitutional treatment must not be neglected. When the disease cannot be traced to mercurial action, small doses of the muriate of mercury are allowable when excitement is required. The arsenical solution given internally sometimes produces good effects. In foul internal disease of the nostrils with cachexia, no medicine exerts so beneficial an influence on the general health and local disease, as sarsaparilla, exhibited either in decoction, in extract, or in powder. The solid extract is the preferable form, and is given either amongst milk, in substance as a bolus, or dissolved in water or in distilled aromatic water.

Loss of substance, from ulceration or injury, is repaired by surgical operation. A portion of integument is borrowed from some other part, and by the adhesive process is made to cover and supply the deficiency. Such operations were contrived and practised by Sicilian and Italian surgeons some centuries ago, and were revived in our day in Germany. The integument was borrowed from the upper part of the forearm; it was not applied immediately, but was detached gradually, and allowed to thicken, to change its consistence, and to become more vascular, previously to its adaptation to the mutilated organ. When considered sufficiently prepared, it was shaped so as to fit accurately, though still remaining attached at one point to the arm; the cicatrized edges of the



deficient parts were then made raw, and the new substance was affixed by suture; the original attachment was preserved entire, and the patient kept in a constrained position—the arm and head being approximated and bound together by apparatus—for many days, till union occurred. Then the flap was separated entirely, and the new nose moulded into its proper form, by subsequent paring and compression.

The Rhinoplastic operation, introduced from India—where from time immemorial it has been practised by one of the castes—has superseded the preceding, and is variously modified. It is less difficult in execution, not so liable to failure, and more easily undergone by the patient. The same preparation of the flap is not required, though it is said that the Indian operators are in the habit of previously pummelling, with the heel of their slipper, the integument to be used for the new nose, so as to excite the circulation and produce thickening; from the similarity of texture in the integument of the face, its application to a new situation is not much observed.

The apex and alæ can be readily repaired by a flap of proper shape and dimensions from the forehead. The cicatrized edges where the nose formerly rested, must, in the first place, be dissected off pretty deeply, so as to be prepared for the attachment of the new appendage. The size of the lost organ, and the dimensions necessary for its replacement, are then to be taken into consideration. It is recommended to make a mould in wax of the

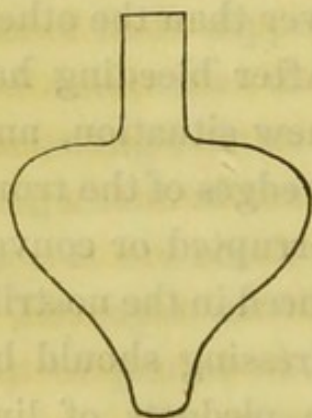


part, and after flattening it out, to use it as a guide for the incisions. But a piece of card or soft leather is more convenient; this having been cut of the proper size and form, is laid down on the forehead, the part representing the root of the nose resting between the eyebrows. It is held firmly by an assistant, whilst the surgeon traces its dimensions with a knife carried deeply through the integuments. The pattern is then removed, and the flap dissected down, being laid hold of with the finger and thumb, or with a hook. It is then twisted round, the lower part being left undisturbed. This attachment at the root of the nose may be narrow and long, so as to admit of its being twisted, but it is not to be left thin; it must embrace the fibres of the corrugator supercilii, so that its vascular supply may be abundant. The incision on the side to which it is proposed to make the turn may be brought a little lower than the other, so as to facilitate the twisting. After bleeding has ceased, the flap is applied to its new situation, and retained in apposition with the raw edges of the truncated organ by a few points of interrupted or convoluted suture; a little oiled lint is placed in the nostrils to support the flap, but no other dressing should be applied. To cover the part with pledgets of lint smeared with ointment, and adhesive strap, can answer no good purpose, and the subsequent removal of such might endanger the adhesion. The attention must now be directed to the wound of the forehead; the lower part is easily brought together, and retained by a stitch; thereby the whole surface is



diminished, and what remains will soon be repaired by granulation. The operation should not be performed in very cold weather, and even in summer the patient should be enjoined not to leave his chamber. The lint may be removed in three or four days, and then, too, some of the stitches may perhaps be dispensed with. The flap will be found adherent, but loose, and raised by every expiration; very soon granulations rise from the inner surface, the part derives support from below, and becoming firm, preserves its form well. It will be necessary during the cure to keep the nostrils of their proper size and shape, by means of well fitted tubes.

Nothing has as yet been said of the columna. In the Indian operation it is provided for by a slip purposely brought down from the forehead, and attached to the point which the root of the original columna

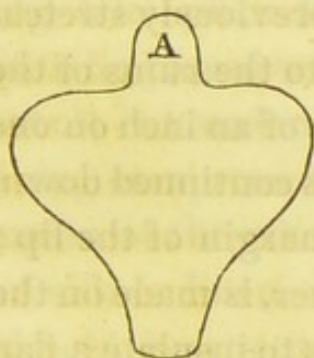


occupied. Their flap is of this shape. In the greater number of foreheads, an encroachment must be made on the hairy scalp, in order to obtain this part of the flap; and after bringing it down and ingrafting it into the lip, there is a risk of its not adhering, as happened in a case on which I operated some years ago. Besides, during the healing of the internal surface, it will be difficult to prevent it from shortening, and turning inwards upon itself, and thus pulling down the apex of the nose. In the case to which I alluded, a columna was made, after consolida-



tion of the rest of the organ, from the upper lip, as will be immediately explained ; and in again performing the operation for restoration of the whole nose, I should proceed on the plan of taking only a flap sufficient for the apex and alæ from the forehead, and should borrow the columna from the lip. In this way the risk of failure will be diminished, and the form of the lip materially improved. The columna might be provided at the same time with the other parts ; but it would be more advisable to delay this part of the operation till a few weeks after adhesion of the other flap has been perfected.

Since writing the preceding observations, I have in several instances performed the operation according to the plan here proposed, and with the most perfect success. The form of the nasal flap was this. The projection A was made in order to be turned down, so as to form the tip of the nose ; as well as to constitute a convenient attachment for the columna, which was subsequently to be made.



In separating the connexion with the forehead, a thin wedge-like portion is removed, and the raw surfaces, after the cessation of bleeding, are laid in apposition, and retained by gentle compression. But this should not be done till the new nose is consolidated and perfect.

Restoration of the columna is an operation which, in this, and other civilized countries, must be more frequently required than the restoration of the whole



nose. This latter operation came to be practised in consequence of the frequency of mutilations as a punishment ; the punishment for some of our sins is left to nature, and she generally relents before the whole of the organ disappears. The column is very frequently destroyed by ulceration, a consequence, as before stated, of injury or of constitutional derangement. The deformity produced by its loss is not far short of that caused by destruction of the whole nose. Happily, after the ulceration has been checked, the part can be renewed neatly, safely, and without much suffering to the patient. The operation which I have for some years practised successfully, and in many instances, is thus performed :—The inner surface of the apex is first pared. A sharp-pointed bistoury is then passed through the upper lip, previously stretched and raised by an assistant, close to the ruins of the former columna, and about an eighth of an inch on one side of the mesial line. The incision is continued down, in a straight direction, to the free margin of the lip ; and a similar one, parallel to the former, is made on the opposite side of the mesial line, so as to insulate a flap composed of skin, mucous membrane, and interposed substance, about a quarter of an inch in breadth. The frænulum is then divided, and the prolabium of the flap removed. In order to fix the new columna firmly and with accuracy in its proper place, a sewing-needle—its head being covered with sealing-wax to facilitate its introduction—is passed from without through the apex of the nose, and obliquely through the extremity of the elevated flap : a few turns of



thread suffice to approximate and retain the surfaces. It is to be observed, that the flap is not twisted round as in the operation already detailed, but simply elevated, so as to do away with the risk of failure. Twisting is here unnecessary, for the mucous lining of the lip, forming the outer surface of the columna, readily assumes the colour and appearance of integument, after exposure for some time, as is well known. The fixing of the columna being accomplished, the edges of the lip must be neatly brought together by the twisted suture. Two needles will be found sufficient, one being passed close to the edge of the lip; and they should be introduced deeply through its substance; two-thirds, at least, of its thickness must be superficial to them. Should troublesome bleeding take place from the coronary artery, a needle is to be passed so as to transfix its extremities. The whole cut surface is thus approximated; the vessels being compressed, bleeding is prevented; and firm union of the whole wound is secured. The ligature of silk or linen, which is twisted round the needles, should be pretty thick and waxed; and care must be taken that it is applied smoothly. After some turns are made round the lower needle, the ends should be secured by a double knot; a second thread is then to be used for the other needle, and also secured. With a view of compressing and coaptating the edges of the interposed part of the wound, the thread may be carried from one needle to the other, and twisted round them several times; but in doing this, care must be taken not to pull them



towards each other, else the object of their application will be frustrated, and the wound rendered puckered and unequal. Last of all, the points of the needles are to be cut off with pliers. No farther dressing is required; as previously remarked, no good end can be answered by any application, and the separation of dressing may afterwards be troublesome; discharges from the neighbouring passages are retained by it, foetor is produced, and union interrupted. The needles may be removed on the third day; their ends are cleaned of coagulated blood, and, after being turned gently round on their axis, they are to be cautiously withdrawn, without disturbing the thread or the crust which has been formed about them by the serous and bloody discharge. This often remains attached for some days after removal of the needles, and forms a good protection and bond of union to the tender parts. Some care is afterwards required from the surgeon and patient in raising up the alæ, by filling them with lint, and thus compressing the pillar, so as to diminish the œdematous swelling which takes place to a greater or less degree in it, and to repress the granulations. It is besides necessary to push upwards the lower part of the column, so that it may come into its proper situation; and this is done by the application of a small round roll of linen, supported by a narrow bandage passed over it and secured behind the vertex.

Independently of the great improvement produced on the patient's appearance by the restoration of the lost part of so important a feature, it may be ob-



served, that, when the columna has been destroyed, the lip falls down, is elongated, and becomes tumid, particularly at its middle, so that borrowing a portion from it materially ameliorates the condition of the part; and the cicatrix being in the situation of the natural fossa, is scarcely observable.

The alæ of the nose, deficiencies in the upper, anterior, or lateral parts of the organ, in the forehead, &c. may be supplied from the neighbouring integument, on the same principle as the preceding repairs.

The integuments covering the apex and alæ of the nose are sometimes opened out in texture by interstitial deposit, forming a lipomatous tumour, lobulated, discoloured, and intersected by fissures. The sebaceous follicles are enlarged enormously, so as to admit the point of a quill. Turgid veins ramify superficially; and the surface is of a reddish blue or a purple colour, varying its hue from time to time, according to the state of the health, and the changes in the circulation. The enlargement often attains great magnitude, producing much deformity. Vision is obstructed, and the introduction of food, both solid and liquid, interfered with: the lobes tumble into the wine-glass, spoon, and cup, and sometimes they are so elongated as to require being pulled aside in order to uncover the mouth. Breathing is also impeded more or less, by encroachment on the nasal orifices. The disease may be often attributable to hard living; but many, not intemperate, labour under it.



It is desirable to have the tumour removed, even before it has become large; and it can readily be conceived that local applications must fail in bringing the skin into a healthy condition. Incision is required. If both sides of the nose are affected, a small scalpel is carried down in the mesial line through the altered structure, and, whilst an assistant places his finger in the nostril, the surgeon lays hold of the integument with a sharp hook, and carefully dissects away the diseased parts, first on one side, and then on the other. The vessels are then tied, and sometimes a considerable number bleed smartly; oozing may continue, but is readily suppressed by continued pressure, the nostrils being well stuffed. Afterwards such dressings are to be employed as agree with the stages of the sore. After cicatrization, the comfort and appearance of the patient are much enhanced: and there is no risk of reproduction—the disease is of the skin, and all affected has been removed.

*Inflammation of the antrum maxillare*, is occasionally met with; but the surgeon is more frequently called upon to treat the consequences of the action. The symptoms of inflammation of the antrum are violent throbbing pain, referred to the part affected, to the temple, and to the teeth implanted in the alveolar processes that form the lower part of the cavity; the side of the face is swelled from infiltration of the soft parts, and the schneiderian membrane of the corresponding nostril is generally observed red and swollen. The affection can frequently



be traced to exposure to cold ; it may be the result of external violence ; but is usually an extension of disease in the sockets of decayed teeth. Unless active and early measures are taken to subdue the inflammatory attack, the antrum becomes distended by increased and vitiated discharge from its lining membrane. The swelling of the cheek becomes more apparent, since, to increased infiltration of the soft parts, enlargement of the cavity is superadded. The membrane covering the small aperture through which the antrum and nostril communicate, partakes of the general thickening, and thus no outlet is left for the accumulating fluid. The escape of matter from the nostril, on the head being turned to the opposite side, has been laid down as an indication of accumulation or abscess in the antrum ; the statement is incorrect, and is a result of surgery being professed by those who have not practised it, but judge of morbid states by the healthy condition of parts. In the skeleton, fluid no doubt will run over from the osseous shell, in some positions of the scull ; but it cannot escape from the cavity when covered with membrane, and that membrane subject to vital actions. In short, the symptom is not observable in the disease in question. Extensive ulceration of the parietes of the antrum towards the nose may take place, as a consequence of the accumulation, and the matter may then escape by the nostril, if not allowed an exit otherwise ; but such is not a common occurrence.

In general, the cavity is considerably enlarged before the matter comes to the surface. If not interfered with, it usually escapes through the sockets of



decayed teeth, or, the anterior thin parietes being absorbed, comes down by the side of the canine or small molar teeth, and is discharged slowly, so as to annoy the patient by its flavour and fœtor, without the abscess being emptied, or a chance of cure afforded.

Accumulations of fluid sometimes take place in this cavity, give rise to great enlargement of the sinus, and continue for many months, without pain or much inconvenience, and without any matter escaping. The bony parietes are attenuated, yield to slight pressure, and return to their original level with a crackling noise, such as is produced by parchment. The contained fluid is thin, greyish, and contains flocculent solid particles. In short, the antrum maxillare is occasionally the seat of chronic, as well as of acute abscess.

Cancerous ulceration sometimes takes place in the cavity; the matter is not long confined, the parietes soon soften, the teeth drop out, the alveolar processes disappear, and a large opening is formed, which furnishes a fœtid, sanious discharge.

In inflammation of the antrum, carious teeth must be removed, blood abstracted from the neighbourhood of the affected part—leeches being applied to the gums, the schneiderian membrane, and the integuments—and fomentations to the cheek should be frequently and assiduously employed. When the cavity has become distended with fluid—mucous, muco-purulent, or purulent—such must be evacuated without delay; and the opening must be of such size, and so situated, that the fluid may escape as soon as secreted. In removing diseased or crowded teeth opposite the



part, an opening may be made from the extremities of the fangs having projected into the cavity ; it is in a good situation, but cannot be made of sufficient size ; an aperture of but small extent may be sufficient for the draining of an abscess in soft parts, but here the divided texture is unyielding, and the perforation must be free. Bad teeth are taken away with the view of abstracting a source of irritation which may give rise to, keep up, or induce a return of collection in the antrum ; but extraction of sound teeth, to obtain an exit for the matter, is not warrantable. Even when they are extracted for a different reason, and discharge of matter follows, the surgeon must not be contented, but must make another and more efficient opening. The membrane of the mouth is to be divided on the forepart of the maxillary bone, immediately above the first small grinder, and a large perforator then pushed into the antral cavity ; little force is required, for the parietes are soft and partially absorbed. The perforation should be of a size sufficient to admit the little finger ; thereby a free and dependent exit is allowed for the concrete as well as the fluid matter. If the discharge is very foetid, and long of drying up, and if there is an appearance of disease in the osseous parietes, injections into the cavity may be required, though seldom. In general the discharge gradually diminishes, the membrane of the antrum resumes its healthy condition and functions, and the aperture in its parietes is shut by a fine ligamentous substance.

*Ulcers of lips.*—The prolabium is liable to ulcera-



tion from various causes ; from long continued irritations, as sharp corners of teeth, rugged tartar on the external surfaces of the teeth, the habitual use of a short tobacco pipe ; from external violence ; from the application of acrid matter ; or from an ulcerative disposition unconnected with external circumstances. The constant and free motion of the parts is prejudicial to healing, and consequently the sores often remain long open. Though ulcers on the lips are generally of a bad character, it does not follow that all are so. Many are simple ; but these after remaining long are apt to degenerate. Others from the first assume malignant action, and unfortunately they are more frequently met with than simple and well-disposed sores. The malignant sore often commences in a warty excrescence which ulcerates at the base ; the ulceration extends, the warty appearance is succeeded by ragged and angry fleshy points, the surrounding parts become indurated and the stony hardness spreads. The appearance which the sore presents is that of open cancer, described at page 187, Part I. The ulceration may either be limited in depth and extent to a small part of the lip, or may involve the greater part of the prolabium, and that without much induration. It is generally situated on the right side of the lower lip ; sometimes in the angle of the mouth ; the upper lip is rarely affected. I have removed a few malignant ulcers from this last situation. Sooner or later the lymphatic glands participate in the disease ; a chord of indurated lymphatic vessels is felt passing over the jaw in the course of the facial artery, and the glands with which



these are more immediately connected soon enlarge and become hard. Indurated swellings over the jaw, lymphatic or not, usually depend on the labial disease; they in some instances increase very slowly, in others acquire such volume as to induce by their pressure on neighbouring parts alarming and dangerous symptoms at an early period. Without much increase of size they sometimes attach themselves firmly to the bone, and involve it in the disease. The malignancy seems then to acquire fresh virus, the skin ulcerates with fetid discharge, all the neighbourhood is speedily infected, and the patient sinks slowly under the evil.

Simple ulcers of the lips may be made to heal readily,—by abstracting the exciting cause, preventing motion of the lip by the restraint of a bandage, disusing the part as much as possible, and by employing such applications to the sore as are best suited to the character and appearance which it may present; but it must be borne in mind that all remedies can be of little service unless motion of the lip be prevented. Sores of a bad kind must be attacked early, otherwise no hope of success can be entertained. Escharotics are not to be trusted to; the knife is the only effectual means of removing the disease. When the sore does not involve much of the lip, the cheeks are in general flabby and relaxed, particularly if the molar teeth have been lost: in such circumstances, all the diseased part is taken away with facility, and the features are not deformed thereby but rather improved. The part cut away resembles the letter V, the angle being towards the chin: this form of inci-



sion is preferable, on account of the diseased portion being chiefly in the prolabium, and the parts afterwards coming together very neatly and readily. The lip is stretched by the operator and his assistant laying hold of the prolabium on each side of the portion destined to be taken away; a narrow straight bistoury is passed through the lip, at the angle of the form of incision, and the operator, standing in front of the patient, makes the first incision towards himself, by bringing the knife up to the prolabium. He then takes hold of the part to be removed, and laying the edge of the knife on the prolabium at the other side of the induration, cuts down to the point where the instrument originally entered. The incisions must always be made far from the indurated parts. The edges of the wound are retained in apposition by means of convoluted suture, as formerly described. When the wound is extensive, as when a considerable part of the cheek is involved, approximation may be accomplished by a few points of interrupted suture, and afterwards the parts may be more securely and accurately fixed by convoluted sutures placed between the interrupted. When a large portion of the cheek is removed, as for disease which had commenced at the angle of the mouth and extended around, all the parts cannot be brought into contact, and some of the deficiency remains to be filled up by granulation. The neighbouring parts stretch, and the deformity that may be the immediate result of the operation, in a great measure disappears after some time. In cases of superficial and malignant ulceration of great extent, no attempt can be



made to bring the parts together after excision ; great deformity, and almost total closure of the mouth, would be the consequence. The diseased parts must be freely removed (for this is the primary and essential part of the operation, all other considerations yielding to it,) and the deformity will prove much slighter than might be supposed ; granulations arise, and considerable reparation of the lost parts thence ensues. Still there is a risk of the sore, at first healthy and active, gradually assuming the nature of that for which the incisions were made.

It may be necessary to remove the whole lip, or the greater part of it. Hence arises much inconvenience to the patient ; he is much reduced by the profuse secretion and loss of saliva ; the surrounding parts are excoriated and irritable ; his clothes are wetted ; his speech is very indistinct ; his teeth become thickly coated with tartar ; and he is in short kept in a state of constant annoyance. The part may be supplied from under the chin ; but this reparative operation should not be performed at the same time with removal of the original and carcinomatous lip. By making two operations, with a considerable time intervening, the chance of success is greater, and indeed the labour is diminished. After removal of the disease, allow the parts to fill up by granulation and contraction as far as they will, and then form a new lip. I have done so in several instances ; in one case, the parts had perished by external violence, in another, they had been destroyed by some powerful escharotic. A piece of leather, of the size and shape of the under lip, is placed under the chin, and a cor-



responding portion of the integuments is reflected upwards, a thick attachment being left at the symphysis menti. The callous margins of the space formerly occupied by the original lip are pared; and the flap, having been twisted round, is adapted to the edges of the wound, and retained by points of interrupted or convoluted suture. To insure adhesion, the attachment at the chin should be left thick and fleshy, and the flap should not consist of mere integument, but contain no small share of the subcutaneous cellular and adipose tissues, in order that circulation may be vigorous in the part. The integuments below the chin are naturally loose, and consequently the margins of the wound there are readily approximated. The flap soon becomes œdematous, and remains so for some days; it must be supported by a compress and bandage. After adhesion of its upper part is completed, the mental attachment, which prevented the lower portion from uniting, is to be removed; a bistoury is introduced beneath the non-adhering point, and carried down so as to divide the attachment, which is then removed by a second stroke of the knife. The lower part of the flap is now laid flat and close to the chin, and supported by a bandage. In the adult, union may be retarded by the edges of the flap twisting inwards, and interposing their beard between the opposed surfaces; when such is the case, the offending margins must be pared away. The advantages of such an operation, when successful, are too evident to require detail.

Removal of glands in the neck or beneath the jaw that have become diseased in consequence of malign-



nant disease in the lip, is attended with danger, and not followed by any benefit. But for this disease I have known most bloody and cruel operations undertaken, even portions of the jaw to which the glandular tumours adhered have been cut out. Such proceedings cannot be too strongly reprobated.

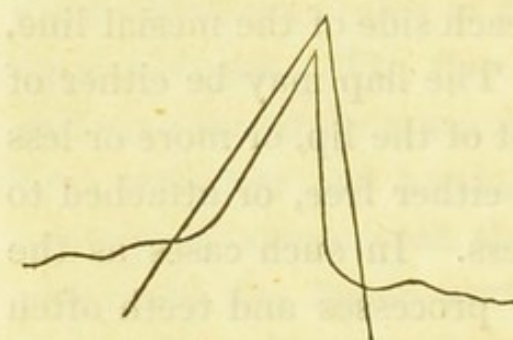
*Congenital Deficiencies of Lips, Palate, &c.*—Congenital deficiency of the lip uniformly occurs in the upper one; it is either simple or complicated. Frequently there is only a fissure on one side of the mesial line. This may, though seldom, be combined with division of the soft or of the hard palate; or there may be a fissure on each side of the mesial line, with an intervening flap. The flap may be either of the same length as the rest of the lip, or more or less shortened; and it may be either free, or attached to part of the alveolar process. In such cases as the latter, the central alveolar processes and teeth often project considerably beyond the arch of the hard palate, greatly increasing the deformity. The deficiency of the lip produces a disgusting and horrible deformity of the countenance; and when there is division of the palate, the voice is indistinct, or almost unintelligible.

The simple fissure of the lip, without deficiency of the palate, is easily remediable by operation. As already mentioned, the fissure is to one side of the mesial line; and its edges, covered by a continuation of the prolabium, are rounded off at their lower part. The operation is not attended with much loss of blood, nor is it very painful. It can be performed at any



period of life, but in young children it is not advisable to have recourse to more severe operations on these or other parts. Children bear the loss of blood badly, and their nervous system is apt to be shaken; convulsions are induced, and often terminate fatally. The most proper age for removing deformity by operation is from two and a half to four years; there is then no danger incurred, and during the growth of the individual the parts recover more and more their natural and healthy appearance.

The operation for single harelip consists in paring off freely the edges of the fissure, and removing completely the rounded corners at the free margin, thus.

