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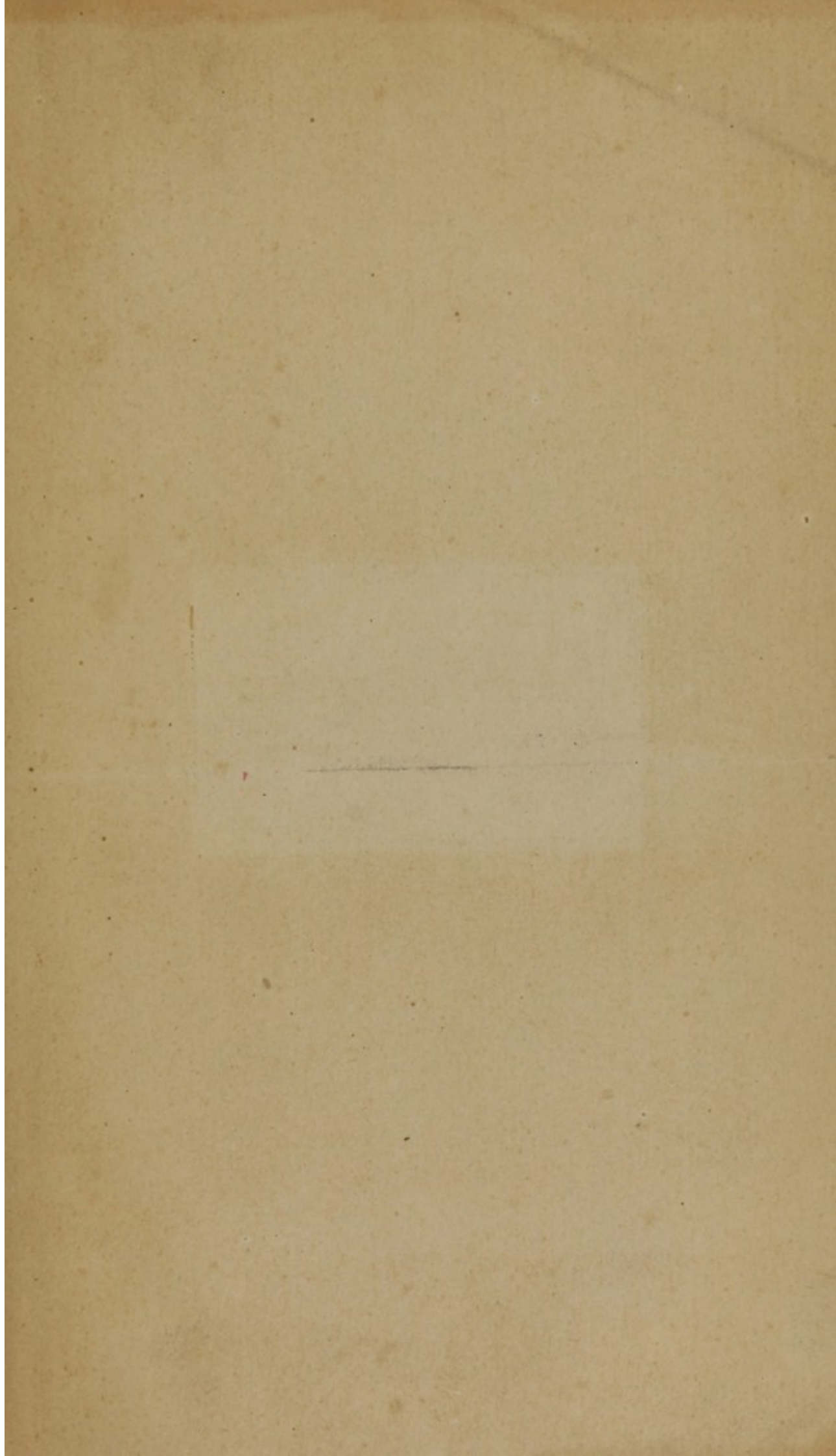
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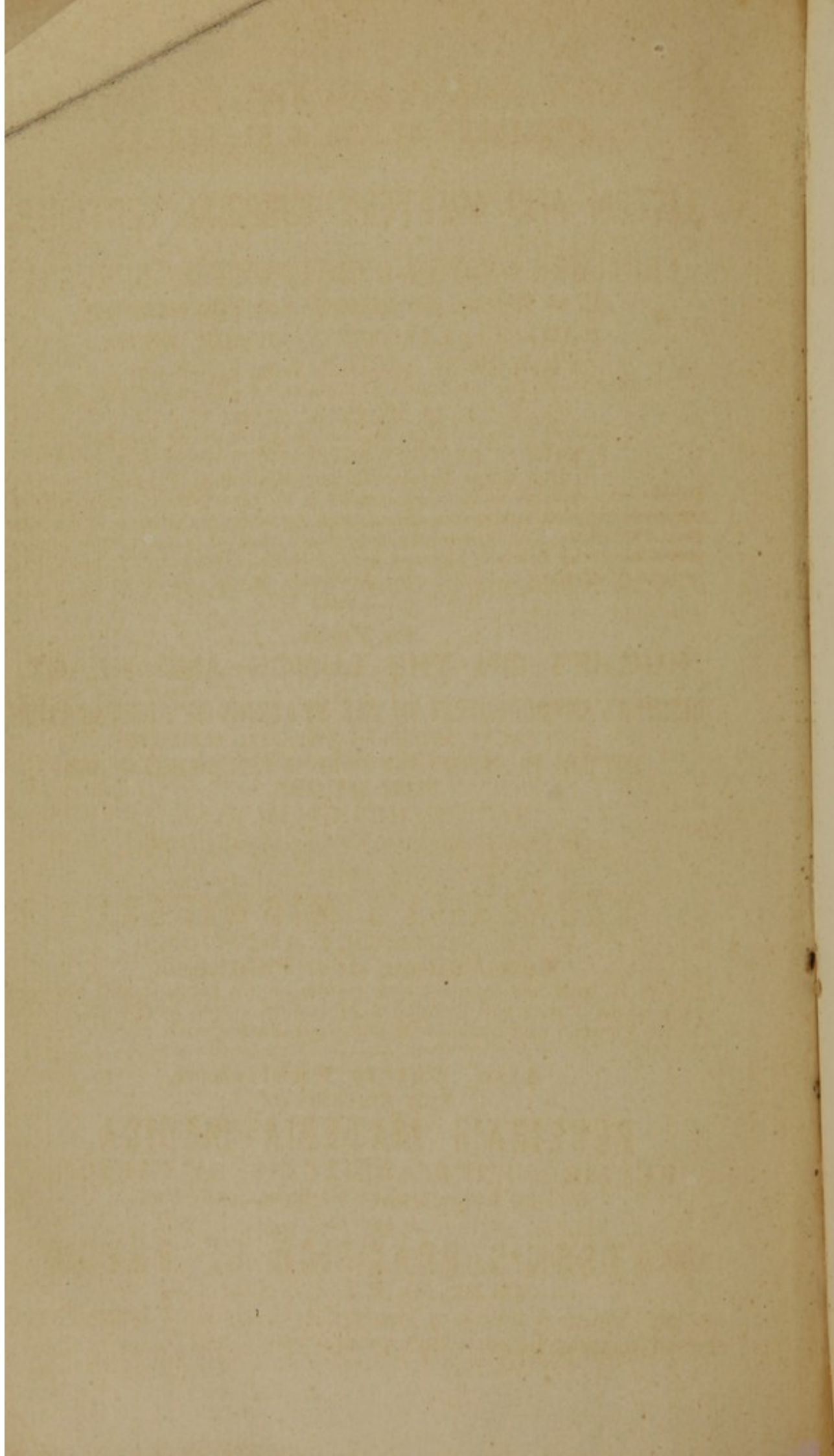
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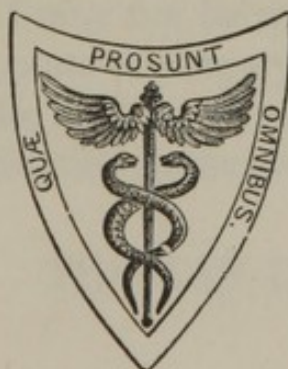
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BY ROBERT LISTON, ESQ., F. R. S.,
SENIOR SURGEON TO THE UNIVERSITY COLLEGE HOSPITAL, AND PROFESSOR OF CLINICAL
SURGERY IN THE COLLEGE.

WITH
NUMEROUS ADDITIONS

BY THOMAS D. MÜTTER, M. D.,
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IN presenting to the profession in this country these lectures of Mr. Liston, I feel fully assured that no apology is necessary; like everything emanating from that excellent surgeon, they teem with practical and judicious advice, and their perusal will amply repay even the veterans of our art.

It will be observed that this volume contains all the lectures published up to the present date, but does not conclude the course. It is simply a collection of much valuable matter, delivered in 1844 at the University College, London, and furnished the profession through the pages of the "London Lancet." It must prove a most valuable *addition* to the other works of Mr. Liston, republished in this country, and which should be in the hands of every surgeon.

The additional matter furnished by the editor is included within brackets [], and amounts to near two hundred and fifty pages, a much larger quantity than he at first expected to add, but he trusts it may not be without its advantages as illustrating some points of surgery but slightly or not at all referred to by the author. Another volume will be issued hereafter, should the publication of the lectures be continued.

THOMAS D. MÜTTER,
244 Walnut Street.