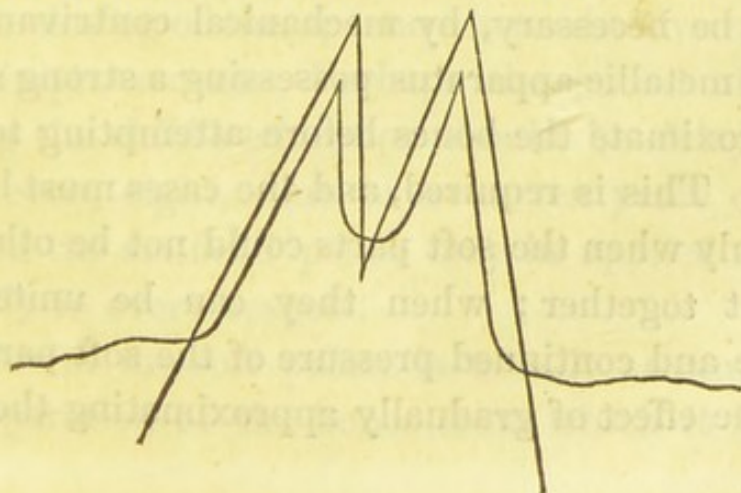


This is most neatly, quickly, and easily accomplished by passing a straight bistoury through, from without inwards, so as to penetrate the membrane of the mouth, above the angle of fissure. The parts are stretched by the fingers of the assistant, whilst the instrument is carried downwards so as to detach a flap composed of the edge and rounded corner. Unless the rounded portions are taken clean away, an unseemly notch is left in the prolabium, where in the natural structure it is prominent. A similar proceeding is followed on the opposite side. Hæmorrhage is prevented by the assistant making gentle pressure whilst he stretches the lip. Two sewing needles, the heads covered with a small nodule of sealing wax, are introduced as directed after the operation for removal of diseased parts in the lower



lip, and the twisted suture completed. One needle should always be passed close to the free margin of the lip. No further dressing is required, for reasons already assigned. The forceps of different kinds for holding the edge during its removal are worse than useless; and paring with scissors is to be reprobated, as an effectual means of preventing immediate union. By the plan above recommended, bruising is avoided, and union takes place rapidly.

Fissures, more or less extensive, of the hard palate, generally attend double harelip. The position and size of the intermediate portion of the lip, and of the superior maxillary bone, are various; and the operator, in forming his plan of procedure, must be guided by the state of the parts. If the fissures are not very wide—if the intermediate portion of bone, that adhering to the septum narium, is not prominent—and if the soft parts covering this are free and long, the operative procedure is simple. Two such operations as are described for single harelip, the latter performed at an interval of some weeks, are all that is required. Thereby the intervening flap is united first to one side, and then to the other.





If the flap is short and free, without osseous projection, the operation may be concluded at once thus. The edges are pared on both sides, and the parts brought together as in single harelip, the small intervening flap not preventing apposition below. One pin is passed at the prolabium, the other traverses the flap.

When the bone projects, and the flap is long, the parts may be rendered favourable for the operation at two different times (mentioned above) by gentle and continued pressure; the osseous prominence being reduced, so as to restore the natural position of the soft parts.

When, as not unfrequently occurs, there is projection of the bone, and the soft and hard parts seem to be incorporated with the apex of the nose—when, in short, little or no intermediate flap exists, the protruding portion of bone may be removed by cutting forceps down to the level of the palatine arch; and then the soft parts can be brought together by one operation, as for single harelip.

In some cases, when the space between the palatine plates of the superior maxillary bone is wide, it may be necessary, by mechanical contrivance, fitting on metallic apparatus possessing a strong spring, to approximate the bones before attempting to unite the lip. This is required, and the cases must be very rare, only when the soft parts could not be otherwise brought together; when they can be united, the equable and continued pressure of the soft parts will have the effect of gradually approximating the hard.



When the hard palate is deficient, the patient is subjected to great inconvenience from food escaping into the cavities of the nose, and, in later life, horrid wretchedness of articulation occurs. It can readily be understood, that surgery is of very little avail here. Recourse must be had to mechanical contrivance. A plate of metal (gold or platina), or a piece of ivory, or of sea-horse bone, may be fitted to the opening, and retained either by accurate adaptation, having sponge or caoutchouc attached to the upper surface, or by wires, elastic or not, resting on the neighbouring teeth. It may be made of a piece with artificial teeth if any are required. The sponge is objectionable, as retaining the discharge, and thereby imparting an unpleasant odour to the expired air. But it is no easy matter, and often altogether impracticable, to retain such apparatus when the soft palate is also deficient. The time at which such contrivance is to be adapted may admit of some dispute. If done early in life, the natural tendency of the parts to approximate may be interfered with and subverted; if dispensed with till a later period, the patient gets into a habit of snuffling and speaking so indistinctly that the closing of the aperture is productive of little or no improvement. Perhaps the period of commencing the child's education should be delayed till he be seven, eight, nine, or even ten years of age, and then the artificial palate may be applied advantageously in every respect.

Fissure of the soft palate is usually accompanied with separation of the bones from which it is sus-



pended. The size of the fissure is various, and depends very much upon the state of the hard parts. In some cases, the extent of separation is great; in others, the edges are readily approximated by making the patient throw the muscles into action. The latter class admit of operation with a view to permanent union of the edges of the fissure. But it is a proceeding which, to insure success, requires not only great steadiness, coolness, and dexterity on the part of the operator, but the utmost courage, submission, and self-denial on the part of the patient. These qualifications can scarcely be expected in patients under 12 or 14; and, by consequence, the operation should not be attempted till after that time of life.

Before proceeding to operate, it should first be ascertained that the fissure is not of such extent as to prevent apposition of its edges, without great dragging of the parts; for, if the separation be wide, temporary apposition may perhaps be effected by ligatures strongly applied, but the apposition will not be complete or accurate throughout the whole fissure, and adhesion will not take place; the palate will be too much stretched, and will throw off the ligatures by ulceration at the transfixed points of its margins. The patient must be made aware of the nicety of the operation, of the responsibility that rests upon himself, and be exhorted to steadiness and patience. A single exclamation of pain may subvert the whole proceedings. He is seated opposite to a strong light, and made to open the mouth wide; if necessary, the jaws may be kept separate by a wooden wedge, placed

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so as not to interfere with the operator. The head is thrown back, and held steadily by an assistant. The operator depresses the tongue by the forefinger of the left hand. A long, narrow, sharp-pointed bistoury, is passed through the velum, close to its attachment with the palatine plate, and about a sixteenth part of an inch from the edge of the fissure : It is then carried downwards to the point of the uvula, so as to detach a narrow slip from the whole edge. The same is done on the opposite side of the fissure. After allowing the patient a short rest, the coagula and mucous are cleaned away from the parts, to prepare for union. Long needles, in fixed handles, and armed, are passed through the pared edges on each side. On one side the ligature is thin, the opposite thick and strong ; the former is attached to the loop of the latter, and withdrawn, leaving the strong ligature passed through both apertures ; and by this the margins are gradually approximated, and retained by a firm knot. A second point of suture, and a third, if necessary, is applied in the same way. Or a single short curved needle may be used. It is introduced by means of a *portaiguille*, with a long handle, and passed through, first from the outside of one edge, and then from the inside of the other. A ligature, either of thread or of pewter wire, can thus be conveyed at once ; if the latter is employed, it is secured by twisting, and the ends cut off by pliers ; the needle is attached to the wire by a female screw in its end.



Afterwards, success depends on the patient. All attempts at articulation, and even deglutition, must be strictly forbidden for three, four, or five days.

*Inflammation* of the Soft Palate, Uvula, and Tonsils, requires little surgical treatment. Reiterated attacks may sometimes be traced to the progress of a wisdom-tooth, or to the presence of stumps in the posterior part of the upper or lower jaw. Perhaps the most common cause is sudden suppression of the discharges from the skin, and from the adjoining mucous surfaces, in consequence of exposure to cold. The affection is accompanied with pain and difficulty in swallowing, and frequent and difficult excretion of mucous. The secretion of the saliva is increased; the attempts to swallow it are frequent, and the inflamed parts being thereby put in motion, the pain is aggravated. From the inflammatory action extending along the eustachian tube, the patient describes the pain as shooting towards the ear. The parts are red, and soon become swollen; in some cases to so great an extent, as to completely prevent deglutition; and occasionally the breathing is impeded, but the inflammatory swelling must be very great indeed, to obstruct the openings into both mouth and nostrils, and thereby threaten suffocation. The voice is hoarse, croaking, and husky, and when the swelling is considerable, the patient speaks only in a whisper. The internal swelling is often accompanied with an external painful tumour of the lymphatic glands, and the pain is much increased by



external pressure. There is more or less concomitant fever, preceded by slight shivering.

Removal of the local cause, and mild antiphlogistic measures, are usually sufficient to effect resolution, and put a stop to the disease. General bleeding will seldom be required; blood is abstracted locally either by scarifying the internal surface, or by applying leeches at the angle of the jaw. Fomentations afford much relief, and may be applied, either externally, or internally by inhalation of the steam of water, or of water and vinegar. The greatest benefit is experienced from this remedy during the early stage, it being employed either to promote salutary effusion and effect resolution, or to forward the secretion of purulent matter. At the same time, antimonials, purgatives, warm drinks, diaphoretics, and the pediluvium, are not to be neglected. In the relaxed state of the parts after subsidence of the violent symptoms, stimulating and astringent gargles may be used with advantage.

But in neglected cases, or those originally violent, suppuration, sometimes extensive and dangerous, occurs in the cellular tissue betwixt the pillars of the soft palate, or betwixt the layers of the velum. The swelling thereby formed may be so large as to impede the passage of air by both the mouth and nostrils. The mouth is opened with difficulty and pain; deglutition is seriously impeded, or altogether impracticable; the voice is weak and indistinct; and the countenance is swollen and discoloured. Life is endangered by the risk of the purulent matter burst-



ing out suddenly during the painful and laborious efforts at respiration, and escaping into the air passages ; fatal results have thus taken place, and to prevent such the abscess should be opened early. When the swelling is large, and attended with alarming symptoms, the matter is most conveniently evacuated by a flat and long trocar and canula. If the abscess be small, and the breathing not affected, there will be no danger in allowing the collection to burst spontaneously. Suppuration may also occur in the external glandular tumour, or in the surrounding cellular tissue. When sloughing to any extent takes place, it is in patients of an extremely debilitated habit of body, or when the affection is attendant on disease of a malignant character. Metastasis may take place to the larynx, to the trachea, or to the lungs, either spontaneously, or in consequence of percussive applications.

*Chronic abscesses* are occasionally met with in these parts, or behind the upper part of the pharynx unconnected with disease of the subjacent bones. The matter must be evacuated as soon as its existence is ascertained. No great accumulation should be allowed to take place in any situation, far less in the immediate neighbourhood of important parts.

*Scarification* of the tonsils and surrounding membrane is seldom required. A lancet concealed in a canula, with a spiral spring to withdraw its point, is used for this purpose, and for opening abscesses ; but dangerous and fatal results may ensue, and have actually followed such incisions of these parts. A sharp instrument directed *outwards*, made to penetrate either



by the rash thrust of an ignorant and careless practitioner, or by a hurried movement of an unsteady patient, may reach the common trunk of the temporal and internal maxillary arteries, or even the internal carotid. The sheathed lancet may be useful in the hands of such as are not habituated to the use of instruments; but scarification of the parts can be effected safely by a straight, sharp-pointed bistoury, covered with a slip of lint to within three-quarters of an inch of its point. The patient's head is steadied by an assistant, the point of the instrument directed backwards, not at all outwards, and its edge upwards so as to avoid wounding the tongue, which is also to be kept out of the way by the forefinger of the left hand.

*New Formations* about the isthmus faucium, are rarely met with. Small warty excrescences, and small pendulous or polypous tumours, are occasionally seen. These, if productive of inconvenience, can be easily removed by cutting instruments.

Enlargements of the uvula and tonsils are common, impeding deglutition, and producing indistinct and burring articulation. If large, respiration is interfered with.

*Elongation and Enlargement of the Uvula* attends inflammatory attacks in the fauces, but may continue for a long time afterwards. The organ is increased in volume, both in length and in breadth, from interstitial deposition of new organized substance, and from unusual vascularity. The inconve-



nient size produces nausea and cough ; and it is said that the tumour has, in some instances, got entangled in the rima glottidis, suffocating the patient, or at least giving rise to the most alarming symptoms. In some cases the elongation appears to have kept up cough and expectoration for years.

The parts may be touched with a bit of sponge, dipped in the tinct. muriatis ferri ; but a more useful remedy is the powder of alum, applied either on a spatula, or by insufflation. Astringent decoctions, or solutions, are of little use. But in cases of large and long continued enlargements, the swelling cannot be expected to subside under such treatment, and recourse must be had to curtailment by cutting instruments, of which the best for this purpose is long blunt-pointed scissors. The patient is made to open his mouth wide; the surgeon then introduces the instrument into the mouth, and watching an opportunity when the uvula is nearly stationary, suddenly clips off a sufficient portion. This is followed by instant relief.

Frequently an œdematous swelling of the uvula, of a crystalline appearance, resembling a large grape, accompanies ulceration in the neighbourhood ; puncturing of the part, and attention to the cause of the affection, are sufficient for the cure. When the blood-vessels of the uvula are in a state of chronic enlargement, scarification is employed with advantage.

*Chronic Enlargement of the Tonsils* occasionally takes place in children, but generally in persons from eighteen to twenty-four years of age, or in such adults



as are subject to irritations in the neighbourhood of the organs. A delicacy of constitution is supposed to be indicated by the affection. One or both tonsils may be enlarged, usually both. The surface of the tumour is irregular; the mucous follicles are enlarged, and often filled with sebaceous matter. The swellings in each side gradually approach each other, meet, and by narrowing the isthmus, seriously interfere with the functions of the parts. Little pain is felt, and that is dull, occasionally shooting through the ear. Respiration is at all times fettered, and during sleep noisy. Occasionally the swellings exceed their usual size, from some accidental excitement of the circulation. They may subside very considerably on removal of the cause, or abatement of its operation, for there is nothing malignant in their nature. It is true, as I have seen, that the tonsils may be involved in malignant disease spreading from the neighbouring parts; but in the affection under consideration, no mark of malignancy appears, as far as I know. There is mere enlargement and opening out of the texture, without much, if any, change in structure or consistence; the part may be cut into without the risk of exciting unhealthy action, and the divided surface cicatrizes readily.

Deobstruents, and iodine, as the most efficient, may be given, with perhaps some effect. In the adult, when the affection is troublesome, permanent, and of long duration, the exuberant matter must be removed; and this is accomplished either by ligature



or by incision. The former method is the more difficult, tedious, painful, inconvenient, and dangerous. It is seldom that one ligature, with a simple noose, suffices; it is necessary to transfix the tumour, and, separating the portions of the ligature, to include the upper and under halves in distinct nooses. The latter method is the preferable. It is not requisite to cut out the whole tonsil, and there is risk in attempting such a measure, but that part only is removed which projects beyond the natural level of the gland. Long curved scissors may be employed, but the straight probe-pointed bistoury is more convenient; and this, to ensure security, may be blunted to within an inch and a half of its point, or rolled so far in lint. To facilitate incision, the tumour is laid hold of by a sharp hook, or what is better, by a vulsellum. Occasionally violent attempts at retching occur during the operation; but there is little pain or hæmorrhage. The healing of the sore is hastened by fomentations and mild gargles, and by either stimulating or soothing applications, as circumstances require.

Excision of the tonsils is said to produce the bad effect of changing the pitch of the voice—taking from the high, and adding to the low notes. I have performed the operation, as above described, on vocalists, to remedy indistinctness of articulation and constant hoarseness, with the desired effect, and without altering either the pitch, quality, or compass of the voice. No doubt, unpleasant results might follow extensive incisions of the parts, as division of the anterior fold of the palate, and removal of the whole tonsil; but



by paring off the prominent parts of the glands, no risk is incurred.

*Ulcers of the Palate, &c.*, are said to have arisen almost uniformly from contamination of the system following sores on the genital organs. Now, at least, they seldom and scarcely ever occur from this cause, unless most execrable practice has been resorted to. Foul and extensive ulcers of the membrane of the mouth, of the tongue, of the gums, and of the folds of the palate, are common in those who have used mercury recently; and those whose constitutions have been saturated with mercury, or who have taken only alterative doses for a considerable time, are for long liable to ulcerations of these parts on exposure to moisture and cold—one set of sores healing, but others soon breaking out. It is, indeed, very rare to meet with sores in these situations that are not thus accounted for: Certainly such as are by recurrence deep, extensive, and troublesome, are not seen unless in those who have suffered from mercurial medicines. Slight excoriations are not uncommon in individuals of the soundest and most untainted systems; but even in very young subjects, if the sore is of considerable size, and slow in healing, it will generally be found that some preparation of mercury, probably calomel, had been given previously, and perhaps without precaution and care. Calomel, as well as other forms of the mineral, is too often and too freely given, and without proper consideration; the ruin of many good constitutions is attributable to this cause,



and to this cause alone. How long mercurial poisons continue to exercise a prejudicial influence on the constitution, is a question not easily determined. In many, its dominion is long and powerful. Frequently its effects are developed years after its exhibition, from accidental circumstances, such as change in the mode of living, derangement of the stomach and its appendages, exposure to inclement weather, change of climate, &c.

Sores form in various situations, between the pillars of the fauces—in the site of the tonsils—on the uvula, and by its side—on the posterior and anterior surfaces of the pendulous velum; sometimes the ulceration appears to have extended from the nostrils. Often the uvula is entirely lost; it is not long since I saw two uvulæ, in one day, as black as a bit of coal, surrounded by ulceration, and just about to drop away. Ulceration of the posterior surface of the velum is marked by dark redness, and swelling of the anterior. Sometimes it happens, that by deepening of the ulcers, the velum is perforated at one or more points, and the edge of the opening healing, a permanent deficiency remains. The whole of the soft palate may be destroyed, either by one extending ulceration, or by repeated attacks. When cicatrization takes place, the posterior nares are narrowed, deformed, or even completely closed. Along with ulceration of the fauces, abscesses frequently form in the coverings of the hard palate; they are either the consequence or the cause of necrosis of part of the bone. Whatever their origin,



more or less of the bone with which the matter is in contact, dies and separates; and thus openings are established between the cavities of the mouth and nostril. This is productive of great inconvenience, the patient speaks very indistinctly, and when taking food, a part of the more fluid ingesta returns by the nostrils. During the progress of the exfoliation, the breath is intolerably foetid.

Such is an outline of mercurial products in the mouth. Eruptions and ulcers on the surface of the body often accompany or follow them; and the patient gets into a bad state of health—becomes cachectic.

The state of the system must be ameliorated if possible; and chiefly by attention to the digestive organs. These may be improved by such medicines as ipecacuan, gentian, rhubarb, scammony, aloes,—given in various doses and combinations, according to the circumstances of the individual case. The first possesses many of the good qualities of calomel, in regard to the biliary secretion, and leaves no evils behind it. Sarsaparilla is a most important remedy, and the form of its exhibition should be varied when its effects begin to diminish. The different applications which may be made to the sores have been mentioned formerly; of them all, the nitrate of silver is the most generally useful, either in solution or in substance. It is used at intervals of two or three days, not to destroy living texture, but to diminish irritability and dispose to heal. If there be no great loss of substance, deficiency in the soft parts may be repaired



by operation after the ulcerative disposition seems to have ceased. In deficiency of the palate—during the progress of the ulceration in the bone and the parts investing it, and for some time after it has ceased—the inconvenience is lessened by filling the opening with crumb of bread softened, and made into a paste by kneading; this must be frequently renewed, otherwise it collects discharge, and becomes offensive. After cicatrization of the margins, and contraction of the opening, a metallic plate may be fitted in.

*Ulcers of the Tongue.*—Such as are not of a malignant kind are readily healed on improving the state of the digestive organs and general health. The state of the organ indicates that of the chylopoietic viscera, it enjoys intimate sympathy with the other parts of the alimentary canal, and why it should suffer from derangements of them is readily understood. The sores may be continued by local irritations, as by friction on encrusted tartar, or sharp or decayed portions of teeth, or by repeated application of heat, as in smoking. In consequence of long continued irritation, like similar ulcers of the lips, they take on malignant action. The malignant ulcer generally occurs in patients past the meridian of life. Yet I have seen the greater part of the tongue involved in carcinomatous swelling in young subjects; from one girl, twelve years of age, I was obliged to remove one half of the organ vertically. Stony induration surrounds the exposed surface to a considerable extent, and the sore presents all the characteristic appearances of cancer.



In many cases the induration precedes ulceration, in others follows it. Sooner or later the absorbents are affected, becoming swollen, painful, and hard; and, as in malignant affections of other parts, the disposition and action is not limited to those in the immediate neighbourhood of the primary disease. The tongue is subject to simple induration, which is totally unconnected with malignant disposition, and subsides on improvement of the digestive organs; occasionally repeated leeching of the part accelerates the cure.

Enough has already been said about removing the local irritating cause, when such can be discovered; and the maxim, though most important, need not be formally repeated in regard to affections of the tongue. The simple ulcer heals under the usual applications to sores on mucous surfaces, whilst the general health is at the same time attended to. For malignant, nothing but removal of the part can avail. But this is not always either advisable or practicable: the disease may have involved the organ too extensively, and the lymphatics may have too widely participated in the action. When the diseased part is small, and nothing contraindicates surgical interference, it may be removed by the bistoury; usually the bleeding is very slight, but if troublesome it is easily arrested by the cautery. When the disease is extensive, ligatures are to be employed. During the process a vulsellum is useful for grasping the morbid part, and securing the organ. The ligatures should be strong, and are introduced by needles in fixed handles. They may either be passed at once,



or be preceded by finer ones, by which they are afterwards drawn through. The tongue is transfixed beyond the induration, and, if one ligature is sufficient, its noose is divided, and the parts tied separately, so as to include the mass. But frequently several ligatures are required, and their portions must be so disposed as not only to isolate all the indurated and ulcerated part, but also some of the neighbouring sound structure. They are tied firmly, to cut off vitality as completely as possible, and at once. Considerable swelling and salivation follow, but gradually subside. In a short time fresh ligatures are passed through the old perforations, and drawn from time to time, till the part sloughs and drops away. The swelling may be relieved by hot fomentations, and opiates mitigate the pain. The discharge is profuse and foetid. A weak solution of the chlorate of lime, vinegar with honey, a solution of the borate of soda, &c. may be used as gargles. The healing of the wound is to be promoted by applications suited to the appearances which it may assume.

*Inflammation of the Tongue* occasionally occurs during certain eruptive diseases, and sometimes in consequence of accidental circumstances, as stings in the part from venomous insects; but it is not a common affection, and is generally produced by the abuse of mercury. When that poison was used more freely than now, the disease in question was by no means rare. It was then customary to see patients who were made to spit some gallons in a day, for the cure



of a venereal affection, supposed or real, with their faces swollen, and their tongues protruding from their mouths, enormously enlarged. This consequence of the exhibition of mercury is more apt to occur in some constitutions than in others, and I have seen it produced in a violent form by the patient's taking only two Plummer's pills.

The tongue swells rapidly, fills the mouth, and protrudes of a brown colour from effused serum. The patient is unable to speak, deglutition and respiration are much impeded, and thirst is excessive. In some instances the inflammation proceeds to supuration, but the more general termination is resolution.

In the more mild cases, a cure will generally be procured by evacuating the bowels freely by means of saline purgatives, and by local abstraction of blood; the blood may be obtained either from the application of leeches, from opening several of the enlarged superficial veins, or from slight scarifications. Afterwards astringent lotions may be employed. But in more severe cases, the tumour is productive of very great inconvenience to the patient, and is not unattended with danger; the difficulty in breathing may amount almost to suffocation, and in such the treatment must be active. Several free incisions are to be made longitudinally on the dorsum of the tongue; from these the effused fluids are evacuated, a considerable quantity of blood escapes, and by consequence the tumour speedily subsides. Superficial incisions are not sufficient, and



the practitioner should not shrink from cutting tolerably deep ; for although the wounds may appear ghastly in the engorged and tumid condition of the organ, yet, when the swelling subsides, and the tongue regains its usual bulk, their size is so remarkably diminished, that they resemble trifling scarifications, and, in some instances, are almost imperceptible. Their extent and number must vary according to the size of the tumour, and the urgency of the concomitant symptoms. If such practice should fail in diminishing the swelling, and affording relief to the respiration, it may become necessary either to perform tracheotomy, or to introduce a gum-elastic tube from the nares into the windpipe. If the inflammation terminate in suppuration, the abscess must be treated on the same principles as those occurring in other parts of the body.