January, 1846.

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In preparing the present volume, it has been found that the
 works of Mr. Johnson, I feel compelled to refer to, are
 necessary; the first, being a collection of some of the
 best papers, they were with great care and pains selected
 and then given in my copy of the volume of
 one set.

It will be observed that this volume contains all the
 papers published up to the present date, but does not
 include the notes. It is a complete collection of papers valuable
 in the history of the movement. It is the Library of Congress
 and was purchased by the President through the agency of the
 "National Library." It must prove a most valuable addition
 to the other works of Mr. Johnson, republished in this work.
 The volume which should be in the hands of every surgeon
 and which should be in the hands of every student
 of the subject, is the volume published by the author in 1884
 under the title of "The Principles of Surgery," and is
 within brackets [] and amounts to nearly two hundred
 and fifty pages, a much larger quantity than has at first appeared.
 It is not, but it is not to be without the advantages
 as illustrating some points of surgery but which are not
 as all referred to by the author. Another volume will be
 issued hereafter, should the publication of the former be
 continued.

THOMAS D. MITTER

214 West 11th St.

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LECTURES

ON THE

OPERATIONS OF SURGERY.

LECTURE I.

IMPORTANCE OF OPERATIVE SURGERY. A THOROUGH KNOWLEDGE OF ANATOMY NECESSARY. INCISIONS. HEMORRHAGE. DRESSING WOUNDS. UNION OF WOUNDS. SUTURES.

GENTLEMEN,—The season is now so far advanced, and you have heard so much of the pathology and treatment of surgical diseases, and so much of surgery generally, that it seems to be high time that something should be said to you respecting injuries and diseases of particular parts of the body, and of the mode of remedying such of them as cannot be brought into a favourable state otherwise, by operative procedure. This is regarded as an inferior part of our professional duties, and truly it is so. Still, however, it is very essential that you should study to perform the operations of surgery creditably, with dexterity, and, moreover, with safety to your patients. A practitioner, however scientific he may be, if he were foolhardy enough to attempt an operation without having devoted some attention to the *art*, might find himself placed in a very awkward predicament, engaged in a proceeding, and in a middle of a very hazardous operation, which, possibly, he had neither the skill nor the courage to finish handsomely. He might thus lose, at one sweep, much of the reputation which he had gained by years of previous toil and successful practice.

There can be no doubt that many men have entered into practice without duly appreciating the necessity of studying how to relieve patients, labouring under otherwise irremediable injuries or diseases, by surgical operation. Many professional men affect to despise operations, and those who have studied hard to perform them as they ought undoubtedly to be accomplished, *tute cito et jucunde*; but they have failed in convincing the profession generally, or the

reflecting part of the public, that operative skill and sound knowledge of and discretion in the treatment of disease are incompatible. No surgeon or physician can know too much of any department of the science or art of healing, and many and oft is the time I have heard learned doctors of physic, practising as physicians, thank their stars that they had studied diligently and even practised surgery. Without this additional knowledge they have expressed their firm conviction that they could not have understood the nature of inflammatory action, or formed a just estimate of its consequences on internal parts. Pumannus, in his "*Chirurgia Curiosa*," puts the case in its proper point of view. "The knowledge of *external* maladies," he says, "was a necessary step towards the cognizance of *inward* diseases; nor, indeed, can any man be a good physician without it. But too many practitioners understand little or nothing of chirurgery; nay, they think it undervaluing to them, and, therefore, despise it, which, methinks, is a very unaccountable and ill-grounded fancy to imagine it less honourable to cure external than internal diseases." Some such doctors esteem "it an honour to foul their fine fingers with nasty black coals, in chemical processes, and yet think it a disparagement to their dignity to lay their hands on a wounded limb. Chemistry is a noble study; but to help the lame, to restore the blind to sight, or cure the wounded, is a much more generous and Christian employment. What an irretrievable loss had posterity suffered if the ancients had taken up with the contrary opinion; or how could our great master Hippocrates have obliged the world with his Aphorisms, Prænoons, &c., if he had not been thoroughly conversant in all parts of the healing faculty?"

To help the lame and to cure the wounded is but a small, though essential, part of the surgeon's duty, and is not to be accomplished by manual dexterity, by mere handiwork. You know full well that the surgeon of modern days has far higher duties to perform; that the art of healing is not divided, as in the darker ages, into the labour of the mind and the labour of the hands, the latter being our portion. The surgeon, it is true, was once the servant of the priest and physician; he performed the menial part of dressing wounds, shaving the heads of his masters or their patients, and stooped to other meaner occupations. He shared neither the emoluments nor honours. He had not the solace in his labours of reflecting that he had in any way contributed to the mitigation of suffering or the preservation of life.

But with the spread of civilization a better state of things obtained; the relative position of master and servant ceased to exist. After many bitter disputes the labour was divided; physicians and surgeons went hand in hand, finding that they had a common field to occupy, equal duties to perform, and that the labours of each demanded equal powers. These powers education and experience

supplied to both. The honours and the rewards became the same, and so it is in our days.

The general principles which characterize disease as to the nature of its progress or effects, and the means whereby it is to be arrested, are the same whether it occurs in any of the internal viscera or in any of the external and exposed organs or parts, in the lungs or in any of the limbs. The remedies may differ in name and the mode in which they are applied, but the intelligence which dictates the remedy and directs the cure is the same.

In the practice of surgery, in other words, the adaptation of practical knowledge and skill to the cure of injury and disease, you must not fall into the error of imagining that *operations* so called, whether capital or minor, constitute its larger or more important part. This I know to be a very common belief, especially amongst the young and inexperienced; but this I know, also, and can confidently assure you, is a belief the most erroneous.

Let us take one or two examples. No cases present themselves to the surgeon's notice more frequently than diseases of joints. Shall I tell you that such cases are to be met only, as of old, by recourse to incision or amputation, and that you are at once to look to the temper and edge of your bistouries, catlins, and saws? Assuredly not. By attention to the general health of your patients, by judicious local applications, by uniform support of the distempered parts, and by perfect rest, the majority of such diseases can be arrested in their course, and the limbs preserved in their natural appearance and functions.

A surgeon, by his qualifications, must at all times be competent and prepared fearlessly to undertake the so far hazardous operation of removing a large stone from the bladder, the source of most excruciating, most torturing pain. It is a great matter to be able, by a speedy operation, bloody, severe, and perilous to life though it be, to rid the patient of his misery, and to restore him to comfort and health. But the result is a hundred times more gratifying and creditable if, by the internal use of simple remedies, by suitable attention to diet, &c., the disease shall, in its infancy, be met and defeated, the pain alleviated and removed, and health restored without danger, the patient being subjected neither to one moment's suffering nor to the loss of a single drop of blood.

It is a point of ambition with the accomplished surgeon to be ready, at a moment's warning, to amputate skilfully a crushed limb which has obviously no chance of retaining its vitality, and which, if not instantly removed, must peril the whole frame's existence; and when, by such severe operation, well performed, he succeeds in averting the greater calamity, he has most just grounds for self-gratulation, and may truly say that another good thing has been done by his art for suffering humanity. "But when in the case of an injury, a shade less severe, there is a doubt whether or not the

limb may be enabled to resist the threatened gangrene; when the surgeon hesitates not to give the patient the benefit of that doubt; when, by great patience, care, and skill, he arranges the mangled fragments in their proper places, retains them so by suitable apparatus, affording due support, and yet permitting no undue pressure, regulating the play of the general circulation, controlling the effects of the *vis vitæ*; in short, averting both local and general disaster, and bringing the healthful action of reparation, though it may be slowly, to complete its valued process of cure; and when, ultimately, a thorough and permanent success crowns such patient and anxious labours, is not the cause for self-gratulation increased a hundred-fold? May he not proudly say that a far better thing has been done for humanity, and will not the public award him a higher and truer meed of praise?" You have had carefully described, and you have, moreover, witnessed in the practice of the hospital, the dreadfully distressing symptoms attendant upon rupture in a state of strangulation; the disturbed bowels, hiccough, agonizing, burning pain of the belly; and, above all, the constant vomiting of feculent matter; you have observed the state of collapse, utter helplessness, depression of the powers of life, attendant upon this disorder. Well, you are called to such a case; the usual means have failed of affording relief, the attempts to replace the protruded viscera have been made in vain, an operation has been proposed, the patient and his friends waver, and give an unwilling consent; you will not always be satisfied as to the impracticability of effecting reduction of the hernia from the report of others; you make the attempt at the taxis in perhaps a more scientific manner and more perseveringly; your efforts are crowned with success; the symptoms instantly abate, and the patient is on the spot restored to comfort and to health. You have thus not only relieved the patient from great suffering and saved him from imminent danger to life, but you have averted the necessity for the performance of a painful and often tedious operation, and one of itself not unattended by serious risk. You retire from the case with feelings of gratification and delight at your successful interference, and without one particle of anxiety as to your patient's recovery. This cannot be said of all the cases in which the operation is resorted to, and it is often, as you must know, unavoidable. In conclusion, I need not tell you that it is a much more satisfactory termination of a case of retention of urine, to the surgeon, no less than to the patient, when the water is got to pass by the natural canal than when it is withdrawn by the almost obsolete (at least in this school) operation of paracentesis vesicæ. "Wherein, then, consists the advancement of modern surgery? in what is it most different from the cruel and debased handicraft of the dark ages? Not surely in the multiplying operations, nor in the invention and more frequent use of maiming instruments, but in limiting the expenditure of blood and pain, and

often averting altogether the use of operations." Whilst many of the capital operations, as they used to be termed, seldom require to be resorted to, many diseases and deformities, previously considered incurable and beyond the reach of surgical skill, have been successfully attacked and removed by the knife. I recollect well, as a student of surgery, seeing many tumours of the face and neck and jaws, frightful to behold, under which patients were permitted to drag out a miserable existence, which now could be taken away without hesitation, and with but slight danger to the individual. Patients are not allowed to perish from the bursting of aneurisms near the trunk of the body. Deformities of all kinds, in the eyes, neck and limbs, are at once removed or put in the way of being so, by a slight snip with scissors or simple puncture. Foreign bodies, which must sooner or later lead to a fatal termination, are without hesitation removed by opening the windpipe. Patients labouring under disease of this tube are relieved from impending suffocation by the same proceeding. Operations are not of themselves truly the opprobrium of surgery; they have been and may easily be made so; but they are really much less so than they were. Not only are they seldom employed, but, besides, those which we are still compelled to perform, are simplified and shorn of their horror. I would urge you to study, by every means in your power, to become dextrous operators; but, as I have all along done, I would again most earnestly conjure you to acquire such knowledge and put it in practice, too, as shall, in the majority of instances, forestall your operative skill. The field of operative surgery, though happily narrowed, is still extensive, and cases are constantly occurring, and must occur, in which you will be called upon to take up the knife.

Women, it is to be presumed, will continue to bring forth children with hare-lip and club-feet, as heretofore, and these cannot be remedied without a surgical operation, and manipulation of one kind or other. A great many tumours are still unmanageable, except by the application of the knife. Many cases are met with where disease in bones and joints has not been treated very carefully or scientifically in the first instance, and where it has gained such an ascendancy that recourse must be had to the amputating knife in order to preserve the patient's life. There are also a great many injuries constantly occurring which must call for the interference of the surgeon. It is very necessary, therefore, that the *art* of operating should be well studied and well understood. It does not follow, as I have already remarked to you, that because a person has acquired dexterity in operations he should not practice other branches of surgery equally well with his neighbours. It is an acquirement very easily carried about, and one which you will often find of signal advantage. It is true that every person who studies

the profession is not called upon to practise operations ; many persons who settle in large towns are not disposed to interfere with operations, and to incur the anxiety and responsibility which they necessarily involve. But any of you may be so circumstanced that it is impossible for you to avoid an operation. You may go abroad, in charge of a large body of men, or you go a voyage with a great number of passengers entrusted to your care, and, thrown entirely on your own resources, you may be compelled to operate. A patient may have strangulated hernia, or may suffer under retention of urine, and you must interfere, or you will get into great and deserved disgrace. A fellow student of mine went to India, as surgeon of a ship ; one of the crew received a wound somewhere behind the angle of the jaw, which continued to bleed, from time to time, so profusely as to endanger his life, and at a time when the operation for tying the carotid artery had only been performed once or twice, and that with all the advantages of good assistants in hospital practice, this gentleman was necessitated to cut down upon, and secure the bleeding vessel. He gained great credit for the act, and I believe that his success in practice, and in after-life, was mainly owing to this circumstance.

I need not say more to convince you of the necessity of making yourselves masters of this part of your profession. In order to do so you must study anatomy well ; not only understand the intimate structure of parts, but their relative situation ; the muscles, the bones, the position of blood-vessels and nerves, and the depth at which parts are placed. And further remember, that it is not sufficient that you should acquire a thorough knowledge of these things, but, if you intend to practise operations, that knowledge must be kept up. A surgeon who expects to gain a reputation, and still more to maintain it, by doing his duty creditably and skilfully as an operator, must not allow his intimate knowledge of relative anatomy to escape his recollection. He must continue to dissect, though in full practice of his profession, and from time to time it is his duty, not to himself only, but to the public who trust him, to examine carefully and minutely, in the dead body, all the tissues and parts which may be involved in disease, or in any way concerned in operations ; he must do so often, by stealing hours from his sleep and necessary recreations. He must also practice from time to time the various operations of surgery on the dead body. He will thus preserve, not only his knowledge but his manual dexterity. Whilst he does this, he must not overlook morbid anatomy.

At the same time it is very desirable that you should take all possible measures to avoid the performance of operations ; that you should at no time lose sight of this maxim. In hospital practice you must have observed how much that is our object. You have seen more than one case successfully treated during the present session, in which two years ago I should, without hesitation or

doubt, have cut down on the femoral artery. In many cases of aneurism we shall now be able to dispense with operations entirely. And depend upon it, there is more credit to be gained, and a surgeon has more satisfaction in being able to cure a patient in this way than by operation.

INCISIONS.

But you must very often divide the cutaneous tissue for one purpose or another, and your object should be to do that safely, as well as quickly and with as little pain to the patient as possible. The division of the skin must inflict a certain amount of pain, but there is a way in many cases of preventing pain, or rendering it much less severe than it would otherwise be. That mode of cutting must be acquired in order to attain this desirable end.

In the first place, you must not divide the skin by scratches, you must carry the knife completely through the tissue at once, and, doing it with rapidity, you will save the patient a great deal of pain. Then again, by cutting the skin from within outwards, instead of from without inwards, you diminish suffering. This mode may be adopted in many operations. In hernia, in the removal of tumours and in many amputations, the parts may be divided in this way with one-twentieth of the suffering often enough most unnecessarily inflicted.

Incisions are made with variously formed knives, according to the object you have in view, and according to the length to which the parts have to be cut. You would not think of making a long incision with a knife having a small blade. You would not think of amputating the thigh with such an instrument as I now show you, though I have seen it done. I have actually witnessed this operation commenced with a common scalpel, and a considerable part of the proceeding accomplished with it. I need not tell you that it was an exceedingly tedious business, an exceedingly cruel and disgusting one, and the incisions were not completed in less time than ten or fifteen minutes. Such an absurdity would not be thought of now-a-days, and would not be tolerated. If you are to amputate a limb, you use a proportionately large knife. Then if you wish to divide parts quickly, and to no great extent, you will use a knife with a good point and a convex edge. If you require, in the course of an operation, to perform a dissection, you will employ an instrument which you can turn readily in your hand. If it have a good point, and an edge by which you can make parallel incisions, you can turn it about easily, as for dissecting out a tumour in any intricate situation. There is an art in holding a knife. If you wish to make a pretty free incision through any part to evacuate an accumulation of matter, to expose a tumour, or a dead portion of bone,

you would use a knife such as this, and hold it as I now do. You

Fig. 1.



take the joint betwixt your middle finger and thumb, the end of the handle goes into the hollow of your hand, and you then place your forefinger along the back of the instrument in order to steady it. You pass it through the skin perpendicularly so as to divide the *whole cutaneous tissue at once*, then laying the convex edge upon the part, you, with a slightly sawing motion, cut it to the extent you desire, and then withdraw the instrument in the same position in which you entered it, namely, perpendicularly. In this way you will be able to divide the skin throughout its whole thickness at once. By the aid of your assistant you keep the parts on the stretch; this is of great importance in making a clean incision. Some old-fashioned surgeons commence their operation in another way; they lay the convex edge of the knife on the integument and draw it hesitatingly and scratchingly along. They thus leave two long tails, one at each extremity of the incision, cutting the more sensitive part of the body, namely, the skin, to a much greater extent than there is any occasion for, a great part of the incision being in this manner rendered useless for the after proceedings.

If you require to go deeper you hold the knife differently, and use one with a shorter blade, and in a smoother and rounder handle, which you can turn nicely in your fingers. You turn it first one

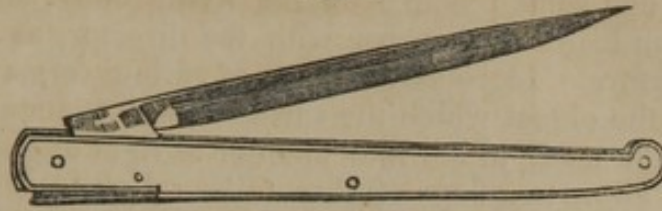
Fig. 2.



way and then the other, so as to make a clean and neat dissection. All knives must be used upon the principle, and, so far, after the fashion of a saw. You must be aware that all knives are set like this instrument. By means of a magnifying glass, you will see that some instruments have their teeth set forwards and some backwards, and this according to the object for which they are employed. A razor, for instance, is set differently from a dissecting knife. The edge of a razor is set forwards, the edges of most surgical knives are set backwards. It is generally in pulling towards you that you cut the tissues. Cataract knives, and some bistouries, however, as those for removing the articulations of the thumb with the carpus, should be set forwards instead of backwards. I have shown you the way of cutting the integuments from without inwards, but you sometimes have, as I have told you, to cut from within outwards. This mode of division is often practised, and particularly in some

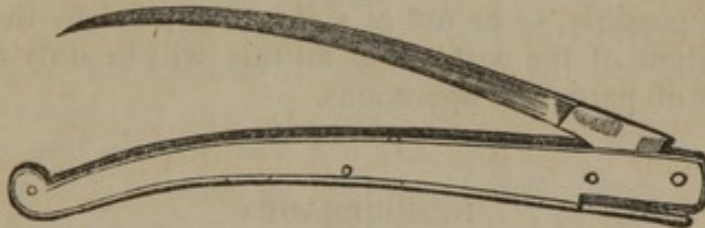
operations. The assistant pinches up the skin, the knife (one with a narrow thin blade and fine point), is entered at a sufficient depth

Fig. 3.