The tongue is also subject to gradual and permanent enlargement. A remarkable case of this nature occurred to me lately, and I shall here detail it. The patient was a male, aged 19. The tongue was of a very large size, compressible and elastic, projected three or four inches from the lips, and completely filled the cavity of the mouth. It was of a dark brown hue, in some places livid ; its surface was rough, at some points granulated, at others fissured, and at many traversed by large venous trunks. At the back part of the dorsum, the papillæ were much enlarged, granulated points were numerous, and several plexuses of dilated blood-vessels ramified imme-



diately beneath the investing membrane. There was occasional bleeding from an ulcerated fissure near the centre of the dorsum, and also from the lateral parts of the protruded portion; in the latter situation, several cicatrices were visible. Saliva flowed in a continuous stream from the apex of the tumour. The lower jaw much separated from the upper, was elongated and unusually narrow; the teeth, particularly those in front, were placed at a distance from each other, were covered with tartar, and projected almost horizontally from the sockets. A depression was felt at the symphysis menti, as if the two portions of the jaw were asunder, and the intervening space occupied by ligamentous or cartilaginous matter. The enlargement was congenital, and the organ swelled rapidly every three months to a much larger size, and subsided gradually. The bleeding was most frequent and profuse when the swelling was greatest, and then too he suffered much pain in the part. Articulation was very indistinct, and could be understood only by those who were accustomed to be near him. He swallowed, and even masticated pretty freely. From the periodical enlargement and diminution, from the repeated hæmorrhages, and from erectile tissue being visible on many parts of the surface, I considered the structure of the tumour to be in part similar to that of aneurism by anastomosis, and to be throughout extremely vascular. I therefore did not attempt removal by incision, but intercepted its vascular supply by tying both lingual arteries. The tumour was not affected immediately



on the application of the ligatures, but soon began to diminish gradually. Every thing was proceeding favourably ; but, on the seventh day, the tongue was attacked with inflammatory swelling, which advanced unsubdued, notwithstanding the most active treatment. Sloughing commenced at the apex, and appeared extending backwards: I then isolated the protruded portion of the organ by ligature, and thus removed it in three or four days. At that time he complained of no pain, and felt very comfortable. But his system became much disordered soon after ; abscesses formed rapidly over both wrists and on the hands, unhealthy infiltration of the cellular tissue took place at the root of the tongue, and amongst the deep muscles at the upper part of the neck, the parts became gangrenous, and he died. Dissection showed that the greater part of the tumour was of the erectile tissue.

*Division of the Frænum Linguae* is sometimes, though rarely, required. Division can be necessary only when the frænum is so short as to confine the point of the tongue, prevent free motion of the organ, and thereby cause indistinctness of articulation. Infants are often supposed by anxious mothers to have their tongues unduly confined, when no such malformation exists ; in such circumstances, it is almost needless to observe that the part ought not to be interfered with. And even when there is confinement, division should not be had recourse to, unless the child is prevented from taking nourishment.



The operative procedure is simple and safe. The tongue is raised towards the palate, either by a spatula or split card—or, what is better, by the fingers—and the frænum is cut across to a sufficient extent by blunt-pointed scissors.

*Ranula* is a swelling produced by accumulation in, and distention of, the extremity of the combined ducts of the sublingual and submaxillary glands. The extremity of the duct contracts, or is completely closed, and in consequence the saliva and mucous (the one the secretion of the gland, the other of the duct) collect, distend the canal, and cause thickening of the parietes. Thereby a tumour is formed, which, in some instances, attains a very large size, displacing in some measure the neighbouring parts, and incommoding the tongue in particular. Indistinct utterance and impeded deglutition result.

The orifice of the duct, if discovered, is to be dilated gradually by occasional introduction of variously sized probes. Often it is necessary to make a small incision in the situation of the orifice, and introduce a bit of gum-elastic bougie, by continuing the use of which for some time, permanency of the opening may be obtained.

*Deposition of earthy matter*—principally phosphate of lime—not unfrequently takes place in the extremity of the submaxillary and sublingual ducts, and the concretion so formed is often of considerable size; some are larger than an almond. The colour is either white or yellowish, and the surface either



smooth or roughened by nodules ; in all, the calcareous matter is friable, and disposed in concentric layers. They are of the same nature as the earthy deposits, called tartar, which form on those teeth opposite to the extremities of the salivary ducts. The foreign body produces uneasiness in the mouth, swelling, and indistinctness of speech : occasionally painful swelling of the salivary gland and surrounding parts takes place. Concretions also form, though very rarely, in the extremity of the parotid duct, and are attended with like inconvenience ; of this I have seen only two cases.

The foreign body is easily removed ; an incision is made through the membrane of the mouth, and the concretion dislodged by forceps, a scoop, or the fingers. The saliva regains its course, and irritation subside.

*Tumours*, unconnected with the salivary ducts, occasionally form in the loose cellular tissue under the tongue. They may be either sarcomatous or encysted ; the former are rare. I have removed several solid tumours, principally adipose, from this situation. They were loosely connected, and taken away without almost any dissection ; indeed they were lifted out with the fingers, after division of the membrane of the mouth and of the cellular cyst which surrounded them. One was as large as an orange, and of a flattened form. The tongue had been displaced by the swelling, and articulation, deglutition, and breathing impeded. The patient, an old lady, had a good recovery. The case had been



by some mistaken for ranula; and I mention this circumstance, lest others may reckon more on the situation of a swelling, than on its feel and other external characters.

Encysted tumours below the tongue are common. The cysts are generally thin and adherent, the contents albuminous and glairy. They attain a large size, and prove very inconvenient. Occasionally the cysts are thick and more loosely attached; such usually contain atheromatous matter. I removed one uncommonly large, from the inner surface of which numerous hairs were growing.

Encysted tumours here can seldom be removed by dissection; the depth of their situation, their firm connexion, the awkward situation in which the patient is necessarily placed, and the risk of hæmorrhage, forbid the surgeon from attempting regular extirpation. A more simple and equally effectual procedure is as follows:—The membrane of the mouth and the cyst are divided by the point of a bistoury; and if the tumour be large, and the distention great, an oval portion of the parietes may be cut out. The contents are thus evacuated. The bleeding is allowed to cease, and, the cavity having been wiped out clean, a stick of caustic potass is applied to the surface, so as to annihilate the cyst effectually. This I believe to be the only radical and safe mode of removal; after any other, the tumour is certain to be reproduced. It has been recommended to pass a seton, so as to excite inflammatory action, and lead to obliteration of the cyst. I have made trial of this practice, but most danger-



ous swelling ensued, the mouth was rapidly filled, and the system alarmingly shaken ; after all the disease was not eradicated.

Tumours beneath the tongue, however originating, occasionally inflame, and become the seat of unhealthy abscess. A large and painful swelling forms, and projects under the chin. The matter gradually approaches the surface, and perhaps evacuates itself imperfectly into the mouth, or the integuments give way, and afford an external issue. In such cases, an early incision from the mouth may prevent the internal mischief, and the disfiguration of the countenance which would otherwise ensue—may, in short, limit the suppuration ; afterwards a free opening is to be made below the chin, in the mesial line, and in the direction of the muscular fibres. A ready drain is thus obtained for the matter, and the cavity of the abscess gradually contracts.

*Tumours of the Gums* are usually hard, and not inclined to increase rapidly. They are of the same consistence as the parts to which they are attached, and grow either inwardly, outwardly, or both. They surround one or more teeth, which at last become loose, and the alveolar processes soften, and form part of the swelling.

These may degenerate, and grow rapidly, or the tumour may be soft (*tumor mali moris*) from the first. The attention of the patient is directed to the part by the occurrence of discharge from about the teeth, which loosen one after another. A soft tumour arises from the sockets after either extrusion



or extraction of the teeth, grows rapidly, and involves more and more of the gums and alveolar processes. Angry ulceration attacks the prominent parts of the swelling; the bone is softened to a considerable extent around; the discharge is thin, bloody, and profuse. Ultimately the lymphatics become affected, neighbouring parts are contaminated, malignant action acquires a firm footing, and extends, the patient becomes hectic, and dies.

Each kind of tumour should be removed freely and early; the untoward results of the latter have been already mentioned; and I believe, that if the former be allowed to progress unchecked, the tumour will extend to the bone, and osteosarcoma of the jaw, more or less extensive, be established. The disease must be attacked at an early period of its existence, and teeth, sockets, and soft parts taken freely away, by means of a strong knife. After excision, the actual cautery should be applied, otherwise the disease is apt to recur. Portions of involved bone, which may have escaped the knife, are by the cautery made to exfoliate.

*Inflammation of the Gums* and neighbouring parts is attended with violent pain, swelling and throbbing, difficulty in opening the mouth, headach, and fever. Inflammation of the soft parts runs its course speedily, and, as the cause is seldom removed during the existence of the inflammatory action, generally terminates in suppuration, so giving rise to what is termed *parulis* or gumboil. Frequently the inflammation extends to the sockets of the teeth, which sel-



dom resist the action long, but from their low degree of vitality soon become necrosed ; and by the presence of the dead portions of bone, a fresh accession is given to the disease. Severe pain is experienced on touching the teeth whose alveoli are affected ; they project and become loose ; purulent matter is secreted, and oozes out between the loosened teeth and diseased gums. Abscesses form, and point in different situations ; the gums are tumid and spongy ; through the openings in them the bone can be felt bare, and the purulent matter is situated within or around the alveoli, and under the mucous membrane and cellular tissue which invest them.

When the inflammation has been either intense from the first, or of long duration, it not unfrequently happens that abscesses form within the substance of the jawbone, and occasionally to a considerable extent—a portion of the bone having become inflamed, and the action terminating in suppuration and partial caries. This is more apt to occur in the inferior than in the superior maxillary bone ; and, if allowed to proceed, the osseous cyst containing the purulent matter gradually enlarges, its parietes become attenuated, and the affection is termed *spina ventosa*. Purulent collections in this situation also seem, in many instances, to arise from, or at least to be preceded by, the formation of a cyst around the decayed root of a tooth. Such cysts are generally of small size, and pyriform shape ; externally they are smooth, membranous, and of rather a delicate texture ; internally, they are lined by lymph of soft consistence, and contain purulent matter. In



fact, they are purulent depôts, which form in consequence of inflammation around the fangs of the teeth, and from which the matter is discharged through a small aperture at the upper part of the cyst, and by the side of the affected tooth. Occasionally they attain the size of a prune.

Mercury is perhaps the most common cause of this disease; but it is also produced by certain operations on the teeth, and by the presence of carious teeth or of stumps.

*Caries of the teeth* is an extremely common affection, and in some instances seems to arise from an unhealthy state of the constitution; but it is most frequently produced by the teeth having suffered from chemical agents, as when the mineral acids have been taken for a considerable time as medicines, or when the individual is in the habit of consuming sweetmeats and confections. Sometimes the disease remains almost stationary, and may give little or no annoyance for a number of years; in other instances, its progress is very rapid. A portion of the tooth gradually decays, and this is at first unattended with any uneasy sensation; but when, from continuance of the ulcerative process, the central cavity has been exposed, the pain is excruciating, attended with headach, and swelling of the surrounding soft parts. In general, the progress of the disease may be arrested by removing the diseased portion, and stuffing the cavity, before any pain has been felt. But after the central cavity of the tooth



has been exposed, and pain consequently experienced, the most effectual remedy is extraction.

From the presence of carious teeth, or decayed portions of teeth, many evils both local and general ensue, besides inflammation and abscess. They are frequently the cause—and the sole cause—of violent and continued headaches; of glandular swellings in the neck, terminating in, or combined with abscess; of inflammation and enlargement of the tonsils, either chronic or acute; of ulcerations of the tongue or lips, often assuming a malignant action from continued irritation; of painful feelings in the face, *tic douloureux*, pains in the tongue, jaws, &c.; of disordered stomach, from affection of the nerves, or from imperfect mastication; of continued constitutional irritation, which may give rise to serious diseases.

Along with abscess of the gums, purulent matter often collects in the cellular tissue of the cheek or of the chin. In the latter situation, the inflammation and suppuration are often caused by the teeth in the front or side of the lower jaw being too much crowded together; and of course, the patient cannot be effectually benefited till one or more of the teeth be extracted, and sufficient space allowed for developement of the others. The abscess gives way, and discharges its contents often both externally and internally, and a fistula remains, which cannot be got rid of, unless, as in other affections, the cause be removed. The cavity of the abscess must be opened into either from without or within, and after the



subsequent irritation has subsided, the cause must be removed ; carious teeth or stumps are not to be taken away during the inflamed state of the parts, but after the pain and inflammation have subsided in consequence of free evacuation of the purulent matter. After these have abated, and not till then, the offending bodies are to be extracted, both in order to procure a more speedy and effectual cure, and with a view to prevent recurrence of the disease. If a portion of the jaw has become necrosed, the sequestra are to be extracted as soon as they become loose, and openings and counter-openings must be made, according to circumstances, so as to afford a free outlet to the matter.

*Spina Ventosa of the Jaw* often originates, as before mentioned, in a small cyst at the root of a decayed or dead tooth. The disease is usually situated on one side of the lower jaw ; but sometimes occurs in the upper, and is at first unconnected with the cavity of the antrum. Inflammation has taken place in the internal structure of the bone ; matter is secreted by the medullary vessels, and collects in the cancellated texture. Purulent formation advances, the cancelli are broken down, the external laminae of the jaw are extended, protruded, and attenuated ; and then the internal cavity enlarges, containing pus, perhaps mixed with other fluids, and with disorganized particles of bone. Sometimes the collection proceeds slowly, and the expansion of the bone is gradual and uniform ; in other instances, the swelling rapidly attains a large size. As the disease advances,



the bony parietes become remarkably thin and delicate, particularly at the more prominent parts of the tumour; and at many points bone is deficient, and its place supplied by membranous expansion. Occasionally alteration of structure takes place in the cyst; solid matter is added, either bony or fibro-cartilaginous, and morbid action proceeds in the new deposit. In acute cases, in which the secretion and distension are rapid, severe pain is felt in the part at the first, and usually continues but little ~~in~~ abated; when the swelling is slow and gradual, considerable pain is experienced during the inflammatory stage, but soon diminishes, or ceases entirely. In every instance, the features are deformed, and the functions of the mouth more or less impeded.

Osteosarcoma may supervene on spina ventosa—morbid action occurring in the parietes, and morbid deposit ensuing, as in the following instance. The patient was a male, aged 21. Swelling had existed for a considerable time at the posterior part of the lower jaw in the left side. The wisdom tooth and last large grinder had never appeared, and the swelling occupied their situation. The bone was expanded on each side; the upper surface of the tumour was soft, its growth had been gradual, and no great pain or uneasiness was experienced. I cut out an oval portion of the cyst where it projected into the mouth, and well-digested matter was evacuated; a seton was then passed out near the angle of the jaw, and worn for some weeks. The plates of the bone approximated, the cavity contracted, and the dis-



charge ceased. Two years afterwards rapid swelling took place in the same situation, suppuration occurred, and the matter was discharged by incision; the tumour subsided. Again inflammatory swelling occurred twelve months afterwards; the same course was followed and the patient relieved. A hard swelling now occupies the jaw from its angle to the canine tooth, it is increasing in size; the necessity for its removal is apparent, and has been decided upon.

But in general, after free evacuation of the purulent matter from a bony cavity, even of very large size, the space between the parietes diminishes rapidly, the distended and attenuated bone contracts and is condensed, the new deposition is absorbed, and the parts regain their natural and healthy appearance.

In the slighter cases of spina ventosa, removal of the offending teeth or portions of teeth, is generally sufficient; the matter escapes freely enough from the sockets, and the discharge soon ceases. When the cavity is considerable and its parietes thin, a counter opening at the base of the jaw is required; and it is often of advantage to introduce a small cord from the opening in the mouth through the counter opening, and to continue its use for a short time, drawing it backwards and forwards in the cavity occasionally. For making the counter opening and placing the seton at the same time, a strong needle in a fixed handle is most convenient. This practice I have employed in a good many instances, and can confidently recommend as successful. In a large



spina ventosa, not complicated with solid growth, the parietes may be removed freely and with safety; the cavity is dressed to the bottom, and gradually fills up by granulation. The division of the integuments to expose the tumour will vary according to the circumstances of the case; the incision of the bone will generally be accomplished by a strong bistoury. Such procedure will seldom fail in procuring a cure, and is less severe, less dangerous, and productive of less deformity, than division of the jaw and entire removal of the diseased portions, an operation which can very seldom be warranted by spina ventosa. In the following case, the tumour was the largest of this kind which I have met with in the jaw, and yielded to the treatment just noticed. The patient was a male, æt. 48; he applied to me in 1821. The tumour had been of three or four years' duration, equalled a large fist in size, and involved the left side of the lower jaw at the junction of the ramus with the body of the bone. The sac extended behind the coronoid process, and downwards, through the substance of the jaw, amongst the hyoid muscles. Several carious teeth and stumps were imbedded in the swelling; the projection was chiefly lateral, the parietes were yielding, and the line of the jaw could be traced from below. There was occasional slight discharge of purulent matter from the neighbourhood of the involved teeth. The cheek was laid open, and the bony and cartilaginous parietes of the cavity completely removed; the bleeding from the bony surface was arrested by cautery and pressure.



The soft parts united kindly, and the patient obtained a rapid, perfect, and permanent cure, returning home with the cheek united in ten days after the operation.

*Solid Tumour of the Lower Jaw—Osteosarcoma*—commences in the internal structure of the bone, frequently in the neighbourhood of stumps. The origin may be traced to external injury of the part; or the disease may take place in the jaw, either along with osteosarcomatous tumours of other bones, or subsequently to their developement; in such circumstances a peculiar disposition of the system is the only cause that can be assigned. The tumour generally occupies the lateral parts of the bone. Its growth may be either slow or rapid, and is attended with dull uneasiness, rather than acute pain. At first the morbid deposit is confined to the cancellated texture, but as it increases the external laminae are distended, and at last give way at one or more points, and the tumour protrudes fungus into the mouth. The consistence of the mass is various, it may be soft and brainy, or cartilaginous, mixed with bone and fibrous matter in various proportions; but the anatomical characters have been detailed at page 207, Part I., and need not be here repeated. The features are much deformed, the swelling seriously incommodes the neighbouring parts; the teeth loosen and drop away, and fungi arise from the sockets; a foetid, thin, sometimes bloody discharge is secreted copiously, and the health declines. The part protruding around



the gums is deeply indented by the teeth of the upper jaw ; it separates the jaws to a greater or less extent, prevents closure of the lips, induces salivation, and impedes the taking of nourishment. The tumour is one of those which are apt to be reproduced, and if unmolested, gradually undermines the system, and ultimately destroys the patient miserably. At one time every instance of it was regarded as hopeless ; but of late a great many tumours, in various stages of advancement, have been removed successfully by British, Irish, and foreign surgeons. In some instances, the portion of the jaw containing the morbid growth has been sawn out ; in others, one half of the bone, or more, has been removed by disarticulation, after being divided beyond the diseased part. The operation is severe, and to a spectator shocking, but can be undertaken with safety, and in most cases with almost a certainty of favourable termination. In no other way can the disease be eradicated. Partial excisions, applications of the cautery, &c. only hasten malignant advancement.

To expose the tumour and admit of the bone being readily divided, incision of the soft parts requires to be extensive. And previously to determining on the plan of operation, the extent of the disease must be ascertained accurately. If, for example, the tumour is included between the lateral incisor tooth and last molar on the same side—these teeth must be extracted to permit division at these points. A semilunar incision may then be made along the base of the jaw, the horns of the incision pointing upwards



and passing over the space which was occupied by the extracted teeth. The flap is dissected up, and the membrane of the cheek divided along the line of incision. The bistoury is then carried along the inside of the bone so as to divide the membrane of the mouth and separate the attachments of the muscles. The tongue is pushed aside, and a copper spatula placed under the jaw at the part to be divided, in order that the soft parts may not be injured during the sawing. A small narrow saw, or one commonly known by the name of Hey's, is applied to the bone at the points where the teeth were extracted, and by a few motions of this instrument a notch is made of no great depth; a pair of strong cutting pliers are placed in the track, and by them division of the bone is accomplished with equal neatness, and much more rapidly than if the use of the saw had been continued. The pliers should be strong in every point, and the handles long, to afford the advantage of a powerful lever. The chain saw has been recommended for performing the section of the bone, but I have not yet seen one to be depended on; it is not only slow, but uncertain, in its operation.

The incisions may be made otherwise. The cheek may be divided by passing through it a long narrow bistoury, close to the anterior edge of the masseter muscle, and carrying the instrument forwards and through at the angle of the mouth. From each extremity of this incision another is made downwards, the anterior one inclining forwards, the other back-



wards. By reflection of the flap thus formed, the bone is exposed more easily, rapidly, and perfectly, than by the former mode of incision.

In either method, no artery, except the facial, requires to be secured by ligature. After division of the bone, the attachments of the tumour, which may not have been separated previously, are cut with the bistoury, the cavity is filled lightly with charpie, and the incisions are carefully and neatly put together, and retained by points of interrupted and twisted suture; the latter form of suture being adopted at those points where accurate coaptation is most important.

The *symphysis* of the lower jaw has been removed, and its extirpation may again be rendered necessary, either on account of tumour commencing in its internal structure, or from disease of the sockets extending deeply and approaching the base. I removed it in a case of malignant disease, by which, and by the applications used as remedies, great ravages had been made on the under lip; the gums and alveoli were involved, as also the bone, to a considerable extent, without any apparent affection of the lymphatics. Nothing untoward occurred in the operation, and the case was proceeding favourably; but after some weeks the patient was seized with violent erysipelas of the face and head, and perished. One objection to the operation is, that the muscular attachments of the tongue to the symphysis, cannot be divided without some risk; the antagonist muscles are unrestrained; the os hyoides and root of the tongue may be drawn backwards upon the forepart of the verte-



bræ, so as to close the air passage, and cause suffocation.

*Disarticulation* of one side of the jaw is not unfrequently necessary ; it is absolutely required when the tumour encroaches upon and involves the angle and ramus. It is a more severe operation than excision of part of the bone, and attended with greater risk ; yet it may be advised and undertaken with a very fair and probable chance of ultimate success. The incision of the cheek is made to incline more upwards than those recommended for partial excision, and is extended to over the articulation of the jaw ; from this point, another is made in the direction of the ramus, and prolonged an inch or more beyond the angle. A third incision is made perpendicular to the first, or to the lower lip, over that part of the bone in front which is to be divided. The flap is turned down, and the muscles and membrane of the mouth separated from the bone opposite to the last incision ; after which, the finger is passed through to complete the detachment. The bone is then divided at that point by the saw and pliers, the tooth in the line of the track having been extracted previously to the commencement of the operation. The cut end of the jaw is laid hold by the left hand, and depressed, and the bistoury carried backwards along the internal surface, to effect detachment as far as the angle. The bone is still more depressed, and the temporal muscle cut from the coronoid process. The mass is thus loosened, and forced downwards and backwards on the neck ; the forepart of the capsule is then cut,



and the bone twisted out. Separation of the remaining attachments is completed by a few rapid strokes of the knife, and the whole mass removed. Hæmorrhage is then to be permanently arrested, but instead of immediately tying every open mouth which presents itself, it is better to expose the common trunk of the internal maxillary and temporal arteries—which is easily effected, as it emerges from under the digastric muscle—and to pass a ligature beneath it, by means of an aneurism needle. This is more quickly done than the applying of ligatures to the many branches of this trunk which have been divided. The other vessels—the facial, branches of the lingual, &c.—are then tied, the cavity is filled with charpie, and the incisions of the soft parts are carefully closed. In these, union by the first intention usually takes place nearly throughout the whole extent; suppuration occurs from the deep wound, the charpie is dislodged gradatim, and removed, granulations spring up, and, after some time, the cavity is obliterated. The cheek must necessarily fall inward very considerably, but the deformity is not to be compared to that caused by the tumour. During granulation, the patient is made comfortable by the frequent use of tepid gargles, lodgement of pus in the mouth being thereby diminished. Articulation and mastication are not so perfect as when the jaw was entire and sound; but the patient gradually becomes accustomed to the want, and these functions improve. Partial paralysis of the side of the face necessarily follows, for there is no possibility of accomplishing disarticula-



tion of the jaw, without dividing many branches of the portio dura.

Supposing that the portion of the jaw between the angle and symphysis had been removed on account of osteosarcoma, and that the ramus subsequently became affected, it is no easy matter to effect disarticulation, as I have experienced.—The patient was a female, aged thirty, of delicate constitution, and subject to toothach from infancy. I removed an osteosarcomatous tumour, extending from the angle to the canine tooth, on the right side. Division was made wide of the existing disease, and the sawn surfaces appeared quite healthy; but about five months afterwards, symptoms of return occurred in the ramus, and ten months after the first operation disarticulation was indispensable. The operation was accomplished with very considerable difficulty, on account of there being no lever to overcome the action of the temporal muscle. After separating the attachments as much as possible, an attempt was made to force down the coronoid process, from under the zygoma, by pushing the lower end of the bone backwards, in order to divide the insertion of the temporal muscle; but this proved ineffectual. The capsular ligament of the joint was then divided, and the bone with difficulty turned over from behind, forwards. It was then detached underneath the coronoid process, pulled down from under the zygoma, and the temporal muscle at length divided at its insertion.

In none of these operations is there a necessity for preliminary exposure and ligature of either the caro-



tid artery or its branches ; by so doing, a great addition is made to the patient's sufferings, the real operation is only commenced when the patient supposes it should have been finished, and he is thus annoyed and worn out. The flow of blood is easily moderated, or altogether arrested, by the pressure of an assistant's thumb against the forepart of the vertebræ, below the angle of the jaw.

The position of the patient is either recumbent, with the face turned from the operator, or sitting with the head supported and steadied.

The instruments required are, a very strong, sharp-pointed bistoury, for division of the soft parts ; saws, of which I prefer Hey's, for notching the bone ; strong and long pliers, for completing the section of the bone ; an aneurism needle, for securing the common trunk of the temporal and internal maxillary ; dissecting forceps, hooks blunt and sharp, thin copper spatulæ, ligatures, &c.