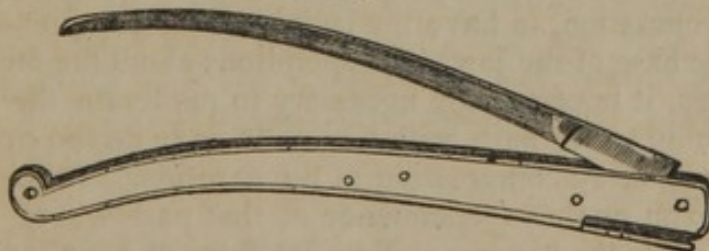
under the fold, you draw it out towards the surface of the body, and then you find that you have made a tolerably long and very clean incision; where the parts are very loose it may be made many inches in length if required, and with less pain than one of half an inch could otherwise be inflicted. Skin that has been undermined by abscess or ulceration is incised with advantage from within towards the surface. For this purpose a very narrow and curved knife, with a sharp point, is most advantageously employed. In

Fig. 4.



order to prevent entanglement of the point, a little pellet of bees'-wax may be put upon it; but, by dextrous management, the instrument may be slid sufficiently far under the integument without any such guard. Then, again, when there are counter-openings, a blunt-pointed bistoury may be used, straight or curved, as may seem most suitable. Care should be taken in the fashioning of the point of

Fig. 5.



this instrument, that it may be made to cut or not, according to the inclination of the handle. In enlarging the openings of abscesses, or dilating sinuses, it will prove very useful. It may be made to cut by raising the handle from the surface, the skin being made tense, or if there is any portion of the coverings thinned, this may be opened previously by the application of a pointed bit of caustic potass, or by the use of a sharp-pointed knife. The probe point of the bistoury is then brought out at this point, and by a sliding motion the superimposed integument is cut to the requisite extent.

This instrument you will find come into use in various operations, those for fistula, hernia, &c. A grooved probe is sometimes used as a guide for these blunt or sharp-pointed knives. But a surgeon, after he has had some practice on the living body, and acquired dexterity, soon learns to dispense with the director, as it is called, in a great measure. Incisions are made of various forms and extent, according to the object which the surgeon has ultimately in view. One cut may be made to fall into another at right angles, or otherwise so as to allow two flaps of skin to be raised, as for the exposure of a tumour of a diseased bone or joint. One flap only may be raised by making two incisions meet at a point, forming by their juncture an acute or obtuse angle. Again, four flaps may be dissected up by making two incisions across each other. Portions of cutaneous tissue may require to be removed as when affected by disease in themselves, or involved, or likely to be, in disease commencing in other parts. The removal of integuments is not to be resorted to, however, without much and anxious consideration; this proceeding is apt to lead to tedious and imperfect cure—often to great deformity. Above all, incisions must always be made in such a way as, if possible, to be out of sight, concealed by the dress, or hair, or position of the part. But all this will be duly considered in treatment of particular operations.

HEMORRHAGE.

Incisions must also be made in such a way as to avoid, as much as possible, the effusion of blood. There are means of arresting the bleeding during an operation. An assistant may compress the arterial trunk going to a limb or part, or a tourniquet may be applied. For example, when operating on the lips, you will find it of advantage sometimes, in order to save the patient the loss of blood, and prevent it from spirting into your eyes and interfering with the progress of the operation, to have the facial arteries compressed as they pass over the base of the jaw. In operations about the face, involving the bones, it is essentially necessary to moderate the current of the blood going to the part, with a view to save its too profuse effusion; this is done by compression of the carotids. In making deep dissections, you ought to commence at that part where you know the vessels enter the tumour. You cut them at once, and you are able, by having them compressed in the wound by the fingers of an assistant, to go on without much further loss of blood. The permanent arrest of the bleeding is generally managed by the application of ligatures, and it is best to attend to this after the operation is completed. The small round thread ligature answers better than any other. It should be tied lightly. If there is any prospect of a cure by the first intention, one end of the ligature should be cut off *quite close* to the knot (a reef one), and the ends should all be carefully gathered and brought out at one corner or another of the

incision after it is put together. If there is no intention of approximating and retaining the edges, both ends of all the ligatures had better be cut off close to the knots. You are recommended in surgical books to stop and secure the different vessels, and then go on with the operation. But this is a very troublesome, a very tedious, and an unnecessary proceeding, and I know of scarcely any operation in which it is required; you thus subject the patient to a great deal more suffering than if you dissect out the part rapidly. Suppose you are removing a tumour, if you take it out quickly, you have some bleeding, it is true, at the time, but the morbid mass is removed in a few seconds or minutes, and you are then able, by means of a sponge, to prevent the effusion of blood till you look out for the vessels. You generally find that there are not half so many to tie as if you had stopped and attempted to tie them immediately, when they were divided; many of them have shrunk and contracted, and the bleeding has been stopped by natural means. Those vessels that do bleed are to be picked out as clean from the surrounding tissue as possible, and secured by ligature. For this purpose the common dissecting forceps answers very well, or what is better, the instrument used in the hospital is a sort of forceps with hooked points. How this instrument came into its present form, though it often goes under my name, I cannot tell, but it is by far the most convenient and efficient one you can employ. Some use what is called Assalini's forceps, an instrument that closes and holds on when the grasp is relaxed; it seems to me a useless fiddling affair. I do not suppose that you well know what I mean by *tenaculum*. This is one of a very moderate size. It is a sort of large hook for pulling out the vessel, the ligature being applied behind the convexity of the hook. When I began to attend surgical lectures and hospital practice, vessels were always tied with a great clumsy thing of this kind. The bleeding part was fixed with the hook, the ligature was tied behind the hook, and then the hook was taken out. You may take up a vessel very well with the common dissecting forceps, such as I have in my hand, large and well made, but I prefer the others with the spring catch and hooked points. You may take hold of one vessel after another, while your assistant is going on tying them.

[In the text Mr. Liston has well described the mode of applying the ligature, but it may not be inapposite, for the sake of the student, to add a few words in relation to the action of a ligature upon the different vessels, and its influence upon the circulation of the neighbouring parts, as well as in the vessel itself. It is a singular fact, that although mentioned by Celsus, the ligature was not generally employed until the time of Paré, and even then its operation was but in part comprehended. The numerous beautiful and ingenious experiments, of Jones, Vacca, Scarpa, Travers, Beclard, Manec, N. R. Smith, and others, have in our day, however, rendered the

whole subject so simple that nothing remains to be desired. It appears that when a ligature of proper shape and size is applied to *an artery in its continuity*, freed from all its connections, it divides the *internal* and *middle coats*, while the *external*, in consequence of its peculiar structure, remains entire. It undergoes,

Fig. 6.



however, an important change in its condition, its walls being forced by the ligature between the lips of the wound in the internal and middle coats, so as to form *an irregular or puckered cone over each end of the vessel*,—the apices of the cones terminating at the loop of the ligature, which is thus lodged in a sort of gutter. When applied to a vessel which *opens upon a free surface*, the ligature operates in the same manner, with the exception that instead of producing *two cones* there is but one, the end of the vessel forming a sort of *fringe* over the loop (Fig. 6). As soon as the vessel is secured, there is immediate *stagnation* of the blood between the point at which the ligature is applied, and the first collateral branch of importance given off by the main trunk. This is speedily followed by *coagulation* of the blood, and the clot, where the vessel is sound or has been divided with a sharp instrument, is conical in form, often twisted upon its axis, and reaches with its apex the orifice of the first collateral branch. When the vessel has been lacerated, the coagulum occupies nearly, if not completely, its entire caliber, and of course takes the shape of the vessel.

Fig. 7.



The next thing that occurs, at least in the vessel itself, is its conversion into a solid cylinder by the organization of the coagulum. By some it is supposed, that the coagulum is first absorbed, and then lymph effused, but surely this would be a useless labour, inasmuch as the basis of the clot is precisely what nature requires for the accomplishment of her object. In fact, the changes which take place are simply these: there is first, from the divided arterial tissues, effusion of a small quantity of lymph or plasma between the coagulum and the walls of the vessel; then adhesion between the clot and these walls; next, absorption of the colouring particles of the coagulum, and lastly, its complete organization. The vessel thus becomes a solid cylinder, and, if large, remains as a fibrous cord during the life of the individual, becoming, however, less and less until it is often a mere thread, (Fig. 7,) but if small, it is absorbed off as high as the collateral branch (Fig. 8).

While these changes are taking place within the vessel, the ligature, in consequence of the irritation it develops, is soon imbedded in a mass of coagulable lymph, which adheres to the artery for some distance above and below the knot, and thus assists the internal coagulum in preventing secondary hemorrhage. By and by progressive, and in some cases ulcerative absorption is set up, and the ligature is loosened and detached. If this process be interfered with, either by inflammation, or the unnecessary and foolish handling of the ligature, or if the patient be labouring under any constitutional disease which prevents the ready coagulation of the blood and its subsequent organization; as soon as the ligature is loosened, the blood is forced out, and in this way we have secondary hemorrhage. It is always important, therefore, carefully to watch our patient about the period at which we expect the detachment of the ligature, which period varies with the size of the artery and the manner in which the ligature is applied. From the 5th to the 12th day may probably be considered the usual time for the whole process to be accomplished, but if the ligature is *flat*, or *irregularly shaped*, or if we *happen to include a bit of muscle, or nerve, or any of the surrounding tissues in its loop*, there is no telling when it will be completed. I have known a ligature retain its hold for six months in consequence of an ignorant surgeon having included a piece of nerve in its grasp. But the ligature is sometimes held fast by the granulations of the wound long after it has divided the vessel. When, then, we find its detachment unusually delayed, it is well, from day to day, to make slight traction upon it, and as we generally gain a few lines by the effort, we should carefully endeavour to avoid any loss of the advantage, by attaching, by means of a bit of adhesive plaster to the adjacent parts, the free extremity *placed upon the stretch*.