*Wounds of the Face and Neck.* Accidental wounds of the face may involve the more important blood-vessels and nerves, and interfere with the eye or its appendages, with the nose, or with the mouth. Injury of these parts is to be avoided in incisions premeditated for the removal of disease or deformity ; and, in such premeditated wounds, the line of incision should always be, if possible, in the direction of the muscular fibres. The bleeding seldom proves troublesome ; pressure on the vessels, as they pass over the bones, arrests it temporarily ; and ligature is



seldom required, accurate adaptation of the divided surfaces proving sufficient for effecting permanent closure of the divided branches. Paralysis, more or less extensive, follows division of the nerves and muscles. But paralysis of the face also arises from a variety of other causes; it often remains after injuries of the head, probably in consequence of extravasation in the brain; it attends on morbid formations in the substance of the brain, or in its membranes, and follows long continued irritation in the neighbourhood of the nerves. Paralysis from the last mentioned causes is not likely to be recovered from; that following simple division of nerve, may disappear after a considerable time, the nervous tissue reuniting, and resuming its functions. When there is reason to suppose that the nervous function is alone deranged, while the structure remains sound and the continuity undissolved, advantage may follow the application of strychnine to a raw surface over the course of the affected nerves.

In *Tic Doloureux*, division of the nerves of the face, as they pass out of the foramina, is seldom resorted to; nor ought it to be practised, unless at the urgent request of the patient, and after all other means have failed to afford relief; and even then the operation is scarcely warrantable, since it may be said never to have succeeded. We must trust to milder measures, to the removal of local irritations, to paying strict attention to the digestive organs, to the administration of purgatives, tonics, and anodynes; and occa-



sionally benefit has resulted from the external use of the nitrate of silver.

Spasmodic action of the muscles of the face, without pain, sometimes follow wounds and other injuries of the nerves which supply them ; and sometimes no cause can be assigned for the occurrence. In this affection also I have adopted, with advantage, the application of nitrate of silver to the integuments over the nerves.

Division of the parotid duct, or wound of the gland itself, is occasionally followed by the formation of a fistulous aperture, discharging saliva over the cheek. We endeavour to prevent this by accurate union of the recent wound. After the fistula has formed, an opening is to be made from it into the mouth, and kept pervious ; the external aperture is then closed by suture after excision of the smooth edges, or is made to contract by the repeated application of a heated wire ; pressure alone is of little use.

All wounds of the face are to be put into the most favourable possible state for healing without suppuration, in order to prevent deformity. The twisted suture is best adapted for this purpose ; more accurate coaptation being thereby obtained than by the interrupted form. In extensive wounds, the parts may be brought somewhat into their proper position by a few points of interrupted suture ; twisted sutures are then placed in the intervals, and the isinglass plaster is of use in closing those points which may still gape slightly ; in many cases, the greater part of the approximation may be accomplished by isinglass plaster alone.



Deep wounds behind the angle of the jaw, and at the lateral and lower parts of the neck, are highly dangerous ; indeed they are almost certainly and immediately fatal, as can readily be understood when the large blood-vessels and important nerves are considered which course in these parts, and which must be either wounded or completely divided. The bleeding has in some cases been arrested by immediate ligature of the divided extremities of the vessel, by firm and permanent pressure, or by pressure at first and ligature of the trunk of the vessel on the recurrence of hæmorrhage after the lapse of many days ; of these methods immediate ligature of each extremity is perhaps the safest and best. In lacerated wounds violent hæmorrhage may take place some time after the infliction of the injury, from ulceration or sloughing of a large artery ; in such circumstances either permanent pressure may be resorted to, or ligature applied to the vessel above and below the open point.

Dissections for the removal of morbid growths in the situations just mentioned must be conducted with much caution, and with a full recollection of the relative anatomy. Unless the tumour is tolerably loose and defined, it ought not to be interfered with. But it is to be recollected that tumours of these parts are bound down by their condensed coverings—the platysma myoides and cervical fascia ; and that after division of these, the tumour, if not intimately incorporated with the neighbouring tissues, is loosened, and often can be readily detached.



From constant external pressure, tumours growing rapidly spread amongst the deep parts, and often form firm attachments. The parotid is displaced, and almost entirely absorbed, by the pressure of tumours growing out of the lymphatic glands which are lodged on its anterior surface. Such tumours attain a large size, and occupy the exact situation of the parotid ; and on their removal, the space betwixt the angle of the jaw and the mastoid process is completely exposed, and the styloid and pterygoid processes can be distinctly felt. From these circumstances many have been led to believe that they have dissected out the parotid ; but this and the other salivary glands seldom if ever degenerate. And if it do become the seat of carcinoma or medullary sarcoma, it is impossible to remove it with either safety or advantage. Even in the healthy state, removal of the parotid is a troublesome dissection ; and the difficulty must be greatly increased when enlargement has taken place from disease, when neighbouring parts are involved, when firm and deep connexions have been formed, and important structures encroached upon. I have taken away many tumours from the site of the parotid, and some of large size, but would scarcely attempt removal of the diseased gland itself.

The incisions, for the removal of the tumours of which we have been speaking, are to be made in the direction of the fibres of those muscles which are interposed betwixt them and the integuments, in the direction of the blood-vessels and nerves, and towards those points where the vessels are expected to enter



the diseased mass. Attention to the last recommendation is important, in order to save bleeding. For when the trunks of the arteries are divided at the commencement of the dissection, they are easily secured temporarily by the fingers of an assistant; the operation is proceeded in and accomplished with scarcely any further hæmorrhage, and in many instances no other vessels require ligature; whereas if an opposite course be pursued, the same vessels will be divided three or four different times; the hæmorrhage will be greater, and the operation delayed. By cutting also in the direction of the vessels and nerves, fewer arteries are divided, and nerves are less apt to be injured, than if the incisions were made across.

Wounds inflicted with the view of effecting suicide are generally on the fore and upper part of the neck, and their severity depends on the resolution of the individual. Some penetrate the integuments merely, and are consequently of slight extent; there is little bleeding, and the edges are easily brought together by inclining the head forwards, and introducing a few points of suture. Others divide the muscles, and branches of the lingual or of the superior thyroid arteries; such are gaping, more extensive than the former, and accompanied with smart hæmorrhage. Some penetrate the mouth, separating the os hyoides, tongue, and epiglottis from the thyroid cartilage. Occasionally the wound is lower, through the thyroid, or betwixt that cartilage and the cricoid; and sometimes through these into the



gullet: it is seldom lower. Such are truly horrible, the countenance is contorted, and of a frightful expression, inspiration is difficult, hurried, and noisy, and at each expiration blood frothed with air is forcibly ejected from the wound. I have seen wounds of the trachea, near the top of the sternum, but without extensive division of the lateral parts; large wounds, such as are usually made at the upper part of the neck, could not be inflicted here without division of the large vessels, and instant death. Some determined suicides reach the vessels even high in the neck, dividing every thing down to the vertebræ; immediate dissolution takes place from loss of blood. But, in general, mere opening of the air passage is all that is aimed at, there being a vulgar notion that this is sufficient for the extinction of life. A considerable quantity of blood is lost, though the branches only of the external carotid are wounded, and the loss may prove fatal; but the hæmorrhage generally ceases on syncope taking place; and if the patient be then discovered, means should be immediately adopted for permanently arresting it. Its recurrence may cause death, on the patient recovering from the first faint; or he may die some days after, from the effects of loss of blood. And hæmorrhage, though to no very alarming extent, is always to be dreaded in those advanced in life; though in most cases the fatal result is not attributable solely to the bleeding, but is expedited by other circumstances, as defective supply of proper nourishment, and an unfavourable state of the mind.



Some patients seem to be going on most favourably towards a cure, but within two days after the injury, are suddenly seized with difficult breathing, and die in a few minutes. On the examination of such, blood is sometimes found in the ramifications of the bronchial tubes, and the lungs contain little or no air; or the bronchial tubes and ramifications are loaded with adherent mucus; in either case the patients die from asphyxia. In others, nothing remarkable is observed; perhaps passage of the air is prevented by inspissated mucus lodging in the windpipe around the wound, and closing the aperture, or by faulty adaptation of the divided surfaces. Likewise, during motion of the head, or attempts to swallow, either the upper or lower part of the windpipe may change its relative position; the continuity of the tube will be thereby destroyed, either partially or wholly, and suffocation ensue. When the wound is large and transverse, as the majority of such wounds are, there is difficulty in freeing the air passage from mucus. This result becomes evident, when we consider how coughing is effected in the healthy state of parts—that the upper part of the windpipe is contracted by its own muscles, and the air driven through, by sudden action of the muscles of the chest, in a forcible and small stream, so as to carry the mucus along with it. This process cannot be accomplished when the muscles employed in contracting the orifice of the larynx are injured, or when an opening is formed below the glottis, through which the patient breathes, either wholly or in part.



In other cases, death is more slow. The patient is seized with dyspnœa, great anxiety, and occasional spasmodic action of the muscles of respiration, which symptoms gradually become more urgent and alarming. They are attributable to awkward position of the parts, to swelling around the wound, inflammatory or œdematous and rapid or slow, or to bronchitis. To the latter affection patients breathing through artificial openings in the larynx or trachea are peculiarly subject, probably from the inspired air not being heated, as in natural respiration, before it enters the bronchial tubes.

The bleeding is to be arrested as speedily as possible by ligature, and the patient placed in bed with the head and shoulders raised. The edges of the wound are brought together by attention to the position of the head; but, provided the patient breathes easily with the wound open, closure should not be attempted till after eight, ten, or twelve hours—that is, not until all oozing of blood has ceased; the time depends on the extent to which the air-tube has been divided. There is little chance of immediate union taking place; and the wound not being approximated when recent and bleeding, does not diminish the chance, but on the contrary augments it. Adhesion is prevented by the insinuation of air and mucus betwixt the edges, by frequent motion of the edges on each other, by the slightest change in the position of the head, either rotatory or nodding, by the action of the muscles of the os hyoides, and by attempting to swallow food or saliva.



Every circumstance is opposed to complete approximation and immediate union of transverse wounds of the throat.

Plasters and bandages are inapplicable, and unwarrantable from the interruption thereby caused to breathing and circulation : they likewise prevent the escape of mucus and air. Emphysema is apt to occur in consequence, and may prove troublesome ; the cellular tissue of the neck becomes filled, so as to interfere with free respiration, and the infiltration of air extends over the face and chest. Many stitches also cannot be used without bad effects. The corners of an extensive wound may be kept together by points of suture ; and one may be placed at the middle, through the integuments only, to prevent overlapping or inversion of the edges. The head is placed in a comfortable position, inclined forwards, and secured by a bandage passed round the head, with its ends brought down and fixed to a band round the chest. In many cases the patient requires to be watched attentively, to have the motions of his hands restrained by proper means, in order to prevent him from interfering with the wound, or committing other insane acts which might prove dangerous. The state of the breathing and of the pulse must be strictly attended to ; inflammatory symptoms must be actively combated, and swelling prevented from gaining a dangerous extent, by bleeding, general and local. But depletion is indeed very seldom necessary, the loss of blood in the first instance proving a pretty effectual preventive ; it is more fre-



quently requisite to administer nourishment or even stimulants ; but these must be given gradually in those advanced in life, and in those who have lost much blood.

The slightest difficulty or noisiness of breathing must be closely watched, on the occurrence of any alarming symptom, and energetic measures adopted. Swelling about the wound, producing difficult expectoration and a diminished current of air, may require the making of a longitudinal opening into the trachea below the wound, and the insertion of a tube. Thus the respiration is quickly relieved ; and the patient is soon able to regulate the size of the aperture ; he is readily taught to apply his finger over part of the orifice of the tube, when it is wished to clear the passage from mucus. The operation should be had recourse to without hesitation or delay ; there is no danger from its performance, but much from its being withheld.

If the mouth or gullet are not opened, or only slightly, the patient may be allowed to swallow naturally ; though it is true that even the slightest motion of the parts affects the wound injuriously. But, as already observed, immediate union is not to be expected ; swallowing, or attempting to swallow, saliva, produces an involuntary action of the muscles, quite as prejudicial as the swallowing of liquids in large quantity does ; and these motions cannot be prevented, since the patient has no control over them. If the wound of the mouth or gullet is exten-



sive, portions of the ingesta are apt to interfere with the air-tube, particularly if the wound is high, and the epiglottis cut away or disfigured. In such cases, soups and other nutritious fluids are conveyed through an elastic tube, passed by the mouth over the root of the tongue to beyond the injured part, and introduced only when it becomes necessary to administer food; or a small tube may be passed by the nostril, and retained. If the wound is very severe, and the necessity for thus conveying nourishment likely to continue long, the latter method is adopted; it is more difficult in execution than the former, but when the instrument is once passed, no further trouble is given to either the patient or surgeon. Small quantities of nourishment are to be given frequently, of such strength as the symptoms indicate; many patients have died from inattention on this score.

Many have died suddenly and unexpectedly (though this should not be, if symptoms and circumstances were attended to) from the effects of apparently slight wounds; whilst others have recovered, when recovery was unlooked for, after dreadful injuries, and these perhaps not treated in the most approved manner. In illustration, I shall briefly detail, though it did not fall under my own observation, an interesting and remarkable case of recovery. A criminal under confinement attempted suicide by transverse wound of the throat. The larynx was severed at the upper part of the cricoid cartilage, and the cut extremities had retracted at least three inches;



the œsophagus was also cut across, but the extent to which it had receded was not ascertained. A large quantity of blood had been lost ; attempts were made to bring the parts together, but were abandoned on account of the violent dyspnœa which was induced. It was also endeavoured to pass an elastic gum tube into the gullet, from the nose and from the mouth ; but this also failed. He was kept alive by nutritious enemata. On the second day after the accident, the cut extremities of the larynx were approximated by two ligatures ; and, the retraction being thereby diminished, it was then discovered that there was another wound between the cricoid cartilage and the trachea. All ingesta by the mouth passed through the wound. On the fifth day, the ligatures separated, and the larynx again retracted. On the sixth, an elastic gum catheter was passed into the inferior cut extremity of the gullet, and through this nutritious fluids were regularly administered. The wound granulated, and filled up in some measure ; the patient continued to receive both breath and nourishment through tubes introduced downwards from the wound in the throat. Whilst pouring in food, saliva was secreted in the mouth with great profusion. The sense of smelling remained tolerably acute, and he also possessed the power of imperfect whispering articulation.

When, from the untoward circumstances of the case, or from neglect, the opening in the windpipe remains long open, and becomes fistulous, the larynx contracts, and the voice is in a great measure lost ;



the patient breathes almost entirely by the unnatural opening, and all the respiratory functions are conducted imperfectly. But even this state of parts may admit of remedy, as is exemplified by the following case: Elizabeth Oswald, aged twenty-seven, attempted suicide in 1826, and wounded the larynx through the crico-thyroid ligament. She was under treatment for several months; but was at length abandoned with loss of voice, breathing entirely through a silver tube placed in the original wound. On her applying to me, I found the larynx had contracted; an exceedingly minute aperture, not capable of admitting a common probe, extended from the wound towards the glottis, constituting all that remained of the upper part of the natural air passage. Bougies, the size of darning-needles, were introduced from the wound into this diminutive canal; and by gradually increasing their bulk, the passage was brought to its natural diameter in less than three months. Part of the trachea below the wound had also contracted considerably, and was dilated by similar means.

A long œsophagus tube was introduced by the wound into the mouth, there laid hold of and drawn upwards, and then pushed down into the trachea, so that it extended from the mouth to some inches below the wound of the trachea. Its introduction was followed by a severe fit of coughing, which lasted about half an hour. The tube, nine inches long, and equal in diameter to the largest œsophagus tubes, was retained in the windpipe for fifteen days,



during which it caused great salivation ; the teeth loosened, and the strength was extremely reduced.

The callous edges of the wound were removed by incision, and the opening closed by suture. The tube was removed on the tenth day thereafter, and the patient breathed well. Soon, however, respiration became difficult, and tracheotomy (below the isthmus of the thyroid) was performed. A silver tube was introduced, and retained for five days, when it was replaced by a smaller one. After twenty days, the tube was removed altogether, and in a short time afterwards the wound closed completely. The patient continued to breathe with ease through the larynx, and slowly recovered her voice. When agitated, or after sudden and violent exertion, her inspirations are a little longer than natural, but in other respects the cure is complete.

*Laryngitis, cynanche trachealis*, most frequently occurs in children, and in them it is termed *croup* ; but it also, though rarely, attacks adults. The voice is brazen, hoarse, and croaking ; the cough is barking, and the countenance suffused. Inspiration is long, painful, effected with much difficulty, and attended with a wheezing or rattling noise. Expiration, on the contrary, is easy.

Difficult inspiration is a symptom common to all affections of the larynx, and admits of ready explanation. The membrane lining the glottis is thickened, and also covered by a viscid mucus, the passage is thereby much contracted ; and the muscles, by the



action of which the rima is opened, participate in the inflammatory action, and are thereby incapacitated for the full performance of their functions. While inspiration is thus difficult, expiration is more easy, all the powerful muscles of the chest combining to empty the lungs of the little air which they receive.

In croup, there is confusion and pain of the head, the lips are of a livid hue, and the veins of the neck are much distended. Respiration is extremely laborious, the chest and nostrils heave, and all the auxiliary muscles of respiration are called into play. Sleep is broken and unrefreshing; the patient starts, much alarmed, from a feeling of impending suffocation, and catches at the nearest object, having dreamed of drowning or strangulation. The circulation is accelerated, and becomes weak and irregular as the disease advances.

A common cause of croup is exposure to cold and damp; but the frequency of its occurrence in children is attributed to dentition. Dentition induces a long catalogue of infantile diseases, and is intimately connected with most cases of croup. Children are besides of a peculiarly irritable system; and in them disorder of the digestive organs may, in many instances, be considered as at least a predisposing cause, and in all cases it is a constant attendant on the disease. It may also be occasioned by inflammatory action extending to the larynx and trachea from a neighbouring surface, as from the fauces. In some instances it has been produced by the direct application of stimuli to the membrane; as by the patient inad-



vertently swallowing boiling water, and a portion of the hot fluid getting into the windpipe. It is supposed that certain slight degrees of this affection are to be ascribed to spasm, but this opinion has not been so sufficiently confirmed as to entitle spasm to be confidently stated a frequent cause of croup; in nervous and hysterical females, certainly, paroxysms of slight difficulty in breathing are not of unfrequent occurrence, and in them it may be ascribed, with much probability, to a spasmodic action. In children, dyspnœa, apparently dependent on spasm, is produced by affection of the base of the brain.

The most desirable termination of the disease is of course resolution—the cough, pain, and uneasiness subsiding, and the constitution gradually attaining its former state of composure. Too frequently, however, the inflammatory action proceeds unabated, and terminates in effusion of lymph, which is generally of great extent, adhering to the surface of the mucous lining, and forming what is termed a false or adventitious tubular membrane. On the lymphatic formation, dyspnœa is much aggravated; and the second stage of the disease is then said to have commenced. Occasionally the patient sinks before effusion has taken place. The extent to which the pseudo-membranous deposit occurs is extremely various; in some cases it is confined to the larynx, or to the upper part of it; in others it lines the whole of the windpipe, and often is prolonged, either in flakes or tubes, into the ramifications of the bronchi. In general, it is not at every point adherent to the mucous membrane,



but more or less detached, particularly at its inferior extremity, by a quantity of vitiated mucus which intervenes between it and the mucous surface and is intimately adherent to the latter. The mucous membrane is also slightly elevated by effusion into the subjacent cellular tissue.

By the formation of false membrane, the symptoms may be so much increased as to cause speedy dissolution; but in many cases the patient's strength is not altogether exhausted, and the extraneous substance by its irritation causes frequent and violent attempts to expectorate, by which the lymph is not unfrequently expelled either entire or in irregular portions; the relief thereby afforded, though considerable, is in general temporary, for lymph is speedily redeposited, and the patient succumbs. It has been already stated that a portion of the false membrane is usually detached from the lining membrane of the canal, and from this the existence of the membrane is in general easily recognised; for on its being moved by the passage of air in the canal, a peculiar sound is frequently audible, and has been compared to that made by the movement of the valve or clapper of a pump. When perceived during inspiration, it indicates that the membrane is detached at its superior extremity; when in expiration, that the separation has occurred inferiorly. A fatal termination may suddenly take place, in consequence of the detached extremity being so displaced by the passage of the air as to form a complete valve, obstructing respiration, and causing death by suffocation.



When the inflammation extends into the bronchi and substance of the lungs, laborious breathing and the mucous rattle occur. The bronchi are obstructed by vitiated mucus, or by lymph, and serum is effused at the base of the brain; and from either or both of these circumstances the patient soon perishes.

In children the gums should be looked to, and if swollen or tender, they must be freely scarified; this always affords relief, and often forms the most important part of the treatment. The bowels must be completely freed from the fœtid dark-coloured matter which they contain; and if this be effected at an early period, it will generally be sufficient to arrest the progress of the disease. Calomel is the medicine usually preferred, not only from its excellent qualities as a purgative, but also on account of its supposed effect of preventing lymphatic effusion. To the procuring of copious evacuations from the bowels, the attention of the practitioner ought to be chiefly directed at the commencement. With the same view, emetics are of much service. The warm bath will be of use in promoting the cutaneous discharge, and assisting to allay irritation. When the inflammatory symptoms are violent, bleeding, both local and general, is indispensable, and must be had recourse to early; for during the commencement only of the disease can it be of service. The first, or acute, inflammatory stage is of but short continuance, speedily terminating in effusion; and when this has occurred, the symptoms all denote debility of the system, and will be irreparably aggravated by depletion. The



most effectual mode of abstracting blood locally, is by the application of leeches to the forepart of the neck ; and the practice is not contra-indicated, as some have asserted, by any difficulty in arresting the hæmorrhage ; in the second stage of the disease, their place is to be supplied by blisters, and other counter-irritants. Much benefit will be derived from the continued use of nauseating doses of the tartrate of antimony ; in the first stage, the vascular action will be thereby subdued, and in the second the medicine acts as a powerful expectorant, determines to the surface, and promotes the evacuations from the bowels. Often, however, the disease defies all sanative measures, and advances unsubdued to a fatal termination.

Tracheotomy has been both proposed and performed in this disease. Recourse to it is not warrantable till the later period of the affection, and then it will be found unavailing. If performed early, there is found no obstruction to respiration that can be removed ; it can therefore be of no service, and is not required. If it be undertaken at a more advanced period, lymph will most probably be found to extend below the incision ; the bronchial tubes and the substance of the lungs are then the principal seat of the disease, and consequently the operation is futile, at least in children. I have several times been prevailed on to perform tracheotomy on children labouring under croup, the results were unsuccessful, and from my own experience I condemn the practice.

Cynanche laryngea, in adults, is of comparatively rare occurrence ; at least that kind of inflammation



of the windpipe, which, in children, is so rapid in its progress, and so prone to terminate in effusion of lymph, is not often met with in persons of an advanced age. Inflammatory affections of the larynx and trachea are, however, by no means unfrequent in adults ; but are of a very different character, as to symptoms, progress, and termination, from that affection which is strictly denominated croup. Pain is felt in the region of the windpipe, and is aggravated by pressure on the forepart of the neck, by speaking, and by deglutition ; expectoration is increased, and ultimately assumes a muco-purulent character. The voice is altered in tone and in strength, and occasionally there is complete aphonia. Frequently these symptoms, after having continued for a short time, gradually subside ; if not, the mucous membrane, particularly in the upper part of the larynx, becomes thickened and considerably softened in texture, with effusion of serous fluid in the subjacent cellular tissue, and apparently in the substance of the membrane itself. In consequence of such effusion, the difficulty of breathing is much increased. Occasionally lymph is effused on the surface of the membrane ; but this is comparatively of rare occurrence, and when it does take place, is generally confined to the upper part of the larynx.

The effusion of serum is often abundant, causing protrusion of the mucous membrane, and narrowing of the canal ; and when it is limited to the upper part of the larynx, as frequently happens, the disease



is termed *Œdema Glottidis*. In this affection, the majority of the symptoms, which have been already enumerated as attendant on laryngitis, are all present, and in an aggravated form. Inspiration is extremely difficult and sibilant, and occasionally the patient experiences a sensation, as if a foreign body were lodged in the passage, and changed its position on the muscles of the part being put in motion. The symptoms of œdema come on gradually in some cases, in others with alarming rapidity. They often follow ulcerations of the soft palate, and of the root of the tongue, occurring on the patient being exposed to cold or moisture, or supervening rapidly when discharge from the ulcerations is by any accident suddenly suppressed. The difficult breathing, with cough and violent attempts at expectoration, takes place in paroxysms, and often to so alarming a degree as to threaten immediate suffocation, especially during the night. Deglutition is seriously impeded, the strength is exhausted, the body is emaciated, the features become contracted and evince great anxiety. As already stated, the serous effusion is chiefly situated in the upper part of the larynx, particularly on the lips of the glottis, and on the inferior surface of the epiglottis; and on introducing the finger, a soft swelling can be felt beneath this cartilage. In some instances, the disease rapidly proceeds to a fatal termination, the glottis being speedily and entirely shut by the swelling; in others, the patient lingers for weeks and months.

Depletion, local and general, especially the former,



if employed on the first appearance of the inflammatory symptoms, will often arrest their progress ; but if practised at a more advanced period, it can be productive of no benefit, and if any advantage does follow, it is merely temporary. Sometimes considerable advantage will be derived from the use of blisters, or from the unguentum tartritis antimonii being rubbed on the forepart of the neck so as to produce an eruption of numerous pustules. When all hopes of procuring resolution have passed, and when the urgent symptoms occasionally threatening suffocation supervene, tracheotomy should be performed without delay ; and it ought to be borne in mind, that the more early this operation is resorted to, the greater is the chance of success. It has been repeatedly stated, that the disease is confined to the larynx, and, in most instances, to the upper part of it, so that by making an opening in the windpipe below the thyroid gland, the disease is situated above the incision, the patient breathes through a canal which is in its healthy state, the affected parts are set at rest, and from their remaining motionless the disease often subsides spontaneously ; if not, the various applications to the parts can be employed much more successfully than before ; for when the parts remain subject to constant irritation from the movements necessary for respiration and nutrition, all medicines and all topical applications are generally productive of little or no benefit. But if the incision be made into the cricothyroid membrane, we will, in most instances, cut into the very middle of the disease ; at any rate, the



affected parts can be at no great distance from the incision, and the irritation of the tube will be a sufficient cause to excite inflammatory action in parts contiguous to the original disease, and already disposed to assume a similar action ; thus the disease will be extended. I have performed tracheotomy on a very considerable number of patients afflicted with œdema glottidis, and I may say, with uniform success. The disease was speedily subdued, and in most of them there was no great difficulty in closing the artificial aperture, and restoring natural respiration. The relief afforded by the operation is almost instantaneous ; the performance of it, if skilful, is attended with no danger ; and want of success will generally be found to proceed from its having been too long delayed.

In consequence of laryngitis, or of long continued irritation in the neighbourhood, the mucous membrane becomes indurated, and subsequently ulcerates ; or ulceration may extend from the fauces. In some cases, the ulcers of the larynx are few, and of slight extent ; in others, they are more numerous, and of considerable width and depth ; and in some there is extensive and uninterrupted destruction of the surface, surrounded by thickened and elevated mucous membrane. This disease is termed *Phthisis Laryngea*. It is characterised by expectoration of purulent matter, by pain in the region of the larynx increased by pressure, by great prostration of strength, with general sinking of the vital powers, and fre-



quently by hectic fever. From extension of the ulceration, the vocal chords, the ventricles of the larynx, and the mucous folds forming the rima glottidis, are more or less injured, and frequently altogether obliterated; partial or complete aphonia is the consequence.

From the reasons which have been already stated, inspiration is performed with difficulty, and accompanied with a wheezing and rattling sound, resembling the passage of air through a narrow aperture lined with viscid fluid. Deglutition is difficult; and, from the inactive state of the muscles which naturally close the glottis during swallowing, and from the greater or less destruction of the epiglottis, a portion of the fluid taken into the mouth escapes into the windpipe, produces violent coughing, and is ejected by the mouth or nostrils. As the disease advances, the lungs become affected, the patient is incapacitated for ordinary exertion by the dyspnœa which ensues, he grows weak and languid, and seems, in fact, to labour under phthisis pulmonalis. Not unfrequently the two diseases are combined; but, in the majority of cases, the affection of the lungs supervenes on that of the larynx.

When the ulceration extends deeply, portions of the cartilages sometimes become diseased; the soft parts surrounding them are destroyed, they become necrosed, and are expectorated along with a quantity of highly foetid purulent fluid. In some instances, the expectorated portions are osseous, of loose texture, irregular margins, and dark colour, and



of an odour intolerably fœtid. It sometimes happens that the ulcerations proceed still more deeply, perforating the parietes of the canal, and establishing a communication betwixt the windpipe and gullet; or, if the perforation is anteriorly, the communication is with the cellular tissue on the forepart of the neck, abscess forms which may attain a large size and be productive of much inconvenience and danger.

The disease has frequently been produced by mercury, when the abuse of that mineral was exceedingly common; and still its abuse is far from uncommon.

The symptoms may be mitigated by counter-irritation; but tracheotomy affords the only hope of permanent relief; and if performed at an early period, there is every reason to expect that it will prove successful. It is followed by the beneficial results mentioned when speaking of the preceding disease, and the nitrate of silver can be applied to the more external ulcers, along with the internal use of sarsaparilla, &c.

It may even be practicable to employ topical applications to the ulcers within the cavity of the larynx, as in the following case, which, though unsuccessful, shows the advantages to be expected from similar procedure adopted at a more early period. T. C. aged 22, had laboured under the symptoms of phthisis laryngea for five months previous to his application. He was much emaciated, and experienced great difficulty in swallowing, on account of the irritation induced in the region of the glottis; he had occasional cough, purulent sputa, and aphonia almost complete.



The larynx was painful when pressed, the epiglottis was seen to be œdematous, and the general symptoms were of a hectic character. The œdema of the epiglottis was reduced by scarification.

The symptoms increased, notwithstanding counter-irritation and tonic remedies. The stethoscopic indications regarding the chest were favourable.

Tracheotomy was performed, and the patient felt very much relieved in consequence. On the tenth day after the operation, the inner surface of the larynx was touched with a strong solution of the nitrate of silver, applied by means of a bit of lint wrapped round the end of a probe slightly bent, and introduced upwards from the wound. The solution was applied every second or third day, and under its use the patient was remarkably benefited. He swallowed, spoke, slept, and looked better; the purulent sputa diminished, and the cough abated. He complained of less pain in the larynx, and seemed to be regaining strength, though slowly.

But after the lapse of several weeks, evident symptoms of bronchitis supervened, under which his constitution, already shattered, speedily sank. The larynx was found extensively ulcerated, but at a number of points there were distinct marks of recent cicatrization. The state of the lungs clearly showed that phthisis pulmonalis had not only commenced, but made considerable progress.

Dyspnœa is caused by other circumstances besides those already mentioned; it frequently arises from



paralysis of the muscles of the larynx, in consequence of effusion at the base of the brain, from long continued irritation, as from an irritating cause seated in the mouth, and in old people from a general decay of the animal powers. In the last case, it is generally a symptom of approaching dissolution, as is the dysphagia which often attends it.

Severe dyspnœa is sometimes caused by external violence. A fine healthy child, aged eight, in running across the street, fell, and struck the larynx with great force upon a large stone. She was taken up quite lifeless, and some time elapsed before respiration was at all established. A gentleman finding her face livid, opened the temporal artery, and applied leeches to the throat, with some relief. I saw her about three hours after the accident. The breathing, inspiration more particularly, was exceedingly difficult; and this appeared to proceed not only from the injury to the larynx, probably occasioning loss of power in the muscles, but from the collection of some fluid in the trachea and its ramifications. The child was evidently in such a state that, unless active measures were resorted to, and that speedily, a fatal termination would soon take place. Tracheotomy was performed; a quantity of coagulated blood and bloody mucus was evacuated from the opening; and when the discharge and coughing had ceased, a tube was introduced. In a short time the tube was withdrawn, the aperture closed; and no unfavourable symptom recurred.



Large or irregular *foreign bodies*, as coins, pebbles, portions of stone or of coal, seeds of fruit, &c. put heedlessly into the mouth, are apt to become impacted in the rima glottidis, and give rise to severe and dangerous dyspnœa, or even cause sudden dissolution. Smaller and smooth substances pass through into the trachea. Such accidents happen most frequently to children. Peas, beans, small shells, &c. slip into the air passage, are obstructed for a short time in the rima, but are soon forced by the convulsive actions of the patient into the trachea, and frequently lodge in the right bronchus, it being more capacious, and more a continuation of the trachea than the left; or they remain loose in the trachea, and are moved up and down by the passage of the air. Immediately on their introduction, most violent coughing takes place, respiration is convulsive and imperfect, the patient writhes in agony, and is in dread of instant suffocation; the countenance becomes inflated and livid, and most strenuous efforts are made by nature to expel the foreign body. At length he is exhausted, and an interval of perfect quiet ensues; but this is soon interrupted by renewed attempts at expulsion. After a time, the intervals of repose increase in duration, and in many cases are so long continued, as to lull the patient and his friends into a belief that the windpipe contains no extraneous substance. But still coughing continues violent, and the dyspnœa alarming; on attentive examination, the body may be discovered, causing hardness or slight projection in the forepart of the



neck, or a peculiar noise can be detected produced by its movements in the passage ; at the same time, thin mucus is copiously discharged from the lining membrane. Occasionally the foreign body becomes so placed in the canal, as to form a complete valve, and then the labours of the patient to dislodge it are most painfully severe ; if they fail, he is suffocated. The parts may at length get accustomed to the presence of the foreign body, and all uneasiness subside. But danger, though not immediate, still remains. Foreign bodies have remained for years without causing much inconvenience ; but in such cases they have generally settled in some remote ramification of the bronchia ; abscess takes place around, purulent expectoration follows, all the symptoms of pulmonary phthisis are established, the patient grows hectic, and dies.

The existence of the foreign body, when suspected, is to be ascertained by accurate and attentive examination along the forepart of the neck, and by listening carefully to the sounds which may be present in the trachea ; but the urgency and continuance of the symptoms will seldom leave the surgeon to entertain a doubt. If he attentively watch the patient, he can scarcely be mistaken. It has been recommended to examine the *œsophagus* previously to adopting active measures, a large foreign body impacted in that passage being capable of materially obstructing respiration by compression of the trachea, and it is safe and prudent to follow this recommendation whenever the least uncertainty exists regarding the real nature of the case.



When a foreign body has lodged in the windpipe, tracheotomy should be had recourse to without delay. In general, the offending substance presents itself immediately after the division of the trachea, and is expelled by a strong current of air. But in some cases it may be necessary to introduce instruments—probes, scoops, or small forceps—upwards or downwards, to dislodge and extract the body. A little blood from the wound may cause coughing for some minutes, but this soon ceases; the wound is closed, respiration is completely re-established, and all that the surgeon has then to combat are the evil effects on the mucous membrane which the contact of a foreign body may have occasioned.

Tracheotomy is, in all cases, preferable to laryngotomy. In disease of the windpipe, as formerly stated, it is better to cut into a sound part of the passage, or at least as far as possible from the seat of the disease. When an adult, for example, labours under acute laryngitis, the effused lymph is generally confined to the larynx, as was already mentioned; an opening below the thyroid gland is removed from the effusion, and by means of it the patient breathes through a tube yet sound; whereas if the opening is made in the crico-thyroid membrane, the surgeon cuts into the middle of the diseased part: little or no benefit follows, and if the danger is not increased, that equivocal good is all that can be expected from such an operation. Tracheotomy is also preferable for the removal of foreign bodies, unless it is certain that the body is impacted in the rima, for in such



circumstances laryngotomy is much more suitable. In tracheotomy, the incision of the tracheal rings can be extended with much less injury than can division of the laryngeal cartilages, when the largeness of the foreign body, its being firmly fixed, or other circumstances, require that the wound be of considerable size. The risk or danger in the one operation is not much greater than in the other. Division of the crico-thyroid membrane and skin is effected by one incision ; there is nothing important in the way of the knife. Tracheotomy, on the contrary, requires to be proceeded in more carefully, particularly in children, in whom the neck is short, and the trachea deep. Obstacles may also be presented by the thyroid and other veins being distended, and the soft parts are perhaps tumid and infiltrated with serum.

The patient should be seated with the trunk erect, and by throwing back the head, space in the neck is gained. In an adult female on whom I lately operated, this advantage could not be obtained on account of induration in the belly of the sterno-mastoid muscle, with contraction. The incision of the integument is commenced in the mesial line over the cricoid cartilage, and carried downwards, an inch in the adult, but proportionally shorter in children. The cellular tissue is divided by a few touches with the point of the instrument (a small scalpel or bistoury) ; the finger is then introduced to separate the sterno-hyoid and thyroid muscles, and to feel for any stray vessels which may be in the way ; for the thyroid arteries



sometimes cross the line of incision, and it may happen that some of the larger arteries of the neck, by following an unusual course, become liable to injury, if the operation were rashly performed. The plexus of veins on the forepart of the neck are pushed downwards, and the isthmus of the thyroid gland, if it exist, is displaced slightly upwards ; thus the rings of the trachea are cleared. The patient is desired to swallow his saliva, in order to elongate and stretch the windpipe ; and the surgeon, seizing the favourable opportunity, pushes the point of the knife, with its back towards the top of the sternum, into the tube at the lower part of the incision. The instrument is carried steadily upwards, so as to divide three or four rings.

If the operation has been undertaken for the removal of a foreign body, its object is usually accomplished immediately on division of the rings ; if not, the substance must be dislodged by proper instruments, as was previously remarked. The opening is allowed to close after the oozing of blood has entirely ceased ; but its edges must be kept asunder till then, lest the blood be drawn into the bronchial tubes, which occurrence, however slowly it take place, is always dangerous. The union and cicatrization of such longitudinal wounds are soon accomplished ; they close permanently in a few days, even after having been open for many weeks with a foreign substance interposed between their edges. The same obstacles do not interfere as in transverse wounds ; on the contrary, every circumstance is in favour of rapid union.



When the object of the operation is to relieve respiration, impeded by disease in the superior part of the canal, a silver tube, of convenient curve, length, and calibre, is introduced into the wound immediately on the knife being withdrawn, and secured by tapes attached to the rings at the orifice of the tube, and tied round the neck. Frequently a violent fit of coughing, alarming to the patient, follows the introduction, in consequence of some blood having entered the trachea. But on the ejection of some frothy mucus, mixed with blood, the patient becomes quiet and tranquil, breathes easily, and feels composed and relieved. The form of the tube—the calibre gradually increasing from below towards the orifice—completely prevents any farther ingress of blood, by the uniform compression which it makes on the edges of the wound. The secretion of mucus in the trachea is increased by the presence of the foreign body, but the patient easily frees himself from its annoyance, being instructed to place his finger on the orifice of the tube, so as to narrow the aperture, when he wishes to cough and expectorate. Mucus, however, is apt to adhere to the inner surface of the tube, and thereby obstruct breathing; and to prevent this, it is necessary occasionally to introduce a feather, or a probe wrapped round with lint, for some hours after the operation; the attendance of an assistant may be necessary for this purpose, but the patient readily undertakes the duty himself, on being made aware of its necessity. A double tube has been recommended, to facilitate the



keeping of the passage clear, the inner one being occasionally withdrawn, cleaned, and replaced. But this is not necessary. The frequent introduction of a feather, or probe, is sufficient for some hours after the operation, and in a very short time the patient finds that he breathes freely, though the tube is removed for a few minutes, in order to be cleaned. At first, a funnel-shaped tube is used, to compress the edges of the wound and prevent oozing, as already mentioned; afterwards, one of uniform calibre is more easily coughed through. The patient should be kept in an atmosphere of warm and equal temperature, and it is also prudent to place some cloth of very loose texture over the tube, that the temperature of the respired air may resemble as much as possible that passing through the whole track of the windpipe; thus bronchitis may be averted.

In some cases, the necessity for continuing the tube speedily goes off, the larynx, in consequence of rest, having recovered its healthy state and action. After eight or ten days, on taking out the tube, and closing the aperture in the trachea, the patient breathes and speaks well, and continues to do so.

In other instances, the difficult breathing recurs soon after withdrawal of the tube, the morbid state of the laryngeal mucous membrane having not been wholly removed. In such circumstances, the tube must be replaced and continued, but a smaller one suffices, less mucus is secreted, and a considerable quantity of air passes through the larynx; in short, the patient requires merely a small tube to obviate the



danger which might arise from complete closure of the artificial opening. He speaks tolerably well, on placing his finger over the orifice of the tube. In course of time, the larynx may recover, and the tube be no longer necessary.

In some cases, a tube of a certain size must be worn during the remainder of life ; and it may not cause much inconvenience. Attempts to discontinue its use give rise to dreadful suffering ; the difficult breathing, threatened suffocation, and horrible feelings during the night, all recur. The box of the larynx has fallen in, as it were, in consequence of having been long disused, and is unable to resume its functions to their full extent. Besides, great, though gradual, change of structure has in all probability taken place. In several such cases, I have attempted to restore the natural dimensions of the passage, by the occasional introduction of bougies, gradually increased in size ; but in none have I completely succeeded, except in the case of attempted suicide which has been already detailed shortly. In all, my attempts were at first followed by encouraging amelioration, but untoward symptoms occurring forced me to abandon them, though repeatedly persevered in. In one man, I succeeded in restoring natural respiration, but this was not of long continuance ; a fresh accession of œdema glottidis made renewal of the artificial opening absolutely necessary. Still the results are not such as to forbid further trials ; and at any rate, it is now well understood that much greater freedom may be safely used with the air-tube



than was formerly imagined ; yet it must be acknowledged that little benefit can be expected to follow such, or any treatment, in many cases of contraction of the canal, from long-continued disease.

The introduction of tubes into the larynx, has been supposed likely to supersede bronchotomy in some cases ; and it is said that their presence does not produce so much irritation as has been stated. But the practice must, in all cases, be most troublesome to the surgeon, and painful to the patient ; and, in my opinion, continuance of it is in the great majority of cases impracticable. Besides, it is difficult, and not unattended with danger. Bronchotomy is quite safe, and not likely to be followed by such suffering to the patient, or by any other unpleasant consequence, to which the other method is liable.

*Pharyngitis*.—Inflammation of the pharynx is of rare occurrence. The inflammation may extend from neighbouring parts, or be produced by the direct application of an irritating or stimulating cause, as the lodgement of foreign bodies, of pins, fish-bones, seeds, portions of hard food ; or by the application of acrid fluids to the membrane, acids, hot water, &c. In one instance which I met with, it occurred in a very violent form, in consequence of a large and sharp portion of an earthen ware plate having been swallowed by the patient whilst taking his porridge, and becoming firmly impacted in the lower part of the pharynx. I have seen a considerable number of instances in which the disease was produced by the



swallowing of soap lees, a fluid highly acrid, occasioning a severe degree of inflammation, and even destroying a portion of the parietes.

Deglutition is difficult and painful; an exquisite degree of pain is occasioned by pressure on the sides of the neck, and the circulation is more or less excited. Redness and swelling of a portion of the mucous membrane can be observed on looking into the mouth. The changes which occur in the membrane, are similar to those produced in the windpipe by inflammation.

Resolution will generally be effected by the application of leeches to the neck, the exhibition of purgatives and diaphoretics, and strict observance of the antiphlogistic regimen.

If the inflammation does not soon subside, it sometimes happens that *constriction* of the passage occurs, either from thickening or œdematous swelling of a portion of the mucous membrane, or from effusion of lymph, and adhesion of the opposed surfaces. The common seat of *stricture* is that portion of the canal which is naturally the narrowest, the lower part of the pharynx and commencement of the œsophagus, immediately behind the cricoid cartilage: occasionally it takes place in other parts of the canal. In general, the contraction is of small extent, and unaccompanied with much thickening around. The tube immediately above the constricted point is more or less dilated, and often to so enormous a size as almost to resemble a first stomach. In the majority of cases, the parietes of this pouch are attenuated; but occa-



sionally they are much thickened, and the seat of a purulent collection, which subsequently opens into the general cavity. In cases of long standing, ulceration often occurs, usually limited to the neighbourhood of the stricture. When the parts immediately below the stricture are ulcerated, the circumstance is often attributed to the retching which generally attends the disease; but it appears to be the result of morbid action, seated in the parts themselves, similar to the ulcerative process in the larynx following inflammatory affection. But ulceration occurs as frequently above the stricture as below it; and, besides the natural cause to which it is referable, is often produced, or at least aggravated by injudicious or unskilful attempts to remove the constriction. Though the ulcers seldom enlarge to any great extent, yet in some rare cases, a portion of the parietes of the canal is perforated, and a communication thus established with the trachea, or with the cellular substance amongst the muscles of the neck. Or the ulcers, from either long continuance, or inherent disposition, may assume a malignant action, extend rapidly in both width and depth, throw out fungous and unhealthy granulations, form sinuous false passages, and produce a most horrible and intractable disease. But strictures are often of temporary duration, and appear to depend on spasmodic contraction of the circular muscular fibres of the tube. And dysphagia may also arise from an opposite condition of the fibres—from paralysis, in consequence of cerebral affection, a fatal symptom in any disease.



The prominent symptom of stricture of the œsophagus is difficult deglutition. Some patients can swallow only liquids; and when an attempt is made to get over any solid substance, this is stopped at the contraction, and completely obstructs the passage. In such cases, patients will frequently apply for relief, in order that the portion of food may be pushed through the narrowed passage; with the accomplishment of this many are quite satisfied, and are unwilling to submit to farther treatment, obstruction to solid matter being the only inconvenience experienced. But when contraction is great, and the involved portion of the canal almost obliterated, little food of any kind can pass into the stomach, the patient becomes feeble and emaciated, and ultimately dies from inanition. The subjects of this affection are generally far advanced in years, and in them it often occurs without any evident cause.

If pharyngitis have subsided, either spontaneously or after antiphlogistic treatment, and symptoms of stricture supervene, the existence or non-existence of this latter disease must be ascertained by gentle and cautious introduction of a gum-elastic bougie or ivory-ball probe. If stricture exist, the descent of the instrument will be resisted at the contracted point, and most frequently at the lower part of the pharynx; this, in the adult, will be at a distance of about nine inches from the incisor teeth. When the seat of the stricture is ascertained, a bougie is to be introduced, sufficiently small to pass through it; and when this has been pushed beyond, the disease, if unattended



with malignant disposition or action, is completely in the power of the surgeon. After sufficient time has been allowed for the irritation following the first introduction to subside, a larger bougie is to be passed, and retained as long as its presence can be endured. This practice must be continued, till, by gradual increase of the bougie, the canal is dilated so as to admit readily an instrument sufficient to distend the gullet in its healthy state. Thus the passage will be gently and gradually dilated, till it regain its original calibre. The process is partly mechanical, but also greatly dependent on vital action ; by the presence of the bougie the parts are stimulated, the fluid, which may be effused beneath the mucous membrane or into its substance, is absorbed, and the new solid matter is also gradually removed by increased action of the absorbents. But if the bougie be rudely and forcibly introduced, or too long retained, the absorbent action from being salutary becomes morbid, and ulceration is established, which may proceed to destroy the parietes of the canal, so producing an additional and equally formidable disease ; or if the ulcerative action subside, the parts will cicatrise and consequently contract, so giving rise to a new stricture, and narrowing the canal to an equal or greater extent than formerly. Before introducing the bougie, the head must be thrown as far back as possible, and brought to a horizontal position, that the natural curve of the upper part of the canal may be lessened, and the passage of the instrument thus facilitated. It is of consequence also to keep the point of the bougie



pushed back towards the vertebræ, and to grasp the larynx with the left hand and pull it gently forwards, that there may be no risk of the instrument passing into the windpipe, instead of into the gullet; if such a mistake should happen, the surgeon will soon be apprized of it by the violent and convulsive coughing which is generally induced, though not always. Bougies armed with caustic in their points have been recommended, but are unnecessary, the simple bougie being sufficient to remove the disease, if skilfully employed; besides, their use is not unattended with danger, ulceration being frequently produced. In very bad cases, in which the stricture is long in yielding to the means already mentioned, and the nutriment which the patient is able to swallow is necessarily small,—when the canal is altogether obliterated either at one point or to a considerable extent, and when there is consequently little hope of success from any treatment—the strength of the patient may be supported, and life prolonged for some time by the use of nutritive enemata.

Dysphagia may also be caused by tumours in the œsophagus; but as these are generally of a medullo-sarcomatous structure, and consequently endowed with malignant action, the treatment can only be palliative—there is no hope of a radical cure.

Dysphagia may arise from an aneurismal tumour of the arch of the aorta, or of the large arterial trunks passing off from it, pressing on the œsophagus, and so narrowing its calibre. In such cases, also, no hope



of success from any treatment can be entertained ; often the case suddenly terminates fatally, in consequence of the aneurismal tumour giving way at the point which protrudes on the gullet ; the contents are discharged into the stomach, or ejected by the mouth. If treatment by bougies be attempted in dysphagia arising from such a cause, the practitioner not being aware of the nature of the disease, fatal issue will be fearfully hastened—a very unpleasant consequence of any practice.