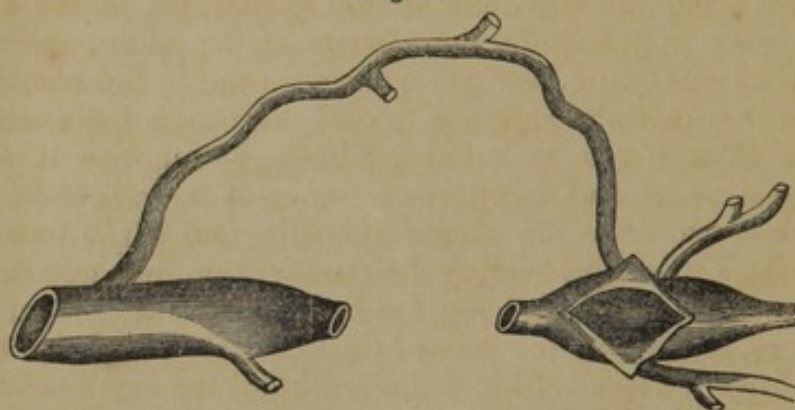
It will be seen from these remarks, that it is important to avoid the inclusion of any foreign body in the loop of the ligature; but there are other reasons much more cogent, which should teach us caution on this point. For example, the experiments of Jones especially, prove that the ligature will not divide the *internal* and *middle tunics*, if there is any substance interposed between it and the vessel. This prevents, in many cases, the effusion of lymph, and the proper obliteration of the artery, and hence disposes to secondary hemorrhage. Again, the inclusion of a nerve has been the occasion of intense suffering, convulsions, and even death;—the inclusion of a vein may produce fatal phlebitis.

Fig. 8.



In large wounds when important vessels are divided, we should invariably apply a ligature to both the *cardiac* and *distal* orifices, for if this precaution be neglected, as soon as the collateral circulation is established, bleeding from the distal orifice will certainly take place. The same rule holds good when an artery (that is, a large one) is merely wounded or punctured. A ligature in such cases should be applied both above and below the solution of continuity. Formerly it was the practice to divide the vessel between them, but this is unnecessary. When the vessel is small, however, we may often save time and trouble by merely cutting it entirely across, so that the natural hemostatic process may take place in each extremity.

Fig. 9.



[Diagram of Anastomosing Circulation.]

In oblique wounds the vessels are divided in such a manner that it is often difficult to apply the ligature properly, but we should always draw the orifice well out from the surrounding tissues, and tie *above* the oblique wound in the artery.

It is well known that in lacerated wounds, even when large vessels are wounded, the hemorrhage is comparatively trifling,—and when an inexperienced surgeon is called to such a case, and finds the arteries lying flaccid and pouring out no blood, he is disposed to trust to the efforts of nature alone, and leaves the vessels unsecured by ligature or any other means. But although nature is occasionally competent to the task, the practice of leaving the matter entirely to her, is fraught with danger; for as soon as reaction takes place, the partially paralyzed vessels acquire a portion of their wonted energy, and often bleed profusely. Hence it is the duty of the surgeon, in all such wounds, to secure, by some appropriate means, every artery of a size sufficient to threaten hemorrhage when reaction makes its appearance.

Lastly, we should never be in a hurry to close a wound, for often the muscular and arterial branches, which seem small and unimportant, and which contract and bury themselves almost as soon as the incision is made, or which, in consequence of the patients fainting, or the action of the atmosphere, pour out little or no blood, will,

under the stimulus of reaction, give rise to severe or even fatal hemorrhage. A good rule is to wait by your patient until reaction occurs, and then every vessel that throws out blood freely, should be secured. Sometimes local reaction in the part may be brought on in a few moments by the application of a warm sponge.

The manner of arranging the ligatures has been made a matter of dispute. Some advise, in open wounds that must heal by granulation, to cut off both ends and allow the knot to be detached and discharged with the pus; others, even where the wound is to be closed and united by the first intention, recommend the same thing, in the hope that the knot will become encysted or be discharged by slight ulceration. The best rule, however, is to cut off *one* end close, and bring the other out of the wound, for in the first case we may wish to hasten the detachment of the noose, and then the long thread will be of material assistance, and in the second, experience proves that although the wound may unite more readily, yet the knot always acts as a foreign body, giving rise to slow and tedious ulceration, and may prove a source of annoyance for months.

The desire to unite the wound speedily, and at the same time to obviate the difficulty of healing the part over an inorganic substance, that must act as a foreign body, led Profs. Physick, Dorsey, Jamison and others, to propose the *animal ligatures* instead of those ordinarily employed. Pieces of kid or buckskin, or the sinews of the deer, or catgut, moistened and rolled, were the materials employed, and it was supposed that the knot would soften and become absorbed, but not before the vessel was obliterated. But experience has shown that the measure, although highly ingenious, is unsatisfactory, and few or none, at the present time, consider it of much importance. Metallic ligatures, especially those made of *lead* wire, have been used by different surgeons, but I scarcely know of any case to which they are as well adapted as the old-fashioned silk or hemp. The material chiefly employed among us, is that known as *saddlers' silk*, one thread of which is sufficiently strong for an artery of ordinary size. For the iliacs, innominate, or any very large vessel, *two* or *three threads*, well waxed and rolled into a round cord, answer a better purpose. The cord should be round and free from irregularities, for unless it presents these qualities, it does not readily divide the internal and middle coats, and hence the effusion of plasma may not be sufficient to obliterate the vessel. I well know, that this division is not considered essential for the accomplishment of adhesion, inasmuch as experiments, particularly those of Sir P. Crampton, Freer, Scarpa, Dubois, Assalini and Mislei, prove that where the walls of an artery are held in complete and firm contact, for some time, obliteration of its cavity is fully secured. But it is evidently much safer to secure an abundant effusion of the necessary bond of union, (which can be done effectually in most cases only by division of the arterial tissues,) than to trust to the doubtful event of

simple adhesion. The high authority of Sir P. Crampton and Scarpa, however, is in favour of the flat ligature, and these gentlemen contend, that we increase the hazards of the measure inasmuch as we weaken the vessel by the division of its internal coats, and thus expose it to speedy ulceration. So firmly convinced was Scarpa of this, that he suggested the introduction between the vessel and the loop of the flat ligature, of a small cylinder of bougie or adhesive plaster, which *protected the vessel from division*, but forced its walls together and caused their union by keeping up a certain degree of compression; and Sir P. Crampton used a bit of wood for the same purpose. It appears, however, that this process, known as the "*mediate ligature*," was mentioned long before the time of Scarpa, by Dionis. Although several have been led to adopt similar views, I think it may with safety be asserted that nearly every practical surgeon of the present day employs in practice the ligature as recommended by Jones, which is certainly strong evidence of the correctness of his views. But it is true that in small arteries, complete denudation is unnecessary, and here the surrounding tissues may be included with advantage.

In consequence of certain results, which were brought about during his series of experiments, Dr. Jones was led to advise an exceedingly hazardous proceeding, in reference to the use of the ligature. It appears that he found "when a ligature is tightly applied round a large unwounded artery in a quadruped, so as to cut the internal coats, and is immediately afterwards removed, that adhesive inflammation takes place at the part of the vessel embraced by the ligature, and the canal of the artery becomes permanently obliterated for some extent. This happened with increased certainty, when two or more ligatures were applied near each other and then taken off." These observations led him to recommend, especially in the operation for aneurism, what is called the "*temporary ligature*," that is, a ligature which is allowed to remain but a short time upon the vessel; and he hoped by its removal to get rid of one source of irritation. But the experiments of Dalrymple, Hodgson and others, prove that the mere division of the coats of the vessels is *not sufficient* in most cases to cause its obliteration, and that consequently it would be exceedingly dangerous to trust to such a measure. The idea of dispensing with the ligature is therefore, at the present time, utterly abandoned. Another modification of the ligature is that known as the "*ligature d'attente*," or of *reserve*. Fearing the giving way of the artery under the ligature first applied, it has been proposed to pass one or more beneath the vessel at some distance above the first, so that in the event of this being thrown off, the others may be tightened at once. But, as one might naturally suppose, the denudation of the artery requisite for the passage of so many ligatures, by cutting off the *vasa vasorum*, will cause the vessel to slough, or, if this does not occur, the threads will act as foreign

bodies, produce ulceration, and of course secondary hemorrhage. No good surgeon, therefore, would ever employ this ligature.

In this age of novelty, one is scarcely surprised at any thing that may appear, either in or out of the profession, but surely we were not prepared to receive the proposition recently submitted, of tying an artery by "*subcutaneous ligature.*" Apart from the necessity which obtains of including the surrounding tissue in the noose, it appears to me that the danger of transfixing the vessel with the needle, and the difficulty of ascertaining when the instrument has fairly passed around the part to be included in the ligature, would be sufficient to cause every surgeon to consider the whole thing unworthy a moment's thought.