*Foreign bodies* lodged in the *œsophagus* produce difficult deglutition, and, if large, may obstruct the passage completely ; much irritation is also caused to the parts with which they are in contact, and inflammatory action kindled in them. A large substance firmly impacted likewise creates difficulty of breathing, by compressing the posterior part of the trachea. Indeed every consequence is of such an annoying nature, as to render dislodgement and removal of the offending substance necessary, though there were no apprehension of danger from its long continued presence. The proceedings must be varied according to the consistence, form, size, and situation of the foreign body. There are a great many instruments for effecting dislodgement and extraction, but the great majority of them are more curious and ingenious than applicable to the purpose intended ; few are of any use. A probang, mounted with a bit of sponge, or with an ivory-ball—a blunt flat



hook attached to a whalebone probe—and long curved forceps, constitute the whole useful apparatus. The feelings of the patient are generally sufficient to mark the position which the body occupies; he is made to throw the parts into action, by attempts to swallow the saliva, and during the attempt to point to the seat of pain. But by this both patient and surgeon may be deceived, for pain and a feeling of foreign matter being lodged often remain at a fixed point, after the body has passed down; similar deception occurs in other situations, as in regard to extraneous substances in the eye, urethra, &c.

Small and sharp substances seldom remain long in the œsophagus, but readily descend into the stomach and intestines; they then either escape along with the fæces, or, as more frequently happens, penetrate the parietes of the alimentary canal. On leaving the stomach or the intestines, by gradual perforation, they frequently travel great distances in the trunk or limbs, without causing much inconvenience,—effusion of lymph surrounding them, and filling up their track. They will appear, long after their insertion, at a far distant point, approach the surface, and gradually make their way through the integument, or be readily extracted. When they enter from the surface, also, they often come within reach long afterwards, and far from their point of entrance. Needles, thus travelling, become oxidized. They are easily removed, on coming near the surface, by fixing them with the fingers, and making a small incision over the more superficial extremity. A needle may some-



times be taken out, by making pressure on both ends, and so forcing the point through the integument.

Small pointed bodies, needles, pins, fish bones, &c. often get entangled in the root of the tongue or in the folds of the palate ; on opening the mouth they can be seen, and are easily brought away. If lodged in the pharynx, they can be reached by the finger. The patient is seated with the head thrown back, and the jaws extended ; the finger is introduced with determination, regardless of attempts to vomit, and swiftly passed into all the sinuosities by the side of the epiglottis, into the pouches betwixt the os hyoides and cornua of the thyroid cartilage, and no part is left unsearched. The substance, when felt, may be extracted without withdrawing the finger by entangling it in the point of the nail ; or curved forceps may be introduced, and applied conveniently to the body by the guidance of the finger. Great care and caution is required in dislodging the foreign body, when both ends, as is often the case, have penetrated the parietes ; if it be rudely grasped and pulled, the parts are lacerated ; or it breaks, and the surgeon, after bringing out the portion held in the forceps, may find great difficulty in detecting and disentangling the other. I have often found it very troublesome to remove delicate needles entire. When they are beyond the reach of the finger, it is of no use to attempt their removal ; the patient suffers great pain during the endeavour, and there is no chance of successful issue ; besides, the surgeon is apt to bring discredit on himself.



Coins may be removed by the forceps, or by the hook, if lodged at the narrow part of the passage behind the cricoid cartilage ; if lower, they generally defy attempts at extraction, and slip into the stomach gradually. Halfpennies, halfcrowns, &c. pass readily along the alimentary canal, and are voided in a short time.

Tendinous or cartilaginous portions of hard meat, when within reach of the finger, can be laid hold of by the curved forceps, and pulled up. Smaller and soft portions, if impeded in the passage, as when it has been narrowed by previous disease, are dislodged and pushed down by the cautious use of a small probang, or œsophagus bougie. In the introduction of any instrument, attention should always be paid to the steps advised when treating of stricture of the gullet.

*Œsophagotomy* is an operation that may, under some peculiar circumstances, be required. When a foreign body is of such a nature that, when once lodged in the gullet, it cannot be removed either upwards or downwards, without serious læsion of the parts, and when breathing is impeded by its projection, incision of the œsophagus may be warrantable. The operation is easily accomplished. An incision of about three inches is made in the superior triangular space of the neck, on the left side,—the gullet usually inclining to the left of the mesial line. It is commenced opposite to the os hyoides, and carried downwards parallel with the trachea ; and the use of the knife is continued till by cautious dissection the wound is brought to the level of the common



sheath of the large vessels. Assistants separate the edges by thin and broad copper spatulæ, and the cavity is frequently sponged. The larynx is pulled aside, and turned a little over on its axis; the pharynx is thus exposed. During the latter part of the dissection, the laryngeal nerves and thyroid arteries must be looked for and avoided. The foreign body is felt through the parietes, and these are laid open to an extent sufficient for its extraction. It is advisable to nourish the patient for some days afterwards through an elastic tube passed by the mouth or nares into the gullet, with its extremity one or two inches beyond the wound. Its introduction requires caution; an instance is on record of a tube being passed with the view of conveying nourishment, and the surgeon not discovering that its extremity had slipped into the larynx till after the injection of some fluid. It is recommended to wait for some minutes before proceeding to inject, and that, if during that time no air pass through the tube, the instrument may be considered certainly in the œsophagus. It is seldom that the opening of the œsophagus will close by the first intention, and therefore accurate approximation of the external wound need not be attempted.

*Removal of noxious matter from the stomach* is now successfully practised by the aid of instruments. This is required when the excitability of the organ has been impaired or destroyed, and emetics in consequence do not act.

It is unnecessary here to treat of the emetics which



act most quickly, or which are most proper in different cases, nor of antidotes for various poisons. Many stomach pumps have been contrived, and their merits have caused much rivalry; but they are all constructed on much the same principle. People, too, seem to indulge the inventors by swallowing deleterious substances much more frequently than before. There has been a demand for cases of poisoning, and the supply has kept pace with the demand. Now-a-days twenty seem to attempt suicide by poison for one that did so long ago.

Most vegetable narcotics—those which do not act with great rapidity, can be removed mechanically; but some of the mineral poisons are heavy and difficult of solution, and are not so readily extracted. Read's apparatus appears to me the simplest and the best, for this and various other purposes. Ample directions are given along with the instrument.

*Inflammation and Abscess of the Ear* are either deep-seated, or confined to the external meatus. Suppurations in the internal parts—in the cavity of the tympanum, or in the mastoid cells—are often attended with the most violent symptoms, excruciating pain, fever, delirium. Such are highly dangerous in their consequences. Collections nearer the surface, under the membrane lining the meatus, are, though not so dangerous, also attended with great suffering and severe constitutional symptoms. The disease may occur at all ages, but is most common in children during dentition; in them it is often accompanied with convulsions and head symptoms, leading to a



suspicion of hydrocephalus being established. The symptoms are all much relieved on the occurrence of copious purulent discharge.

Suppuration in the organ of hearing often follows eruptive diseases ; and both ears, or one, may continue to discharge for a long time. There is always more or less derangement of the functions of the parts. When the disease is external, perhaps hearing may not be much affected ; but when, as often happens, the ossicula, nervous expansions, membrane, parietes, are all destroyed or injured, hearing is lost, or at least very obtuse. Purulent discharge often continues for the rest of the patient's life, at one time scanty, at another profuse, and preceded or accompanied by inflammatory symptoms. Openings form over the mastoid process, communicating with the cells ; and these are often connected with abscess betwixt the dura mater and pars petrosa of the temporal bone. Abscesses, too, of the middle lobe of the cerebrum, or in the cerebellum, are sometimes evacuated through the meatus auditorius. In all cases, but in the last more particularly, the patient suffers extremely on the discharge being suppressed, and is again relieved on its recurrence. At length, fever and delirium may supervene, terminating in coma and death ; I have dissected many who have perished in this manner. Or, after long continued discharge from the meatus, perhaps with paralysis of one side of the face, a soft tumour of the dura mater will be found lying over the pars petrosa, having caused extensive absorption of the bone, and exposed the semicircular canals, cochlea, tympanum, &c. filled



with purulent matter. Abscess of the tympanum itself discharges long, and large, flabby, soft granulations fill up the meatus, different in appearance from tumours which occupy that situation.

Ordinary earache—inflammation extending along the meatus externus, and confined to the lining membrane—will be relieved by leeching behind the auricle, and by assiduous and regular fomentation afterwards. But suppuration is seldom prevented. The abscess may sometimes be opened, with great relief. If deeply seated, the parts are soothed by fomentation and poultice, till spontaneous evacuation of the matter; this is then to be washed away, from time to time, by the injection of a warm and bland fluid; the abscess gradually closes, and the discharge slowly disappears. In cases of long continued discharge, it is generally impossible to ascertain from what depth the matter comes, and there is always great risk in using means to arrest its flow. The patient must submit to the annoyance. The discharge can be moderated, or altogether suppressed by injections of astringent salts, but the practice is unsafe, and in most cases unwarrantable. The parts are to be kept clean by frequent ablution with tepid water, lime water, or other bland fluids; and cotton or wool may be worn in the meatus to take up the discharge, and prevent bad effects from cold. Discharge from the external meatus, and about the auricle, is often kept up by irritation in the mouth, in both children and adults; this should be looked to, and the offending cause removed, if possible.



*Foreign Bodies* are frequently lodged by children in the meatus auditorius externus—peas, beads, shells, shot, pins, &c. By awkward attempts at removal they are pushed deep into the cavity; and the membrane of the tympanum is sometimes broken, as indicated by effusion of blood, and swelling of the parts. Violent inflammatory symptoms may be caused by such substances, and will be seriously aggravated by unsuccessful attempts at extraction. Sometimes they are allowed to remain for days or weeks; in such circumstances seeds swell, separate, and begin to throw out a germ, thus fixing themselves more firmly in the passage. They are easily removed at first, by a small silver scoop, of convenient size and form; and even at a later period, a determined, though not forcible, attempt with the instrument will be followed with success. The scoop is gently and gradually insinuated betwixt the membrane and foreign body; and on its handle being then raised the body is extruded. It is seldom that any excitement follows extraction by this method: but if large and powerful instruments be introduced, and force applied, the parts may sustain severe injury, and troublesome consequences ensue: indeed such proceedings have proved fatal.

Foreign bodies are also occasionally impacted in the nostrils: the procedure above described is to be adopted. Sometimes they are discharged by the posterior nares during attempts at extraction.

*Polypus* of the meatus auditorius externus, is generally of pretty firm consistence, pyriform, some-



times slightly lobulated and warty-looking ; it adheres by a narrow neck to the parietes of the tube near the margin of the membrana tympani, is attended with slight discharge, and with deafness to a greater or less extent.

Extraction is the only means of cure. The body of the tumour is depressed and pulled outwards by the flat end of a probe slightly bent ; delicate forceps are introduced gently, and passed up to the neck of the polypus, which is then firmly grasped ; by combining slight twisting with gentle extractive force, it is readily removed. Or a flat scoop, with a sharp round edge, is passed along till obstructed, and by slight rotatory motion of the edge, the neck of the tumour is divided. After a day or two, a mild escharotic may be applied with the view of preventing reproduction ; a bit of charpie sprinkled with the oxidum hydrargyri rubrum may be pushed up to where the tumour was attached, and the application may be repeated several times, one or two days intervening. Even after this the tumour sometimes returns, again rendering extraction necessary.

*Deafness* is attributable to various causes besides those already mentioned. Accumulation of cerumen in the external meatus is the most common. The cerumen is often mixed with wool, and other extraneous substances, which the patient may have been in the habit of introducing as preservatives from cold, and thus a large and firm plug is formed, completely blocking the meatus. It is removable by the assiduous injection of tepid water, the best solvent of



cerumen. The whole may not be brought away at the first sitting; but the injection must be repeated again and again, till the membrane of the tympanum is free. A powerful syringe is required. But it is perhaps unnecessary to enlarge farther on this subject, for such is the division of labour in these days, that a distinct profession is founded on the operation of squirting water into the external ear; 'tis true that other operations are talked of by these Aurists, as they style themselves, but the advantage to be derived from any of them is often very doubtful. They talk of deafness as arising from a deficient secretion of cerumen, from dryness or from eruptions in the meatus; and heating stimulant applications are poured in—oils, ointments, mercurial salts, acetic acid, garlic, &c. all combined. They even go so far as to recommend mercurials to correct the state of the general health, to improve or rectify the chylopoietic viscera, the assistant chylopoietic, and the whole of the digestive organs, upon derangement of which, say they, many cases of deafness depend. The fools who apply to such charlatans certainly deserve to have their pockets well drained, but ought scarcely to be poisoned.

It has been proposed to pass probes into the eustachian tubes, to re-establish their continuity if obliterated, or dilate them if partially closed. No doubt deafness often depends on obstruction of this outlet from the tympanum, the requisite reverberation being perhaps thereby impeded. It may be closed by swelling of the lining membrane, by destruction of its extremity from ulceration, by the cicatrization of ulcers in the immediate neighbourhood, by congeni-



tal deficiency, or by pressure of neighbouring swellings, or of morbid growths, producing temporary or permanent obstruction. None but the first cause could possibly admit of the use of the probe, and even then it can scarcely be required. By removal of the cause of such turgescence at the end of the tube, or in the neighbouring parts,—which can often be detected, being local,—by counter-irritation, &c. a cure is much more likely to be effected than by the introduction of probes. Not that the operation is exceedingly difficult, for, after practice on the dead body, a probe can readily be passed into the eustachian tube from the nostril. The instrument is fixed in a handle, with its point slightly bent, and on the handle there should be a mark to show the direction of the point; the distance of the termination of the tube from the nasal orifice ought also to be marked. The instrument is passed along the floor of the nostril, and then its point is directed upwards and outwards, whilst the handle is pressed towards the septum narium.

*Puncture of the tympanum* has been recommended as a remedy for deafness arising, or supposed to arise, from obstruction of the eustachian tube; but I believe it has not succeeded in above one out of twenty cases. The puncture is apt to close very soon, and though the hearing may be improved for a short time, the advantage gained soon disappears. The means of keeping the puncture open are not easily applicable; perhaps the most effectual is to touch the edges occasionally with pencil-pointed lunar stone. The puncture is generally made with a short-pointed



trocar, such as is used for hydrocele. The canula is passed down to the membrane, and placed on one side of its centre lest the long head of the malleus should be interfered with. The trocar is then pushed on gently, and should penetrate but a very short distance, in case of injuring the important parts at the bottom of the cavity. By some a sharp-pointed probe is used, passed through a quill; or an instrument about the same size with the probe is made for the purpose, with a canula to fit. But these are by much too small; even the puncture with a trocar closes, notwithstanding the application of nitrate of silver. I have lately used a sort of punch, such as is employed for making holes in leather, of a pretty large size, and neatly made, with the edge very keen, and on a small stalk. This is introduced, and when obstructed, an attempt is made, with a rapid turn of the hand, to cut out a portion of the membrane. I have thus succeeded in improving immensely the hearing of one gentleman, enabling him to hear at four or five times the distance he could formerly. He had repeatedly submitted to punctures before I saw him; and, previously to the operation with the punch, I passed through the membrane a trocar, made large and well pointed for the purpose; but notwithstanding this, and the application of the nitrate of silver, I was unable to preserve the advantage gained, longer than a very few days. In suitable cases, the operation is worthy of trial, being unattended with pain or any dangerous consequences.



*Bronchocele* is not rare in some districts of Great Britain, but unattended with the same peculiarities of countenance and mind as in some other countries. The majority of those affected come from mountainous districts. The disease generally commences early in life, and females are more subject to it than males ; indeed almost all who present themselves are females. The tumours are of various sizes, involving either the whole gland, or only a part. One lobe is usually in a state of greater advancement than the other. The swelling is for the most part soft and yielding, the integuments are thin and movable, and large veins shine through them. It is unattended with pain, or any great inconvenience, though sometimes it equals in size the patient's head, or nearly so, and then it is troublesome from bulk alone. In general, there is little or no obstruction to deglutition or respiration, and the health is not impaired. The tumour is always of slow growth, at length becomes stationary, and the patient gets reconciled to the deformity. Its structure is that of the simplest form of tumour, and it is seldom that its action degenerates.

Internal remedies have been prescribed, with the view of arresting the growth, and promoting absorption of the enlarged thyroid—burnt sponge—muriate of lime—muriate of baryta, &c. The use of iodine, externally and internally, has in many cases been attended with beneficial effects. Tumours have diminished, and even disappeared entirely, during the employment of this medicine ; but in others, the diminution has been either trifling or none. The insertion of setons



has been strongly recommended ; and many patients are said to have been thus cured. I have tried it in one case only ; it certainly had the effect of diminishing the swelling ; but for some time great trouble was experienced from bleeding, whenever the cord was drawn, and the patient afterwards became much weakened by the profuse discharge. The proposal to tie the thyroid arteries, for the cure of bronchocele, has been put in practice, but without a favourable result.

Extirpation of such growths has been repeatedly attempted, but the patients, almost without exception, have perished from hæmorrhage, under the hands of the knivesmen. The immense supply of blood afforded to the gland in the healthy state, must be kept in mind, as also the enlargement of the vessels proportional to the increase of the part. Not arteries alone, but enormous veins, are to be encountered. The tumour is in the vicinity of important organs, and of the trunks of large vessels and nerves, and probably has become attached to them. In short, the operation is attended with such risks, with so absolute a certainty almost of fatal result, as not to be warranted under any circumstances, far less for removal of deformity only.

Enlargement of the isthmus alone gives rise to more severe symptoms apparently, and may warrant an attempt at removal ; but this can scarcely be accomplished altogether by incision. Such is my impression, and under this impression I proceeded cautiously in a case of this nature with which I had



to deal.—J. R., aged forty-seven, from the Highlands. The isthmus of the thyroid gland was enlarged to the size of a goose's egg. The tumour was extremely hard and irregular on its surface, but not painful when touched; it appeared to be adherent to the trachea, and did not admit of much motion. The voice was considerably impaired, and breathing much impeded, inspiration being difficult and attended with a loud wheezing noise. On making unusual exertion, even though inconsiderable, the dyspnœa was much increased; and on ascending a height, or even remaining for some time in a stooping posture, it amounted almost to suffocation. There was no pain or uneasiness in the larynx or trachea. The disease was of three years' duration. A seton had been introduced, but effected no diminution, and rendered the tumour more dense and less movable than formerly. I surrounded the lower part of the tumour by two semicircular incisions, and, dissecting cautiously beneath its base, detached it from its more loose connexions, not interfering with the central portion and its connexion to the trachea. During the progress of the dissection, the blood flowed most profusely from both arteries and veins, but was restrained by securing the former with ligature, and compressing the latter with sponge. An armed needle was then passed through the centre of the tumour, as close to the trachea as possible, and its remaining attachment enclosed by the separate portions of the ligature firmly applied. Every thing proceeded favourably. The tumour soon came away; the wound



healed with a firm cicatrix, and in about a month, the patient went home well.

*Glandular Tumours* of the neck, as formerly noticed, arise from various irritations; and some constitutions are more subject to them than others. The nature of the enlargement is dependent on the cause; it may be simple or malignant. Simple swellings often attain a large size; the lymphatic glands in both spaces of the neck, and on one or both sides, get immensely enlarged, the cellular tissue around is infiltrated with solid matter, and all matted together. Great deformity is produced; the head is turned with difficulty, and twisted to one side; often there is not much pain. After some time, the swelling becomes looser than before; its various portions separate, and gradually disappear; or the centre becomes soft, suppuration spreads extensively, and the surrounding hardness either goes off, or becomes partial.

Discussion of the swelling is to be promoted, and if possible the cause removed; and fomentation, friction, pressure, internal stimulants are to be employed, according to the state of the parts, along with what are called deobstruents in the first instance. When suppuration cannot be arrested, the attention must be directed to prevent the integuments from being destroyed. With this view, the abscess should not be permitted to give way spontaneously, lest an opening be formed whose cicatrization would cause deformity, and leave a stain on the race and genera-

<sup>5</sup> *And what does he mean?*

*They would be at once set down as scrofulous*



tion. An artificial aperture must be made early ; and over all the upper and most exposed parts of the neck, this should be in the direction of the folds, and small.

When many and extensive collections have formed, when the integuments have been undermined and attenuated before advice is sought, it is impossible to prevent deformity. The knife and potass are required, for reasons assigned in the preceding part of this work ; and the detached glands, as well as the thinned skin, stand in need of their free application.

Deep-seated collections may originate in glandular disease, or commence in the cellular tissue ; they occasionally follow transverse wounds of the neck. Great infiltration of the cellular tissue supervenes over the trachea and sternum, and also under the fasciæ ; purulent matter is secreted in the cells, and the parts are extensively separated ; sloughing is prevented only by free and early incision. The nature and extent of the coverings of an abscess seated deeply in the neck, are to be kept in view—the platysma myoides, the superficial and deep cervical fasciæ. Collections under these interfere with the functions of the neighbouring parts, and are attended with great pain, which is somewhat relieved by resting the chin on the sternum, and so relaxing the fasciæ. The matter makes its way to the top of the sternum, and generally points on the outside of the sterno-mastoid muscles. But before the integuments become thin, the deep parts have been seriously injured—cellular tissue sloughed, muscles separated



from each other, with unhealthy purulent matter interposed—the trachea, the œsophagus, or the mediastinum, opened into. Such cases have been alluded to at pages 41 and 45, Part I.

The lymphatic glands situated amongst the fat and cellular tissue between the deep and superficial cervical fasciæ immediately above the sternum, may become enlarged. When the tumour is large, breathing is impeded by compression of the parts beneath, and pain and much inconvenience is endured on account of its limited situation and resisting investments.

Purulent collections under the sternum are scarcely remediable. The parietes on one side are fixed, on the other have constant motion; and thus the surfaces, however healthy and well disposed, are prevented from coming together and adhering. The discharge continues, and at length wears out the patient, pulmonary affection perhaps supervening. The same unfavourable causes operate in other situations, in the iliac fossa, and in chronic collections under the cranium. In abscess of the mediastinum, no dependent opening can be obtained, unless by perforation of the sternum. This is perhaps warranted by œdematous swelling over some part of the bone, indicating, along with other symptoms, the existence of matter beneath. Purulent collections sometimes form in the substance of the sternum, communicate with the mediastinum, and involve the lower part of the neck.

The thymus gland is said to be liable to chronic



enlargement in young subjects of weak constitution, causing serious impediment to respiration and deglutition; the tumour is confined above and anteriorly, and consequently presses backwards on the trachea and gullet. Suppuration may take place in the swelling, and the matter ultimately be diffused in the mediastinum.

*Distortion of the Neck* arises from a variety of causes, and is either temporary or permanent. The head is often kept in an unnatural position for weeks by glandular swelling. Enlargement of the superficial glands, at the upper part of the neck, induces the patient to turn his head to the opposite side; swellings lower in the neck, and deep seated, require relaxation of the coverings, and the head is consequently twisted to the same side. Either rigidity, or spasmodic action, or both, of the sterno-mastoid muscle, displaces the head and twists the neck. The head is either bent forward, or turned to one side; usually, the chin is twisted over the shoulder, on the side opposite to the offending muscle. Induration of the muscle is sometimes met with, also causing distortion; it may terminate in abscess, or after a long time be discussed.

The cause of the spasmodic action in the muscle may be discovered or not. Sources of irritation at the extremities of neighbouring and communicating nerves, are to be looked for, and removed; and the spasms are to be moderated, as much as possible, by external and internal remedies. Opiate frictions, and



the application of the nitrate of silver over the course of suspected nerves, are sometimes followed with benefit, and may be accompanied by the internal administration of antispasmodics, though the efficacy of these is often doubtful. Division of the muscle was a favourite operation of old surgeons for the cure of wry neck. One of the heads, or both, may be detached from the sternum and clavicle ; but such procedure is not likely to be followed with much advantage.

Distortion of the neck is most frequently produced by some vice in the bones, as curvature, from softening, attended with deformity of the trunk or of the limbs. In such cases, the twist is generally to the right side, the ear approaching the shoulder. No treatment can be effectual, unless the other curvatures are corrected ; for the head is placed so, to preserve the equilibrium of the body. The head is to be supported, and its weight removed from the vertebral column, by a curved iron rod attached to the back of stays fastened on the loins, leathern straps passing from the top of the rod under the chin and over the occiput. By the use of such apparatus for a considerable time, the vertebral column may regain its perpendicular direction, and all deformity of the neck be consequently removed. In slight cases, this treatment is not required ; on giving support to the trunk, and raising the shoulders to an equal level, the muscles of the back, perhaps stimulated by powerful and repeated friction, gradually bring the column into its proper form. Then the position of the head to one side is no longer required to balance the body.



But a cure can be expected only when no material change has taken place in the form of the individual bones.