But although we condemn this method in toto, so far as regards the ligature of vessels under ordinary circumstances, there is yet a modification of the process to which we are sometimes obliged to resort in cases of troublesome bleeding, where the vessel can be reached by neither the forceps nor the tenaculum. In the lateral operation for stone, for example, it may be necessary to tie the internal pudic, and here the best plan of procedure is to pass a curved needle, armed with a ligature, and held in Physick's forceps, (an instrument composed of two handles held together by a movable catch or slide,) beneath the vessel, including, of course, a portion of the surrounding tissues. When the needle has evidently passed around the artery, the catch is loosened and the forceps removed, and then the ligature can be drawn out and tied without difficulty. These forceps are preferable to the needle set in a handle, or any thing else of the kind that I have seen.

It occasionally occurs after severe operations, especially upon the extremities, that we are forced, in consequence of secondary hemorrhage, to tie the main arterial trunk leading to the spot. Where such is the case the vessel is to be exposed, and then a ligature passed around it

Fig. 10.



Fig. 11.



by means of the common aneurismal needle, or, when this is not at

hand, a bent probe. A great variety of needles for this purpose have been invented, the best of which are those of Graafe, Physick, Gibson (which, however, is a modification of an old instrument) and Horner; and it will be proper for the surgeon to furnish himself with one or more whenever he expects to perform an important operation, where the ligature of the main artery of the limb may be required.

The process of Dionis, an attempt to revive which has recently been made, is entitled to no consideration whatever. It consists in first tying the vessel in the usual manner, and then, by means of a needle, passing one end of the ligature through and through it just above the knot.—T. D. M.]

I need not say any thing about twisting, or torsion, as it is called, of vessels; I believe that practice is almost abandoned. It will answer now and then in vessels that stand out detached from the neighbouring tissue, such as the facial; but you cannot take hold of the majority of the vessels, and it is not safe to trust to the torsion of large ones. You had better put a ligature upon them, and if you are obliged to do so, you had better put one on the others also.

[It will be perceived that Mr. Liston, as every practical surgeon must be, is opposed to the use of "*torsion*," except in the cases to which he refers. It is really surprising that the measure should have acquired the celebrity with which, at one time, it was attended; for notwithstanding all that has been said in its praise, a more hazardous or more unphilosophical procedure can scarcely be imagined, at least where the large vessels are concerned. It is not in reality a modern invention, although it is generally so considered;

Fig. 12.



for Galen makes mention of a process entirely similar. But it was never received with much cordiality by the profession until the powerful authority of Velpeau, Amussat, Fricke and Thierry induced all to make the experiment. The object of the operation is to lacerate the coats of the vessel, and then, by twisting them upon its short axis, to convert the tube into a solid cylinder, for half an inch or more. The resistance of this cord is deemed sufficient to prevent hemorrhage, and by dispensing with the ligature, a cause of irritation is removed. Each one of its advocates proposes a plan of his own, but it matters very little which we adopt. Amussat, for example, "seizes the artery with the forceps, isolates, and draws it out, for half an inch or more, above the free surface of the wound; then, with the narrow round pointed forceps, it is to be grasped transversely on a level with the wound, and *mashed* so as to rupture its inner coats, while the proper torsion forceps are applied transversely on the *free* end of the vessel to hold it drawn out. With the latter a

half turn of the vessel is given so as to twist it on the first pair of

forceps, which holds it tight. The torsion forceps, without loosening their hold, are then brought in the direction of the long axis of the vessel, and the artery twisted from *three* to *eight* times, according to its size. The upper pair of forceps is then to be removed, and the operation completed by sinking the twisted end of the vessel into the flesh with the other pair!"

Velpéau and Fricke, after isolating the artery with a pair of forceps, "push back the tissues which cover it for half an inch, and then seize it with the finger and thumb of the left hand. The end is then twisted the requisite number of times!"

Thierry's process is more simple than either of the above. He merely "seizes the vessel, pulls it out, and then twists it as much as is necessary!" In all cases the vessel should not be turned more than seven or eight times, for fear of *twisting it off entirely!* In small vessels, or those easily isolated, torsion, I repeat, will answer, but it should never be attempted when the vessel is large, or deeply seated. The objections to its use are simply these: the vessel may *untwist*, and thus give rise to hemorrhage; the part may *slough* before the vessel is obliterated; and lastly, the knot formed of the end of the vessel may act after its death, as a *foreign body*.

Mr. Liston has also passed over, as probably beneath his notice, (and if so, I am almost ready to join him in the opinion,) the remaining processes of *machure*, *refoulement* or *inversion*, *suture*, the *seton*, *acupuncture*, *electro-puncture*, *plugging*, &c. But as these measures are frequently referred to by different authors, and as the student should be made familiar, as far as it is practicable, with every thing introduced into the profession, I have deemed a brief explanation of the most important not altogether inapposite.

MACHURE.

This operation was performed in 1820 by Maunoir, and is very easy of execution. The vessel is to be seized with a pair of sharp toothed forceps, and *mashed* or *lacerated* for some few lines above its orifice, care being taken to confine the lacerations as much as possible to the internal and middle coats. No one would ever think of preferring this method of arresting hemorrhage to the ligature, unless in certain plastic operations, where the irritation of the knot might prevent union by the first intention; but I have rarely had occasion to employ it even here, for generally, if the vessel is small, the efforts of nature are sufficient to cause its obliteration. The application of cold, in some shape or other, or merely exposing the surface to the air for a short time, is usually all that we require to insure this end.

REFOULEMENT, OR INVERSION.

This process, introduced by Amussat, is performed in the following manner. The vessel is to be first drawn out for half an inch, then seized transversely with another pair of forceps, and its internal and middle coats ruptured. The extremity of the artery, thus partially detached, is then *inverted* and thrust into the cavity of the trunk, so as to effect its complete occlusion. It is either left in this situation without any additional support, or it may be attached by a stitch. Although highly recommended by its inventor, no one, I believe, has adopted his views, and I merely mention the operation as one of the *novelties* of the day, and wholly unworthy of our confidence.

SUTURE.

Another mode of arresting hemorrhage is the *suture*, which is nothing more than *sewing* up the orifice of the bleeding vessel. Of course, no surgeon of any note would condescend to employ so peurile a means as this, and soon it will be remembered merely as one of the idle whims of some inventive genius. Lambert, its author, it is true, employs it only in cases of wounded artery where the vessel retains its continuity—and with the view of preserving its permeability.

SETON.

There is "yet another" plan for securing a vessel, or causing coagulation of the blood in one, in cases of aneurism, proposed, I think, by a very ingenious surgeon, Jamieson, of Baltimore. It consists in passing through the artery, by means of a needle, a piece of thread or bucksin, which is allowed to remain some time. This establishes a certain amount of inflammation, and causes coagulation of the blood. Worms repeated the experiments of Jamieson, and with a like result; but Amussat and others failed in the attempt. Most surgeons, however, look upon the means as useless, and it has never, I believe, attained a place among the hemostatic agents of repute.

ACUPUNCTURE AND ELECTRO-PUNCTURE.

In this age of experiment, surgeons are constantly upon the "*qui vive*," and strive to attain notoriety, if not positive reputation, by the introduction of something to which the term *new* or *novel* may be appended. Not satisfied, then, with the usual modes of arresting hemorrhage, we have recently been informed by Pravaz, that one of the best modes of effecting this object, is to *transfix the vessel, in one or more places, with the acupuncture needle*, and should this fail, the measure may be rendered more effective by combining with it *electricity*. It is true that the author of this measure advises it more particularly in cases of aneurism, when it is impossible to perform any of the usual operations for this disease; and here it might possibly prove useful in promoting coagulation of the blood, but even under these circumstances we doubt its importance. In no other case is it entitled to the slightest confidence.

PLUGGING.

Occasionally we find an artery so soft, or so completely ossified, that in the one case it yields like jelly, in the other cracks like a pipe stem, under the influence of the pressure of a ligature. In such cases, where it is practicable, pressure should be applied so as to command the hemorrhage, but when this cannot be done I have succeeded in arresting the flow of blood by drawing the *surrounding tissues over the orifice of the vessel, so as to form a sort of cap*, and then retained them in this position by a ligature. Sometimes, too, I have succeeded in accomplishing my purpose by *lifting a piece of muscle or skin in the vicinity, leaving it attached by one extremity for the purpose of nourishment, and then rolling it into a cylinder*, have thrust it thus prepared into the mouth of the vessel and secured it in this position by a suture or ligature. Another plan, which often succeeds under these circumstances, is this:—first transfix the orifice of the vessel with a curved needle, the convexity being towards the cardiac aspect, and then pass a ligature under it as when we wish to remove a small tumour by Lallemand's process. The needle may be withdrawn in twenty-four hours. My friend Prof. Pancoast, in similar cases, has succeeded by "*plugging the orifice with a piece of linen compress, and tying the vessel over it; when the ligature becomes detached it will bring away the plug!*" This method of plugging the vessel was in former times recommended by Avicenna, and among the moderns, Dupuytren and Roux, as well as Prof. Pancoast, have from time to time advised its employment, especially in the case of an ossified artery. The old plan of arresting hemorrhage, by introducing into the orifice of an artery a plug of

sulph. cupri, or some other styptic, and securing it by a ligature, was at one time a favourite measure, and resembled somewhat, in its action, the plug of Avicenna. Lastly, when the vessel (particularly if a small one) is soft, the *actual cautery* or a powerful *styptic*, as *creasote*, will sometimes arrest the bleeding at once. When an artery is imbedded in bone, so that we can neither reach it with the ligature or cautery, we are reduced to the necessity of plugging the orifice of the bony canal either with a bit of soft wood, or a piece of wax through which a thread has been passed. The wood is most convenient when the wound is open, and must remain so for some time; the wax and thread can be employed when we close the wound at once, as the thread which is brought out of the cut is too small to prevent union, and can be removed with the wax at the expiration of twenty-four hours.