*Excursion* of the cervical vertebræ,—bending of the head forwards, and perhaps a little to one side, generally to the right,—takes place as a consequence of disorganization of the ligaments and connecting fibro-cartilage of the vertebræ, with subsequent ulceration of the bones. The disease generally occurs in the superior vertebræ; in the articulation of the atlas with the occiput, or with the vertebra dentata, or in the articulation of the latter with the one below. The articulations on the left side are usually affected first. There is stiffness, pain, and swelling of the soft parts covering the affected bones, attributed perhaps to exposure to cold, as when sitting in a draught, and supposed to be merely *cric* of the neck. The posterior cervical muscles are weakened, and the head is bent forwards. The patient is unable to support his head by the usual muscular action, and when in the erect position places his hands on the temples, to prevent it from dropping, and to keep it steady. Difficulty of swallowing is a prominent symptom from the first, as can readily be imagined when the close application of the constrictors of the pharynx to the forepart of the affected bones is kept in remembrance. The disease is attended with great suffering, evinced by marked anxiety of the countenance; and the pain is most violent during the night. The complaint is too frequently trifled with at the commencement, its danger being either not understood, or not appreci-

*Effect in the*



ated. The swelling increases, with pain, and the chin falls down on the sternum. The patient grows emaciated, and perhaps becomes weak in the lower limbs, and even in the upper; the fæces and urine are imperfectly retained. Occasionally, abscess forms behind the upper part of the pharynx, increasing the pain and the difficulty of deglutition. On making an examination through the openings by which the abscess has emptied itself spontaneously, the bone is felt bare; and portions, even large, of the vertebræ, or vertebra, are, after some time, discharged, so as to expose the theca of the spinal cord. Even in such circumstances patients have lingered on, and that so long as to admit of some unprincipled fool advertising a perfect recovery.

The termination of caries of the cervical vertebræ, often without any appearance of abscess, is in general fatal and sudden. The head, slipping from its support, falls forwards or to a side, causing immediate and complete paralysis of the whole body; dissolution soon follows. On examination, the articulating surfaces of the vertebræ are found displaced, and the shreds of ligaments which connected them ruptured. The atlas is separated from the occiput, or the processus dentatus, escaping from its situation in consequence of destruction of its confining ligaments, is found compressing the medulla oblongata. In other instances, the termination may be more slow and gradual; the patient is worn out by long suffering and continued purulent discharge; change of structure takes place in the theca vertebralis, or in the



medulla itself; serous effusion occurs at the base of the brain; the patient's sensations are blunted, and he loses the use of his limbs gradually; his intellects fail, and coma supervenes, followed by death.

Active and early interference can alone arrest, subdue, or prevent the dreadful consequences of the disease above described; it is quite intractable in its later stages. Confinement to the recumbent posture, and strict rest of the affected parts, must be enjoined; and blood is to be abstracted locally, once and again, according to circumstances; afterwards counter-irritation is to be employed, and repetition of moxas is the most efficacious. When the painful feelings have subsided, and some impression has been made on the disease, the patient appearing to convalesce, the head must be supported by a proper machine for long. He will thus be enabled to use his limbs, to move about, and repair his general health, the weight of the head being taken from the weakened column.

The *External Jugular* vein may require to be opened for the abstraction of blood in affections of the head; or when venesection cannot be readily performed at the bend of the arm, from the small and indistinct condition of the veins in children, or in people loaded with fat. The vein is made to rise by pressure with the finger above the clavicle. The lancet is passed through the integuments and platysma myoides into the vessel, midway between the jaw and clavicle. After a sufficient quantity of blood has been withdrawn, the pressure below is removed,



and the edges of the wound are put together with a bit of court plaster, or by means of a compress and bandage lightly applied.

*Ligature of the common Carotid* may be required for the cure of aneurism at the angle of the jaw; or on account of hemorrhage from deep wounds in the same situation, when, from any circumstances, the divided extremities of the vessels cannot be secured. A deep incision at the angle of the jaw, towards the base of the cranium, not only divides important branches of the carotid, but may also wound the vertebral arteries where they project tortuous betwixt the dentata and atlas, or betwixt the latter bone and the occiput.

Ligature of the common carotid has been had recourse to to stop bleeding from the mouth, nostrils, and other parts connected with the face—for the cure of large or deep-seated aneurism by anastomosis,—and as a preliminary step to the removal of large and firmly attached morbid growths of the face or neck. This last proceeding, as already remarked, does not in any way enhance the patient's safety, whilst it adds much to his suffering.

The carotid has also been tied for the cure of aneurism at the root of the neck, when it was impossible to place a ligature betwixt the tumour and the heart. My opinion regarding this practice I have given formerly, when treating of aneurism in general.

For aneurism at the angle of the jaw, the point of



deligation must in a great measure depend on the size of the tumour. The artery is most conveniently reached where it is crossed by the omohyoideus; and when deligation at this point is both practicable and eligible, the vessel is exposed at the upper edge of the muscle. But circumstances may require the ligature to be placed much lower.

The patient is placed, either sitting or lying, with the head thrown back, and turned slightly to the side opposite the tumour. An incision is made in the upper triangular space of the neck, and in the course of the vessel, midway betwixt the sterno-mastoid muscle and the muscles covering the forepart of the larynx. Its extent depends on the thickness of the neck—on the muscular developement and quantity of fatty matter, whether the neck be long or short. From two to three inches will in general afford sufficient space. The first sweep of the scalpel penetrates the skin, platysma myoides, and cellular tissue. The cervical fascia is then divided carefully, with the hand unsupported. During the incision, the parts should be a little relaxed by attention to the position of the head. The sheath of the vessels is exposed by cautious division of the cellular tissue which occupies the space betwixt it and the cervical fascia. Thin copper spatulæ, bent to suit the purpose, are used to keep the edges of the wound apart. In general there is very little bleeding; but that the operator may be sure of what he cuts, it is necessary frequently to clear the cavity with a bit of soft sponge. Each step of the operation should be



slowly and surely accomplished ; the least hurry is culpable. When the slight oozing has ceased, the common sheath,—which is distinctly seen, with the descendens noni lying on its forepart,—is to be opened to a slight extent with the point of the knife—the hand steady and unsupported, and no director used. The descendens noni is left to the inner side. The internal jugular vein, swelling up on account of the struggles and hurried respiration of the patient, has in some cases been found troublesome at this period of the operation, rendering the opening of the sheath and the use of the needle difficult. I have not met with any such obstacle in the cases in which I have been concerned. The aneurism needle should be slightly curved, with a perforation near the point ; and the point should neither be bulbous, nor at all sharp, but all of the same thickness, and well blunted at the extremity and edges. It is introduced, carrying a firm round ligature of flax or silk well waxed, through the opening in the sheath, betwixt the par vagum and the artery, and from the outer side. The point is moved slightly, and carried under the artery ; no force being used, as it is unnecessary, and apt to be injurious. The instrument is thus gently insinuated, not thrust, through the cellular tissue, and made to appear on the opposite side of the vessel, with its point towards the trachea. It ought to be passed close to the arterial coats, and care must be taken to avoid including within its track part of the common sheath, or the descending branch of the ninth. Unless the surgeon be indeed very



rash, there is little risk of the vein or par vagum being injured ; to include them along with the artery would argue no small possession of most deplorable ignorance. The loop of the ligature is laid hold of either with the fingers, with forceps, or with a hook, and drawn towards the surface of the wound. It is then divided, and one half retained, whilst the other is withdrawn along with the needle. The vessel must not be raised up from its situation, or detached from its cellular and vascular connexions, more than is merely sufficient for transmission of the needle. A single knot is cast upon the remaining half of the ligature, passed down, and tied firmly on the vessel, by the forefingers of the operator. This is secured by the finger of an assistant, whilst the ends are again passed through, so as to complete the *Reef-knot*, and run down tight as before, the assistant slowly withdrawing his finger to make way for the ligature. A third knot may be made to ensure security, but is seldom, if ever, necessary. As already observed, every thing must be done with deliberation and caution, and the operation may be thus safely concluded in a very few minutes. One end of the ligature may be cut away close to the knot, or both brought out of the wound. The edges of the wound are put together, after all oozing has ceased, by one or two stitches, and the intermediate application of isinglass plaster; bandaging is unnecessary, and might be hurtful. The patient is placed in bed, with the head elevated considerably, so as to relax the neck. The wound will probably heal by the first intention,



excepting in the immediate neighbourhood of the ligature ; and the separation of this may be looked for from the tenth to the twentieth day. Then all risk of danger may be considered as past.

*Ligature of the Arteria Anonyma* has been practised successfully in very few cases. It is required for aneurism of the subclavian, or of the root of the carotid ; or for large axillary aneurism, greatly raising the shoulder, and involving the parts at the root of the neck.

The patient is either seated or semi-recumbent. An incision, from two inches and a half to three inches in extent, is made in the course of the carotid, terminating over the sterno-clavicular articulation. From that point, another is carried along the upper margin of the clavicle, to the extent of an inch and a half. The sternal attachment of the sterno-mastoid muscle is separated, the cervical fascia divided, and the vessel exposed. During the dissection, the internal jugular vein, the par vagum, and the recurrent branch, the inferior thyroid artery, and the arterial distributions from the thyroid axis, must be carefully avoided. The operator should, by free external incisions, make a dissection sufficiently spacious to admit of his seeing the bottom of the wound distinctly as he proceeds. It is necessary that he not only feel but see what he is about to cut ; groping is unsafe, to say the least. Caution in passing the needle is here required equally as in ligature of the carotid ; in such deep wounds the aneurism needle of Weiss is sometimes found useful,



but in general the common one is sufficient. During the dissection it must be borne in mind that the pleura is not far from the edge of the knife.

*Ligature of the Subclavian Artery* is required for the cure of axillary aneurism. That portion of the vessel within the scalenus is unfavourable for operation, in consequence of many branches being given off in an exceedingly short space. Besides, important veins and nerves are in the immediate vicinity. And though these were avoided, and the vessel reached and tied, still there would be no likelihood of a favourable result; obliteration of the vessel would not be expected to take place at the deligated point, one or more collateral branches arising close to the ligature. On the outside of the scalenus there is no such objection. But the vessel is deep, even in the healthy state, and much more so when aneurism has appeared in the axilla, and attained but a small size. When the tumour is large, the shoulder is much elevated, and firmly fixed in its exalted level, greatly increasing the depth of the vessel.

The shoulder is to be depressed as much as possible, and the head thrown to the opposite side. An incision is made along the upper margin of the clavicle, and a second perpendicular to the first. These must be proportioned to the size of the patient, and the supposed depth of the vessel. It is better to err in making the external incisions too large than too small; neither the pain nor the duration of the cure is much increased thereby. But by an opposite course,



both the difficulties and the dangers of the operation are rendered far greater. The external jugular vein must be avoided if possible by the knife; it should be detached slightly, and pulled inwards. The supra-scapular artery, running in a line with the clavicle, ought also to be saved; it acts a principal part in performing the anastomosing circulation after ligation of the trunk, and although the arm would receive a sufficiency of blood from other branches, it is well to keep this entire—not to mention the trouble which wound of it would occasion the operator, by constantly filling his incisions with blood, and the delay caused by the application of ligature to the bleeding extremities. Its division can easily be guarded against, and should be avoided. The subclavian vein is not in the way; it is lower down, under the clavicle, than where the surgeon requires to introduce his instruments. The fascia and cellular tissue is divided carefully, until the cervical plexus of nerves appears, and then the artery is to be looked for on the same level with the plexus, and towards its sternal margin. But in cutting for this or any other vessel, it must be recollected that pulsation is a very uncertain guide. It is communicated to the neighbouring parts, and often is scarcely to be felt at all, or is at least very indistinct. In any situation pulsation is very perceptible before division of the integuments, and other superimposed parts; but after resistance has been removed by exposure of the vessel, it ceases almost entirely. Feeling is the principal guide, and, to experienced fingers, the feel of nerves is different from



those of arteries. The ligature has been passed round one of the cervical plexus, as happened in one of my own cases; the mistake was, however, not without its use, for on discovering that it was a nerve, I retained the ligature, no knot having been cast, and by it pulled the nerve out of the way, so as to allow of the artery being more readily secured. The artery is felt as it crosses over the first rib, and by pressure there, pulsation in the arm is stopt; sometimes it may be even seen. The knife, guided by the finger, is then used very cautiously to prepare the vessel for ligature. A blunt-pointed needle is passed, either plain or with a separable point, and the knots made as was formerly described. A piece of strong wire doubled, and either notched or perforated at the extremities, affords assistance in securing the knots in so deep and contracted a space. Various kinds of serre-nœuds and needles have been recommended, but the simpler the instruments employed are, and the less a surgeon depends on them, the more likely is he to succeed in his undertaking.

*The axillary portion of the brachial artery* cannot require to be tied for true aneurism. Were the aneurism seated at the border of the axilla, and the upper portion of the vessel beneath the clavicle free, the best, wisest, and safest proceeding, is to tie the subclavian. Then the shoulder not being raised, the vessel is not so deep as when the aneurism involves the axilla. The incisions are not so deep nor so extensive, and do not involve so important neighbour-



ing parts as those for ligature of the axillary artery ; and besides, the vessel is tied farther from the diseased part.

The axillary artery may be tied on account of wounds of it, either immediately upon the infliction of the injury, or some time afterwards. The dissection is difficult, the vein being much in the way, and the vessel surrounded by nerves, and intimately connected with them by dense cellular tissue. The artery is more involved at the middle portion of the axilla than at the superior and inferior ; at that point, too, the cephalic vein, as well as the axillary, impedes the operator.

To reach the upper portion of the artery, much muscular substance must be divided. An extensive incision, in the course of the vessel, is made through the integuments. The pectoralis major is got through by separation and division of the fibres, the incision in it being made with as little cross-cutting as possible. Part of the pectoralis minor, probably the superior half of the muscle, must also be cut. The parts are then exposed, the vein to the inner side of the artery, and the nerves interlaced. The vessel is carefully isolated at one point, and there secured.

It is almost impracticable to reach the middle portion of the axillary—supposing the vessel to be divided into three equal portions—without injurious interference with the nerves. If operating with the view of tying the extremities of the vessel wounded at this point, the probability is that the nerves have been divided along with the artery, and then the



proceedings are more simple. The incisions are made in the direction of the bleeding point ; this is reached, and each extremity of the vessel tied.

The lower third of the artery is less involved with the vein and nerves, and can be reached without division of muscular fibres. The arm is abducted and elevated as much as possible. The axilla is thus exposed. A free incision is made in the course of the vessel, which, by cautious dissection, is brought into view ; it can then be dealt with as may be required.

Spontaneous aneurism is of rare occurrence lower in the brachial artery than its axillary portion. However, it is sometimes met with at the bend of the arm. But the aneurismal tumour in this situation is more frequently the consequence of wound of the vessel, inflicted whilst opening a superimposed vein. The mode of proceeding in venesection, the precautions to be employed, and the evils that sometimes follow this little operation, will be treated of by and by. Wounding of the artery is not so common an accident now as formerly. Venesection is not so universally and unnecessarily resorted to, and is performed by better instructed practitioners.

Puncture of the brachial artery, at the bend of the arm, is not uniformly followed by extravasation of blood, or by the formation of aneurism. That it is wounded, is known by the impetuous and saltatory flow of florid blood, accompanied with a whizzing noise. In such circumstances, the thumb is placed firmly over the wound ; the fingers separately, the hand, and the forearm are supported by uniform



bandaging; and a graduated compress, supplying the place of the thumb, is firmly applied, and must be retained for many days. Thus extravasation is effectually prevented. But the measures must be adopted instantly, before any blood has escaped into the cellular tissue, and the apparatus must be well applied and retained. When pressure is required on any point, it is absolutely necessary to give support to the lower part of the limb, as was formerly insisted on; and the proceeding is, if possible, more necessary in this case, the requisite pressure being very great. If ordinary compression only, sufficient to prevent the flow of blood through the opening in the integuments, is applied, blood is extravasated into the cellular tissue, breaking it up, and causing condensation beyond; fluid blood accumulates in the space thus formed; the surrounding cellular tissue is more and more condensed, at length constituting a firm sac, confining the fluid, and communicating with the opening in the artery; in fact, a pulsating and gradually increasing aneurism is established.

Or, blood is effused betwixt the vein and the artery, opposite the wounded points; and a sac is formed, into which blood is propelled from the artery, and which also communicates with the opening in the vein. This state of parts is denominated varicose aneurism; it is very rare.

Or, no extravasation takes place, and the artery and vein unite by lymph effused around the openings, the wounds remaining unclosed, and forming a permanent communication between the vessels. Thus, a portion of the arterial contents is constantly being



injected into the vein, producing a thrilling sensation, but little or no tumour. The passage of the blood through the narrow aperture is also accompanied by a peculiar noise, closely resembling that caused by the motion of the fly-wheel in a musical box. This is termed aneurismal varix, and is not so rare as the preceding.

In recent cases of false aneurism, the sac may be cut into, the vessel exposed, and tied above and below the opening. This is recommended from its being found that the tumour is sometimes slow of disappearing after ligature of the vessel at a distance above. But when the tumour is of considerable duration and size, and the surrounding parts separated and altered in structure, there is no doubt as to the propriety of tying the humeral near its middle—as also, in the case of spontaneous aneurism. The vessel is not deep, but much entangled with nerves and veins. A free incision is made over its course, dividing the skin, cellular tissue, and fascia; the sheath is opened, and a ligature passed round the exposed artery. But it must be recollected that high division of the humeral is not uncommon, and, before casting the knots, pressure should be made on the vessel with the finger against the loop of the ligature, and the effects on the tumour watched; if pulsation cease, and the tumour become flaccid, the ligature should be secured; but if no effect is produced on the swelling, high division is demonstrated, and the other branch must be looked for. Pulsation is certain to return in the tumour, after a few days, and if slow in again disappearing, gentle pressure



should be employed—the arm, hand, and fingers being previously bandaged, to prevent infiltration of the limb.

Wounds of the radial and ulnar arteries may require their being exposed and tied at various points and at various periods—shortly after the accident, or after the lapse of many weeks—on the occurrence of secondary bleedings, or after the formation of false aneurism. This is accomplished by incision in the course of the wounded vessel, sacrificing as few muscular fibres as possible. Nevertheless, the incision must always be free, to enable the surgeon to effect his purpose readily.

*Wounds of the Palmar Arches*, and of the branches proceeding from them to the extremities of the metacarpal bones, are exceedingly common; as also wounds of the radial artery betwixt the thumb and forefinger, of the arteria radialis indicis, and of the superior volar branch. The opening in the integuments and palmar aponeurosis is usually narrow, and the hæmorrhage copious; it is generally arrested by pressure. From these circumstances, blood is extravasated extensively into the deep cellular tissue, blood continuing to escape from the artery, and being either imperfectly discharged, or completely confined. Great swelling, with tension and acute tenderness, takes place; in fact, rapid inflammatory action is kindled in the infiltrated parts, and unhealthy abscesses form; the matter ultimately reaches the surface, but by that time ulceration or partial sloughing has taken place at the wounded part of the vessel,



profuse and repeated hæmorrhages take place, and are with difficulty controlled. The patient becomes weak and pale. The greater part of the forearm may become involved in the inflammation, terminating in infiltration of the cellular tissue, and the formation of diffuse abscesses.

In the first instance, instead of trusting to pressure,—which almost uniformly disappoints expectation, does not prevent internal bleeding, and leads to a severe form of inflammatory action—it is better at once to enlarge the wound, and tie the wounded vessel above and below the injured point. Thus all bleeding is effectually prevented, and the risk of unfavourable consequences done away with. But such a proceeding is difficult, often almost impossible, and generally fruitless, after inflammatory swelling has commenced. The parts are then full of blood and pus, separated from each other, and changed both in appearance and structure; the vessel is either not visible on account of the infiltration around, or its coats are so diseased as to be incapable of holding a ligature. At any period, it is unsafe and unwarrantable to dive, pretty much at random, with a sharp needle, amongst tendons, nerves, arteries, and veins, with the hope of so including the wounded branch. In some cases of secondary bleeding—if no great inflammatory action has taken place, and no abscesses have formed—the wound may be dilated freely, and compression made on the bleeding point by dossils of lint filling the wound completely, and supported by a bandage. This dressing, retained for some days, often succeeds perfectly; permanent obstruction of the vessel, and con-



solidation of the parts immediately around, having been accomplished by the effusion and organization of lymph. When this method fails—and when the case is more advanced, with pain, swelling, and abscess—weakening of the circulation in the part is found to be effectual. The main artery is to be obstructed at a distance from the wounded part. It is needless to tie the radial, or the ulnar, or both; for still blood will be poured in by the interosseous and its anastomoses. The humeral must be secured in the middle of the arm, as has been practised in many instances, and with uniform success. Thus the bleeding is arrested until the wounded vessel recovers, and becomes permanently closed by salutary effusion; then the inflammatory action, and its consequences, in the surrounding parts, must be treated on the general principles of surgery.

*Paronychia, or Whitlow*, designates inflammatory action and its consequences, in the structures composing the fingers. The mere surface may be the seat of the inflammation, or the cellular tissue, or the fibrous structure betwixt that and the sheath of the tendons; or the firm and true sheath of the tendons, and the synovial surface; or the investing membrane of the bone, the bone itself, and the articulating surfaces and apparatus. The inflammatory action may commence in any of these structures, but, if uncontrolled, ultimately involves the greater number, or all. The deeper seated the action, the more violent are the symptoms, and the danger to the member greater. In the cutis vera of the fingers, there is a



plentiful distribution of nerves of sensation ; and, consequently, in superficial whitlow, the pain is often severe, with throbbing, and an occasional feeling of itching. The part is swelled and red, and the redness is diffused. After short continuance, the swelling increases at some points, often about the root of the nail, from effused fluid betwixt the cuticle and rete mucosum ; the fluid is sometimes serous, generally sero-purulent. In the deeper-seated inflammation, the pain, throbbing, heat, and swelling, are all greater. The pain is most intense and almost intolerable, allowing the patient little or no rest ; and the throbbing extends to the vessels of the hand and forearm. A considerable degree of fever attends. The action either involves one phalanx, or extends over the whole fingers, and ultimately attacks the hand. The palm is hard, pained, and swelled ; and, in advanced cases, swelling takes place above the annular ligament. Often the surface of the back of the hand is also inflamed, and the cellular tissue loaded with serum. The disease, if not actively and properly treated, terminates in a very short time ; in two or three days suppuration takes place, with sloughing of the cellular tissue, of the sheaths of the tendons, and of the tendons themselves. Either ulceration or necrosis—often both in combination—occurs in the phalanges ; or the apparatus of one or more of the articulations is destroyed. Abscesses also form in the palm, on the back of the hand and finger, and sometimes under the fascia of the forearm. The separation of portions of one of the tendons is not always followed by loss of motion in the finger ;



neither is exfoliation of the greater part of the distal phalanx always attended with much deformity or shortening, a nucleus being left from which bone may be reproduced. But destruction of the whole flexor or extensor tendons of one of the middle or proximal phalanges, or destruction of one of the articulations connecting them, is not only attended with great suffering, but followed by total uselessness of the part. The wounds may, after a tedious process, heal up, but the finger remains deformed and immovable, in a contracted or extended position, as may be.

The disease may be occasioned by bruises or punctures, the instrument with which the puncture is inflicted being impregnated, or not, with some putrid animal matter. Violent inflammatory action almost uniformly follows opening of the articulations, and also lacerated wounds over the joints. Compound fractures and dislocations of the phalanges, are certainly followed by a severe form of inflammation. But the disease is met with in all degrees of intensity, occurring without any assignable cause. It prevails in spring and autumn; and is common in hard-working people, in butchers, cooks, &c.

In superficial whitlow, the bowels must be attended to, and blood may be abstracted locally, either by punctures or by the application of leeches along the side of the finger, hot fomentation being assiduously and regularly employed afterwards. Or the nitrate of silver may be rubbed lightly over the discoloured parts; frequently the inflammation may be arrested, and resolution speedily effected by this simple application, laxative or purgative medicines being at the



same time administered, as required. The collections which form are evacuated by simple division of the cuticle, and this, when hard, should be clipped away ; poultices are used for a short time, and then the raw surface is dressed, and the finger bandaged, daily. The hand should be kept constantly elevated. The swelling is soon reduced, the cuticle is regenerated, and free motion of the finger returns gradually.

In more severe cases, fomentation and copious abstraction of blood by leeching, at a very early stage, may effectually suppress the inflammatory action ; but patients seldom apply till after the opportunity for this treatment has passed. When tension has occurred, whether purulent matter has formed or not, a deep and free longitudinal incision must be made, including the affected tissues. This is uniformly followed by great relief, all the violent symptoms subside, and the action is limited ; the effusion, if any, escapes, and the affected blood-vessels are emptied—further suppuration is prevented, and the tissues are saved from destruction. Fomentation and poultice are used till the swelling begins to disappear, and the discharge to diminish ; and the hardened cuticle is removed, when detached. The cure is completed by bandaging, and such applications to the wound as its appearance may render suitable. Should inflammation recommence and extend, or abscess threaten in other parts, recourse must again be had to free incision, followed by the treatment already described.