RUPTURE.

Lastly, it has been proposed, particularly in the extirpation of tumours, to ward off the hemorrhage by reducing the vessels to the condition of those in lacerated wounds. To effect this, after the integuments have been divided, the tumour is *forcibly dragged from its connections*, in doing which, the arteries are torn and lacerated. The method is obviously hazardous and uncertain, and should never be employed under any circumstances.

Mr. Liston has also omitted, or barely mentioned, several other hemostatic agents, some of which are among the most useful we possess. For example, compression, the cautery, caustics, refrigerants, certain styptics, position, &c.

COMPRESSION.

In many cases we have nothing on which greater reliance can be placed than compression. When, for instance, the blood issues from a number of small vessels instead of one or two large ones, pressure will answer much better than the ligature, which, to be advantageously applied, must include the whole surface from which the blood oozes. Again, in deep wounds, where the vessel is beyond sight or reach, and it is deemed inexpedient to tie the main trunk, we often find some modification of compression exceedingly useful; or when the wounded artery is placed either upon, or in the immediate vicinity of a bony surface, as is the case with the anterior temporal branches, or the radial, nothing answers so good a purpose as well arranged pressure. In certain cases, too, where the vessel is imbedded in a mass of condensed soft parts, or soft parts infiltrated with lymph or serum, or is lodged

in a bony canal—compression is probably the most simple, and at the same time most trustworthy of all our agents for arresting the flow of blood. But to be useful, as Miller has well observed, it should be applied early, accurately, and steadily maintained. *Early*, in order to anticipate infiltration of the cellular tissue, by which aneurismal formations might be occasioned; or, at least, by which an obstacle of greater or less bulk would be interposed between the arterial wound and the compressing agent. *Accurately*, because a comparatively slight amount of pressure, applied directly to the bleeding point, suffices to arrest the flow; while a great amount of pressure, inaccurately applied, may prove ineffectual. And *steadily maintained*, in order to give time for the vessels to become obliterated! We must be careful, too, in *graduating* our compression; for if applied in such a manner as to arrest the circulation completely in the surrounding parts, or even partially to do this, inflammation, ulceration and mortification may be developed.

Pressure may be applied either as a *temporary* or *permanent* (so called) measure. It is temporary when employed to arrest the flow of blood until some agent, in which more reliance is to be placed, can be had recourse to. In wounds of the extremities or face, or penetrating wounds, it is often thus employed; and here the hands of assistants, or some modification of the tourniquet, are the best means of effecting compression.

By permanent pressure we understand that which is kept up for several days, or until the vessels have been completely closed or obliterated.

Compression may also be applied either *directly upon the open orifice of the bleeding vessel*, or *indirectly* (lateral pressure) *upon it and the main trunk, as recommended by Guattani*, or lastly, at some distance from the orifice, *between it and the heart*.

Some of the older surgeons were exceedingly fond of the first mode, and filled all their wounds, from bottom to top, with pledgets of lint, over which they made firm compression with a roller. But the measure is now restricted to a few cases of deep penetrating wounds, such as that made in the lateral operation for stone, for example, when it is almost, if not absolutely impossible, to reach the bleeding vessel in any other way. The manner of applying it depends somewhat on the character of the wound. If the hemorrhage proceeds from a wound made in cutting into one of the cavities of the body, from which a discharge must necessarily proceed, we should employ a silver canula of large size, open at the *end intended to be introduced into the cavity, instead of having lateral eyes*. This is to be wrapped with lint, so arranged as to form a *conical plug*, the apex of which is to rest in the internal wound. Thus prepared, it is carried in as far as it is deemed proper, and then pledgets of lint wedged into the wound around it, care being

taken to place *small pieces in the bottom of the wound*, and to increase their size as we approach the surface, so as to form of the entire mass a *conical compress*.

When the pressure is to be applied to a deep wound *not communicating* with a cavity, it should be done in the following manner. The surgeon, having first carefully sponged away the clotted blood, looks for the bleeding spot, and as soon as he detects it, should place the fore finger of his left hand upon it; controlling the hemorrhage for a moment, he next takes a small piece of lint, carries it down, either with a probe, a pair of forceps, or his finger, and places it *directly upon the mouth of the vessel*; over this he applies, as rapidly as possible, other pieces, gradually increasing their size until the whole wound is filled up; over this a bandage is placed so as to maintain the pressure for any length of time. Instead of this mode of plugging some prefer what is called a *graduated compress*, which is composed of a piece of muslin, folded so as to form a cone, but I consider the first the better plan, as by it we can render our compression much more uniform. Others, again, prefer a bit of *sponge* for the compressing material, on the ground that, being porous, it allows the serous portions of the blood to drain away, but retains the fibrinous, which, according to them, promotes coagulation in the vessel, or about it. But the objection to the sponge is this; we cannot employ any great degree of pressure, in consequence of its yielding properties; and again, if allowed to remain any length of time in the wound, granulations shoot into its interstices, and hold it fast, so that we cannot remove it without causing both pain and loss of blood.

But although this mode of arresting hemorrhage is sometimes absolutely necessary, it is, nevertheless, to be avoided whenever it is in our power so to do; for however well applied, it is always inconvenient, painful, tedious, and often dangerous. The principal objections to it are these; it is exceedingly apt, in a few hours after the introduction of the plug, unless the parts swell upon it, to become loose from the yielding of the materials of which it is composed; it always occasions suppuration, and of course prevents union by the first intention; and finally it may produce intense inflammation and sloughing.

It is usually considered proper, when hemorrhage follows the operation for stone in the bladder, for fistula in ano, for internal piles, for diseased os uteri, and after extirpation of the eyeball, or when the vessels of a bone, as in some cases of amputation, bleed profusely. When employed we should bear in mind the following rules. 1st. Always look at the plug a short time after its introduction, and if we find the superficial layer dry and unstained with blood, the probability is that all is going on well; but if instead of this we find it moist, and the blood oozing through it, the whole dressing must be removed, and the pressure more accurately ap-

plied. 2d. The dressing should remain undisturbed for four or five days as a general rule, and then the *superficial* portion may be moistened with a little warm water, and removed with the forceps, but it must be done in the most gentle manner, for fear of disturbing the more *deeply seated portion, which should never be forced away, for fear of causing the delicate coagula which fill the vessels to give way.* By and by the apex and centre of the cone become loosened and detached by suppuration, and then they should be removed at once; for having fulfilled their purpose, they are no longer of use, and besides acting as foreign bodies, they prevent the coalescence of the granulating surfaces of the wound, and thus retard the cure. 3d. When we remove the superficial layer we find a granulating surface around it, which, if not prevented, will close around what remains of the plug and prevent its ready extraction; to obviate this, a piece of lint, moistened with warm water, should be carefully introduced and lightly applied as high up as the remains of the original cone. This also serves as a warm water dressing to the granulating surface, and should be daily renewed until the entire mass of lint is removed.

Lateral Compression.—Occasionally it happens that a large vessel of some one of the extremities or of the head is wounded, and then, instead of employing compression, as in the case of a penetrating wound, it will be proper to make it not only over the orifice of the bleeding vessel, but also along its trunk. It is supposed by some that it is useless to apply a compress over the bleeding orifice, as *lateral compression* will be sufficient to arrest the hemorrhage; but this is a very hazardous method of treatment, inasmuch as we run the risk, especially in recent wounds, of sanguineous infiltration, or the establishment of false aneurism. To illustrate the proper mode of managing one of these wounds, let us suppose a case. A surgeon opens the brachial artery in bleeding; the first thing to be done is to apply a tourniquet or garrot to the arm, so as to command the hemorrhage; the next, to place a firm graduated compress directly over the wound in the vessel; then a long firm one over the trunk, for some six or eight inches; and lastly, a roller, commencing at the hand, is to be applied over the whole. The arm is next placed in a sling, and ordered to be kept at perfect rest for some days. The tourniquet, when used, should be removed as soon as the roller is applied, and the pulse examined so as to ascertain that no danger from inordinate compression is to be apprehended. It was at one time supposed that pressure thus applied, enabled the wound in the vessel, where this was partial, to heal and without any obliteration of the trunk; but it is now known that the vessel is entirely destroyed, at least in most cases, becoming, in consequence of cohesion of its parietes, a fibrous cord.