Destruction of the articulating apparatus, with ulceration of the opposed surfaces of the bones, is indicated by indolent swelling around, by unhealthy



and profuse discharge, and by distinct grating being produced on motion of the joint. In such circumstances, amputation of the finger above the diseased part is fully warranted. But if the patient is obstinate in refusing to submit, or if he is in that rank of life where stiffness of the finger is of no great consequence, the member should be kept steady in a convenient position, so as to favour ankylosis of the diseased joint. By splints and bandaging it is preserved in a state of semiflexion, that, after the cure by ankylosis, it may not be in the way when the patient lays hold of any thing, as it would be were it bent into the palm, nor exposed when the other fingers are bent, as must be the case were it kept quite straight. Still the finger is very useless—worse than useless—when stiff either from loss of the tendons or from destruction of the joint; and more particularly when its position is awkward. So much inconvenience does it give rise to, that patients, who peremptorily refused amputation whilst the case was recent, often return after a tedious, painful cure by ankylosis, soliciting removal of the deformed and annoying member. In severe cases of whitlow, all the fingers, the whole hand, and even the wrist, long remain rigid; but the rigidity is gradually dissipated by friction, and by motion, at first gentle and passive.

Chronic thickening and contraction of the *palmar aponeurosis* occurs occasionally, and, in some cases, to such an extent as to disable the hand almost entirely. The fingers are permanently bent, the palm is hard, and the integument puckered. The most severe ex-



amples which I have witnessed occurred in those who were in the frequent habit of playing keyed or stringed instruments; in others no cause could be assigned. Frictions with all kinds of oils and compound liniments, plasters, ointments, &c. have been tried as remedies for this affection, but in vain. The tendinous slips passing to the contracted fingers have been divided, and the origin of the palmar fascia has been cut across, but without permanent benefit. Indeed I believe the disease to be incurable.

The term *Onychia* is sometimes, and not without good reason, designed *maligna*; it is applied to ulceration about the nail. Some of such sores are small, and not indisposed to heal; others are very obstinate. They occur at all periods of life, frequently during infancy. They usually commence in a small and irritable tumour or granulation by the side of the nail, or at its root, with swelling and redness around. This may follow bruises or laceration and removal of the nail, extravasation under it, and various injuries of the part. The disease is also met with in the toes, most frequently the great one, causing much lameness; then it is generally owing to the pressure of tight shoes. In many cases the ulceration is extensive, shreds of the nail projecting through the angry surface; there is considerable loss of substance; the discharge is thin, bloody, acrid, and abominably foetid; the edges of the sore are jagged, and the integuments around are of either a bright or a dark red, according to the stage of the disease. Sometimes the bone is exposed, and involved in ulceration; or,



instead of having lost substance, it is found of an unusually spongy and open texture, and with recent osseous matter superadded. A violent burning pain attends the disease when advanced; the absorbents are irritated, and the glands enlarge along their course. The general health is often impaired in consequence; frequently the disease occurs in those of broken up constitution, along with sores and eruptions on other parts of the surface, ulcerations of the mucous membranes, and other indications of cachexia.

By judicious exhibition of purgatives, antibilious medicines, and preparations of sarsaparilla, and by regulation of diet, the general health may be improved. The edge of the nail, when in contact with the ulcerated surface, must be removed—more especially when the great toe is affected; not that any undue growth is the cause of the disease, but because the sore, pressing on the sharp edge, produces much pain, and keeps up the morbid action. About one third in breadth of the nail should be taken away; one blade of strong and sharp-pointed scissors is passed along beneath the nail as far as its root, and by rapid approximation of the other blade the part is divided; the isolated portion is then laid hold of by dissecting forceps, and pulled away. This should be performed as quickly as possible, for the operation, though trifling, is attended with most acute pain; it is quite effectual, the relief is great, and almost immediate. The nail may also be removed by scraping and paring, but this method is not so effectual as the preceding, and almost equally painful. After-



wards the best application to the ulcerated surface, as to other irritable sores, is the nitrate of silver, either used solid and followed by poultice, or employed in the form of lotion. The remedy is almost specific; very few cases prove obstinate under it. Sometimes it may be of advantage to alternate it with the black wash. In protracted and unyielding cases, removal of the whole matrix of the nail has been proposed; the dissection is painful and tedious, and its efficacy doubtful. When the sore is of a weak character, discharging a glairy secretion, studded with soft flabby granulations, connected with unsoundness of the neighbouring cellular tissue, surrounded by undermined integument, and by considerable boggy, soft swelling, free application of the caustic potass is highly beneficial. When the bone is denuded, and involved in ulceration, the phalanx should be amputated.

Unhealthy children are subject to disease of the phalanges, and of the metatarsal and metacarpal bones, excited by slight injury, or originating without apparent cause. Often more than one bone is affected. There is great swelling of the soft parts around the diseased bone, indolent, and not painful; at first hard and white, afterwards more yielding, and of a dark red hue at one or more points. Imperfect suppuration takes place, the integuments ulcerate, and the cavity of the abscess leads to the exposed bone; a portion of this generally dies, and is long of separating. Great addition of bony matter is deposited around, in irregularly aggregated



nodules ; and a large shell is so formed, partially investing the sequestrum. This affection is termed *scrofulous necrosis*.

Or the bone does not die, but is exposed and ulcerated superficially ; or a considerable cavity forms in its interior, apparently from suppurative degeneration of the cancellated structure. The secretion from the ulcerated surface is thin, acrid, and often bloody ; and new osseous matter is studded around. The surface of the rest of the bone is unusually open in texture, whilst its interior is condensed, and the cancelli are filled with lardy substance. This form is called *scrofulous caries*.

Abscesses in the soft parts form one after another, several of the bones are often affected at the same time, superficial abscesses and affections of the joints and bones often take place in other parts, and the patient grows weaker and weaker.

Whilst the surgeon attends to the general health, and employs palliative local applications, nature frequently effects a cure. The sequestrum ultimately separates, or the ulceration gives way to more healthy action. New bone fills up the cavity, the redundant osseous deposit gradually diminishes, the openings in the integuments close, and the swelling subsides. In some rare cases, it may be necessary to take away the offending part, in consequence of the health alarmingly declining.

*Collections in the thecæ* of the flexor tendons are occasionally met with. Those of the thumb and forefinger are most frequently affected. The swelling



often attains considerable size. The fluid is colourless and glairy, mixed with small cartilaginous bodies of a flattened form, and the size of mustard seeds, or split peas. The swelling sometimes extends under the annular ligament, and under the fascia of the forearm. Motion of the parts is seriously retarded.

Accumulation of the fluid is not prevented by any means. Puncture has been practised successfully in several instances, in others a good deal of inflammatory action followed. On the escape of the fluid, the motions of the parts are regained.

*Ganglia* are collections in the bursæ, of various sizes, about the wrist. They are situated more frequently on the fore than on the back part. Sometimes they occur, small, on the sides of the fingers. At first they are attended with pain, afterwards with inconvenience only. The swelling is usually globular; but when large, as on the back of the wrist, the form is rendered irregular by the pressure of the tendons. The cyst is generally of considerable thickness, and the fluid albuminous. They present an unseemly appearance, and when awkwardly situated, retard the motions of the limb. Frequently they form without apparent cause; sometimes they are attributed, and perhaps rightly, to a twist or over exertion of the wrist, like windgall in hard-wrought horses who have been put to work when young, and before their full strength has been attained. The affection is most frequently met with in females of



the lower ranks ; in them the structure of the limbs is more delicate than in males, and they are often obliged to use great exertions with the upper extremities before the growth of the body is completed.

Friction is of no use. Continued pressure on the swelling, by coins or small pieces of lead bound down for weeks or months, is very seldom followed by cure. If the tumour is placed over a bone, sudden and firm compression should be made with the thumb, so as to rupture the cyst, or with the same view it may be struck sharply by an obtuse body. The contents are thus extravasated into the cellular tissue, and are speedily absorbed ; the cyst inflames, and becomes obliterated. Sometimes the excitement is insufficient for complete closure of the cyst, and the swelling returns ; but this is rare. When the cyst is thick, the tumour of long duration, and the person impatient of pain, it may be punctured by a cataract needle of any kind ; one thin and double-edged is probably the most convenient. The instrument is introduced through the skin, at some distance from the swelling, and by moving the point of the needle after penetration, the cyst is divided freely. The needle is withdrawn, and the orifice closed by the finger. The contents are then squeezed into the cellular tissue, and this is followed by the same favourable results as in the preceding method. Removal of such tumours by dissection is unnecessary, and also attended with risk. I have removed several large ones by incision ; but the whole cyst cannot be taken away, and there is great risk of inflam-



mation ensuing, followed by sloughing of the tendons, or by rigidity of the part. From my experience of the unfavourable consequences of incision, I should not again adopt such a proceeding. Setons have been passed through the swellings, but I cannot attest either their efficacy or their safety.

*Exostoses* of the phalanges of the fingers are rarely met with. Sometimes bony enlargement occurs, involving many of the phalanges along with several of the metacarpal bones. In such cases, both hands are often similarly diseased, and other parts of the osseous system also affected. When the tumour is limited to one or two fingers of one hand, then, to get rid of the deformity and inconvenience, the patient may desire its removal. The whole of the bone affected should be taken away, lest the disease be reproduced.

*Spina ventosa*, acute or chronic, more frequently the latter, is sometimes met with in the metacarpal bones, or in the phalanges. The same treatment is applicable here, as that already detailed in regard to similar affection of the lower jaw. Amputation above the tumour may sometimes be necessary.

The hands of infants are sometimes found deformed, turned inwards as the feet are more frequently. Some of the carpal bones are compressed, from the awkward position of the limb, but become properly developed, if the parts are placed in their proper position as soon as the deformity is observed, and kept so. But the displacement is unmanage-



able if long neglected. Congenital *deficiency* of the fingers is a deformity and inconvenience, but cannot be remedied. *Adhesion* of one or more of the fingers, even to their points, is met with occasionally as a congenital affection. Separation is readily accomplished; but the dressing requires to be carefully attended to. Adhesions may result from careless management of extensive abrasion or ulceration, or from a burn, and such are not so easily remediable. *Superfluities* may be abridged. Some children are born with two thumbs or two little fingers; these have only a cutaneous attachment to the rest of the hand, and that is easily divided by knife or scissors. The redundancy should be removed by the obstetrical practitioner, as soon as it is observed.

The *Bursa* over the *Olecranon Process* is liable to enlargement, by gradual accumulation of the secretion, in consequence of habitual pressure on the elbow. The contents are either serous or albuminous, usually the latter, and the swelling is indolent. But acute swelling not unfrequently takes place in this situation, from external injury; then the tumour is formed rapidly, there is heat and pain in the part, and the integuments are discoloured around: in such cases the bursa is filled with pure blood, or with a sero-purulent and bloody fluid. Inflammation of the bursa often follows bruises and lacerated wounds, and is apt to extend to the forearm and arm; causing extensive and deep effusion, great tension of the parts, and severe constitutional disturbance.



In the chronic cases of bursal enlargement, pressure is to be avoided ; and by the permanent application of a gum and mercurial plaster (emplastri gummosi—emp. hydrargyri—ā part. æq.) absorption of the fluid may in general be procured—the swelling disappearing as gradually as it arose. If the collection is large and obstinate, repeated blistering may be had recourse to ; and if that fail, a seton may be passed through the cavity. But the last mentioned practice is sometimes followed by more action than is desirable, inflammation of the surrounding cellular tissue supervening, and abscesses forming, perhaps extensive. When the collection is purulent, a free opening is to be made into the bursa, and the case treated in other respects as a common abscess. If indolent swelling of the cellular tissue, and spongy thickening of the synovial surface of the bursa, remain after incision, the caustic potass should be applied. In extensive and acute inflammation spreading to the surrounding parts, free incisions are required, along with proper constitutional treatment.

*Venesection*, at the bend of the arm, is too often resorted to by thoughtless or ill-educated practitioners, to the detriment of the patient ; as after accidents before reaction has occurred, in local pains not inflammatory, &c. It is had recourse to by those who have no correct ideas of the actions of the animal economy, who have not within their heads a peg to hang an idea upon ; or if they have, they are too lazy to think and to combine their ideas, so as to



come to a proper conclusion regarding what is the most proper and judicious course to be pursued in any one case. They follow a routine, and bleeding is too generally the commencement of it.

But venesection is absolutely required in many cases, and must be the principal dependence of the surgeon for removing or preventing evil consequences. After injuries, when the circulation has been restored, particularly when parts important to life are involved—in the first stage of inflammatory attacks, with violent constitutional disturbance—in inflammatory affection of vital or important organs—in these, bleeding is employed to an extent sufficient to control the action. But even in such circumstances, the practitioner must be cautious not to push depletion too far, but to stop short at the proper time, so that the life of the patient may not be endangered, nor his health impaired, more by the treatment than by the disease.

Venesection is usually practised on either the basilic or the cephalic vein, or else on either the median basilic or the median cephalic. The vein is made to rise by obstructing the return of the blood by a ligature on the arm, applied not so tight as to prevent the flow in the arterial branches. A vessel removed from the inner side of the tendon of the biceps,—that is not over or near the brachial artery,—is to be preferred. But sometimes none sufficiently large or distinct can be perceived unless in that situation, and then great caution is necessary in making the puncture; the patient's arm must be held very steady,



and the instrument prevented from transfixing the vein. The branch chosen should also be fixed ; one which rolls under the finger is pierced with difficulty. The vessel is fixed by the thumb of one hand placed immediately ~~below~~ <sup>above</sup> the point to be punctured, whilst the lancet is held loosely betwixt the thumb and forefinger of the other ; and the surgeon should by practice acquire the use of either hand for this and other minor operations, being thereby saved much trouble and awkwardness. The right hand is used for the left arm of the patient, the left for the right. The lancet should be in very good order, not too spear-pointed, firm and with a keen edge. The blade, placed at right angles with the handle, and held lightly, as above mentioned, is entered perpendicularly to the vessel. The puncture is made deep enough to penetrate the vein, and then the edge is carried forward more than the point, that the opening in the integuments may be more free than that in the vein. The most convenient line of incision is obliquely across. The pressure of the thumb is relaxed whenever a utensil is conveniently placed for the reception of the blood ; and the arm is kept in the same position as during incision, that the openings in the integument and vein may correspond. Unless this be attended to, the skin will overlap the puncture in the vessel, and thus the stream will be completely obstructed, or at least the blood will not come away so smartly as at first. The blood may also cease to flow quickly from over tightness of the ligature, and from threatening of syncope ; in the former case the

*Below*

*right*

*Left*



ligature is adjusted, in the latter the patient is placed in the recumbent position. When the superficial veins are emptied, the blood flowing by the deep-seated is to be directed to the wound by muscular action ; with this view the patient is made to grasp the lancet-case, or any other solid body, in his hand, and turn it round. If the opening in the integument is too small, the flow gradually diminishes, and at length stops, in consequence of blood being insinuated into the cellular tissue, coagulating, and so forming what is termed a *thrombus*, which plugs the wound. When a sufficient quantity has been obtained, the ligature on the arm is removed, and pressure made below the wound. The integuments around are washed and dried, and two or three small compresses of lint placed on the opening, one above the other, are retained by a ribbon or narrow bandage, applied in the form of the figure 8 ; the bandage should be so tight as to prevent the escape of blood, without arresting the flow towards the heart. The arm should be disused for a few hours ; and after twenty-four or thirty-six hours, the bandage may be removed, when the opening will usually be found closed.

Besides puncture of the humeral artery, or of its branches, other unpleasant circumstances may follow this little operation. The thrombus—a small bloody tumour from infiltration into the cellular tissue around the opening in the vein—proves troublesome, as already remarked, by preventing the flow, and may render a fresh opening necessary, either in the same arm or in the other. Afterwards it generally disap-



pears gradually by absorption ; or the opening in the integuments may not close, and the coagulum be separated and discharged after some days.

Inflammation and abscess round the opening sometimes supervenes. It is treated by fomentation and poultice, and rest, and the matter must be evacuated by free incision. Inflammation of the surface, with diffuse infiltration into the cellular tissue, is also met with after venesection ; the treatment of such an affection is the same as when it occurs in other situations and circumstances.

The symptoms and consequences of inflammation of the vein have been already detailed. The affection is attended with great pain, and with swelling from effusion into the cellular tissue around the course of the vessel ; the integuments are inflamed and tense ; sero-purulent secretion soon takes place in the infiltrated cellular tissue, both deep and subcutaneous, followed by sloughing, and separation of the skin from its subjacent connexions ; even death of the muscular structure sometimes ensues—the pectoral muscles have been found black and soft. The local treatment must be active. Incisions are made early into tense parts, to prevent internal mischief ; and if the vein in the neighbourhood of the wound be filled with pus, it should be laid open freely. The evacuation of the matter affords great relief ; afterwards poultices are to be applied to the wounds, and the other parts should be assiduously fomented. The bowels are to be attended to, and the secretions promoted by mercurials with stimulants—as camphor



with calomel, or the hydrargyrum cum creta. When the tongue gets moist at the edges, stimulants of a more permanent and powerful action are necessary.

I have not witnessed any bad effects of venesection attributable to puncture of the tendon or fascia, or to partial division of twigs of the cutaneous nerves. In spasmodic or painful affections arising from the latter cause, slight extension of the incision is recommended, so as to divide entirely the injured branch.

Inflammatory tumour of the *Mamma* occurs generally during lactation ; and is attributable to injury, perhaps slight, during the then excited state of the secreting vessels—to sudden exposure to cold—to interruption to the flow of the secretion. It occurs, however, independently of this state—sometimes at the age of puberty, during the developement of the gland—or at other periods of life, either spontaneously, or in consequence of external violence. The last class of cases are usually more severe than those first alluded to ; some are more indolent than others ; almost all are preceded by shivering. There is swelling of the part, a sensation of weight in it, and dull pain ; then throbbing heat, and increase of suffering. The surface is inflamed, and the nipple concealed by the tumescence. The milk cannot be withdrawn. Fever attends, more or less violent. Such tumours seldom if ever subside ; suppuration takes place, and the matter generally comes to the surface at more than one point. This abscess originates in the substance of the gland ; but collections occasionally



form in the cellular tissue beneath the mamma, either spontaneously, as in bad constitutions, or in consequence of injury. In either case, and particularly in the latter, the swelling is great, and the suppuration extensive; and troublesome and tedious sinuses remain unless early and free openings are made.

Leeching is of little use in mammary swelling during lactation; cold and evaporating lotions seem to do harm by producing determination from the surface to the deeper parts. The gland is to be kept as free from secretion as possible, and supported by a handkerchief tied round the neck; moderate diet should be enjoined, and laxatives given occasionally. Fomentations are beneficial at first, but are superseded by poultice when matter appears to have formed and to be making its way to the surface. Two or more openings are generally necessary, to afford free outlet to the matter; indeed, an incision is indicated wherever the integuments are elevated, thin, and shining. Afterwards poulticing is continued for some days, and succeeded by other suitable applications. The discharge seldom ceases, so long as the secretion of milk is encouraged.

Adolescent males are sometimes affected by troublesome fulness and uneasiness of the mammillæ. Little or no treatment is required, the inconvenience subsiding gradually and spontaneously.

Indolent enlargements of the mammary gland occur, though rarely. They sometimes attain an immense size; and are often attributable to the menstrual discharge having been inopportunately arrested. Such



tumours have, from their great bulk, required extirpation.

Sarcomatous tumours of various kinds are met with, either in the cellular tissue under the mamma, or in the substance of the gland—tumours not of the gland, though in it. Such are generally traced to injury, as to a bruise by falling against the corner of a table or chair, an accidental push from the elbow of another, &c. Simple sarcoma is the most frequent formation; but I have encountered tumours, thus situated, of a worse nature—reproduced, though freely and fully removed, in fact taken away along with the gland and neighbouring adipose substance.

The gland itself is most frequently affected by carcinoma. Sometimes it is attacked by, or involved in, medullary sarcoma; and bloody tumours are met with, as also the melanoid. In some cases, the gland is enlarged and softened, and penetrated by cysts of greater or less size, and more or less numerous, containing a fluid either serous, albuminous, bloody, or thin and black.

The appearance and progress of carcinomatous, and other tumours, have been already described. The mamma is more frequently the seat of malignant disease than any other gland; it is frequently excited, and much exposed to injury. Often the induration following abscess remains stationary for several years, and at length takes on a new action, forms morbid deposit, and is of rapid growth. The disease seldom occurs in young subjects; though I have met with several well-marked cases under thirty.



Before that time of life, the tumour is generally of a strumous nature, and this should not be confounded with the malignant; for the one is remediable under the influence of constitutional means, the other is not. Malignant disease is in most cases developed about the period when the menstrual discharge ceases; when the discharge is irregular previously to its entire cessation, the mamma is excited, and then hardness is perceptible. The disease also forms, though seldom, long after the "critical period," but in such cases its progress is usually slow. It occurs also, and not unfrequently, in those who have never had the mamma excited by lactation: and the mammilla is also subject to malignant disease in males advanced in life.

When the malignant nature of the disease is recognised, the tumour should be extirpated without delay, before it has made much progress—before it has contracted extensive adhesions, or contaminated the lymphatics. The circumstances rendering interference unadvisable have been fully spoken of when treating of tumours generally. If the patient is a female, the period of the menstrual discharge, if still regular, must be attended to, and avoided; indeed this maxim should apply to every operation on the female. The most favourable time for operating is some days after the cessation. The position of the patient should be sitting, unless the dissection is expected to be tedious; but it ought not to be so,—the extirpation of glands, or the detachment of the tumour from parts to which it may have contracted



firm adhesions, can alone cause delay, and when these circumstances exist interference is not allowable. Any warrantable operation on the mamma can be completed in a very few minutes. Two elliptical incisions are made from the border of the pectoral muscle, in the direction of the fibres, embracing the nipple and any portion of the integument which may be adherent or altered. The surgeon need never hesitate to sacrifice the nipple, for in this disease it can be of no further use; besides, the malignant action is apt to return in it, when saved, it being almost always adherent to the tumour; it *must* be removed. The incisions are made quickly with either a scalpel or a sharp-pointed and broad bistoury; the lower should be the first, that the flow of blood may not interfere with it and obscure its course. This is carried at once through the skin and subjacent adipose tissue, and then the upper is made rapidly, to get over the most painful part of the operation as soon as possible. The dissection is next proceeded in, from the axillary region forwards, and the tumour detached first on one side and then on the other. A few strokes of the knife will separate the remaining cellular attachments to the fascia of the muscle. The surface of the wound and of the extirpated mass should be examined, so that no part may remain whose structure is altered. The vessels are tied; and after oozing has ceased, if sufficient integument has been saved, the edges of the wound are put together and retained. The patient is placed in bed, with the head raised and the arm slung.



Operation is scarcely justifiable when it is evident that the absorbents are affected. Yet a small glandular tumour on the border of the axilla, without any enlargement more deeply seated, may be removed along with the mamma. With this view, the incisions should be made so as to include the tumour and detach it previously to the mamma being interfered with. But when swelling has taken place deep in the axilla, it is impossible to ascertain its exact extent, and it may be considered very certain that a chain of altered and enlarged glands lie along the course of the axillary vessels. The whole of such a tumour cannot be taken away, and in removing even the more prominent parts of it there is great risk of wounding the axillary vein. This blunder I have seen committed more than once, and I have also seen the vein, the artery, and the majority of the nerves, all included in one ligature in order to stop the bleeding. I need scarcely add that the patients soon perished. When enlarged glands are perceptible above the clavicle, or in the intercostal spaces, the practitioner who would advise interference with the original tumour must be grossly ignorant, atrociously unprincipled, or of unsound mind.

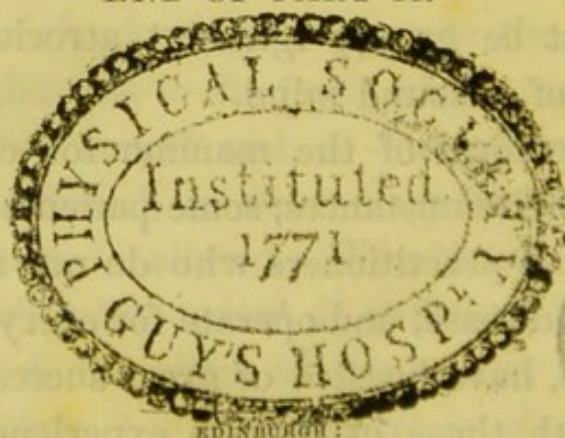
After removal of the mamma for carcinoma, in favourable circumstances, some patients remain healthy. Those practitioners who do not recognise the malignant disease, and operate for every tumour, and at all ages, have boasted of great success. But it is not so with those of mature experience. The *disposition* to malignant action often remains latent for



many months, sometimes for many years, and at length becomes fully developed. The disease may return in the skin; the cicatrix hardens, ulceration occurs, and progresses. Or tubercles form in the cellular tissue, enlarge, and involve the skin. Or the glands become tender and swell; and the swelling is often unattended with uneasiness. Œdema of the hand and forearm, to a great extent, may have existed for a considerable time, and on examination extensive glandular tumours are detected in the axilla and above the clavicle. These perhaps ulcerate; or cough and hectic cut off the patient. In short, permanent riddance from mammary carcinoma is scarcely to be expected by operation, or any other means.

Operations for medullary and bloody tumours of the mamma are not more successful in their results; though I have certainly witnessed permanent cures under unpromising circumstances,—when the tumours were large, of long duration, and even ulcerated.

END OF PART II.



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