Compression between the orifice of the bleeding vessel and the heart.—When thus applied, compression is usually but a temporary

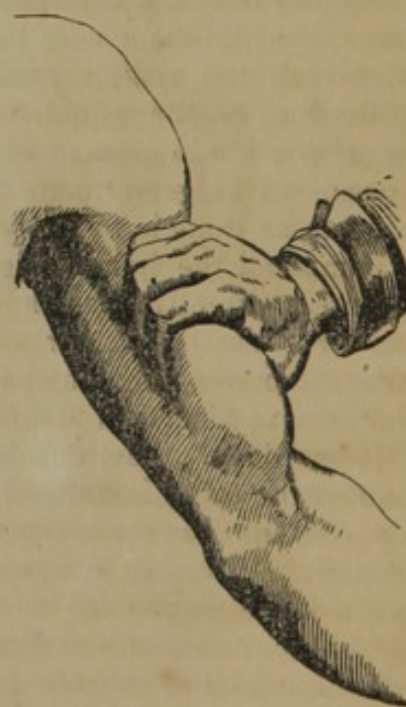
measure, had recourse to merely to gain time for the employment of other agents. But occasionally it answers as a permanent remedy, as in the case of Richerand, where the hemorrhage from a stump was entirely arrested by the application of a tourniquet for several hours. But it is a hazardous mode of arresting bleeding, at least when we trust to it alone; for if *moderately* applied, it may be insufficient, and if used with a *power adequate*, it may be productive of severe pain, paralysis, inflammation, and even mortification of the limb. All agree, however, as to its importance in the performance of operations, and it may be effected either by the hands of assistants, the tourniquet, the garrot, or compressors of various kinds.

Compression by the hands of assistant.—The most natural of all these agents is the hand or finger of an assistant, who compresses the vessel while the surgeon divides the parts on the distal side of the point of pressure. In operating about the head, face, neck, axilla, and in amputations, this mode of controlling hemorrhage is exceedingly useful, provided our assistants are trustworthy. Being entirely under the command of the operator, the pressure may be either increased or diminished according to the indication; and when applied to the extremities it prevents the congestion of the parts often produced by the tourniquet, and of course saves the patient the unnecessary, and frequently, harmful loss of blood.

Fig. 13.



Fig. 14.



But no surgeon, when about to perform a capital operation, should rely upon this method alone; for his assistants may become fatigued, or nervous, or may apply the pressure irregularly, and thus place the life of his patient in jeopardy. Hence, there ought always to be at hand a tourniquet, or compressor, or some thing of the kind.

Compression by the tourniquet.—The *tourniquet of Petit* is the instrument usually employed, at least in operations on the extremities, and is familiar to all. It consists of two plates regulated by a screw, a strap and buckle, and a compress. We should always carefully examine the teeth of the buckle, and if they are not *perfectly round* no reliance can be placed upon the instrument; for as soon as the screw is tightened, the edges of the tongues will cut the strap, and thus prevent the proper constriction of the parts. In its application the plates should always be placed *in contact*, a firm compress laid over the part of the vessel to be compressed, the pad upon this, and the frame (beneath which a firm compress should likewise be introduced) upon the upper or outer portion of the limb, so that it can be readily managed. The instrument is tightened by turning the screw, which separates the plates, and relaxed by bringing it back by reverse turns towards its first position.

Fig. 15.

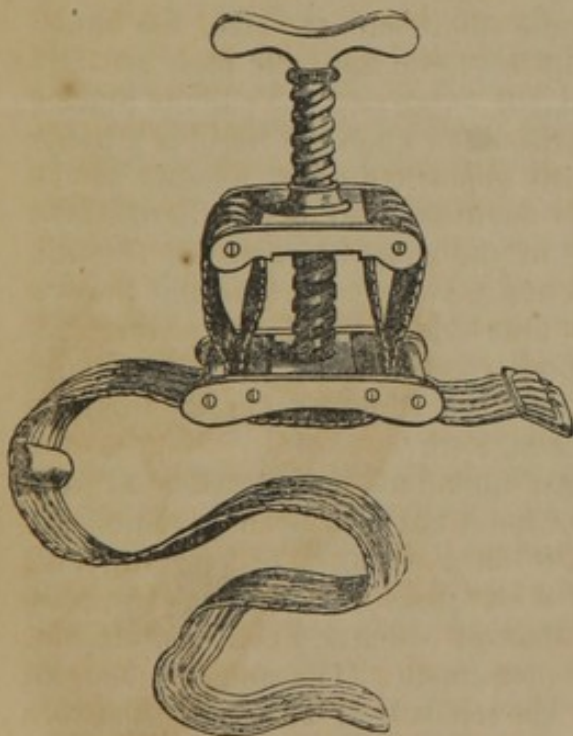


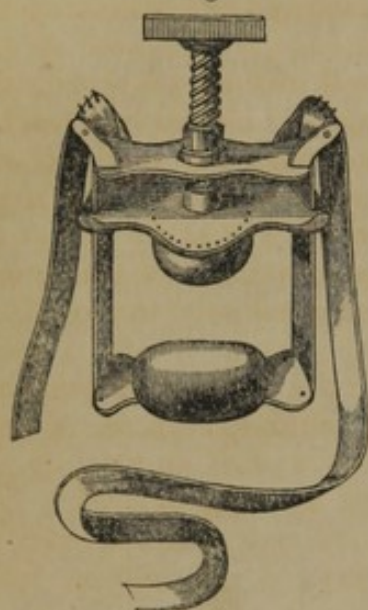
Fig. 16.



This tourniquet is either applied or removed with the greatest facility, occupies but a small space, and arrests the circulation when properly placed at *but two points*, viz., those upon which the

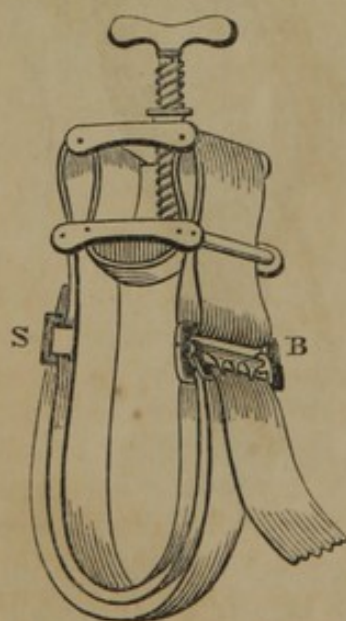
pad and the base of the frame rest. As often employed, it arrests the circulation in the whole limb, and compresses the muscles so as to prevent, in amputation at least, their proper contraction. The instrument described is the original upon which most of the new-fangled notions of some modern surgeons are modeled. It is, of course, needless to describe all of these instruments, but there are one or two entitled to a passing notice.

Fig. 17.



over the artery to be compressed, the other upon the limb, at a point

Fig. 18.



We have, for instance, the tourniquet of Charriere, which I have found useful in operations upon the extremities. It consists of a screw, two superior plates, (the upper one furnished at each extremity with a row of teeth, the lower with a firm pad,) an inferior plate, to which is attached a firm pad, and a strong strap of webbing. The strap is kept in its place by being passed through slots or cleats, or attached to the plates. When the instrument is used, the upper plates must be placed in contact, one end of the strap attached to the teeth of the upper plate on *one side*, the other end left loose until the pads are adjusted. One of these pads is placed over the artery to be compressed, the other upon the limb, at a point nearly opposite the first, and the whole instrument secured by passing the free end of the strap through the slots in the upper plates, and carrying it over the pins which hold it firmly. To tighten the instrument it is sufficient to turn the screw, as in the tourniquet of Petit.

An ingenious modification of the tourniquet has also been invented by Dr. Silon A. Henkel, of Virginia, and we copy, from the *American Journal of Medical Sciences*, his description of the instrument. His object seems to be the removal of all strain from the buckle, which renders the cutting of the strap impossible. "To avoid this, (the cutting of the strap,) I have devised the following plan. I sew to one end of the band, four feet long,

a slide, marked S in the accompanying drawing. The band is then passed through the rollers of the tourniquet in the usual way. The end to which the slide is not attached, is then passed through the upper bar of the buckle B, and then back through the rollers, so as to come *under* the slide; thus making the band through the rollers double. The end to which the slide is not attached is then passed around the arm or leg, and through the lower bar of the buckle, and then back through the lower bar of the slide, thence to the third bar of the buckle, and there fastened; thus making the band between the buckle and slide triple.

"The third bar of the buckle is fastened to the buckle with the same wire that holds the tongue in place. The third bar reaches down as low, and is as wide as the lower bar. The points of the tongue rest on the third bar; which latter is movable like a hinge at the point at which the wire passes through.

"In this way a limb may be compressed as hard as usual, and the tongue of the buckle subjected comparatively to no strain whatever."

The garrot.—This instrument, or rather the original, is probably the most ancient of all tourniquets, and although Morel is considered its inventor, it can scarcely be supposed that he was the first to employ a measure so simple, and, at the same time, so readily obtained. The original instrument consisted of an handkerchief or bandage folded diagonally so as to form a rope, in the middle of which a knot was made; and of a stick, or the handle of a whip, or something of the sort, by which the bandage, after having been applied to the limb, might be tightly twisted. Thus composed it is sometimes called the "*field tourniquet*," from its having been frequently employed on the field of battle; it is also occasionally called the "*Spanish windlass*!" As at present modified, the garrot consists of a pad, (to be placed over the artery,) at the base of which is attached a ring, and through this the strap is made to pass; a firm compress, or bit of curved horn or metal, to be placed over the opposite side of the limb to diminish the pressure; a strap; and something by which the loop may be twisted. The pad having been properly adjusted, and the cap of metal placed opposite, the strap is then passed three or four times around the limb, and tied, or firmly fastened. Next

Fig. 19.



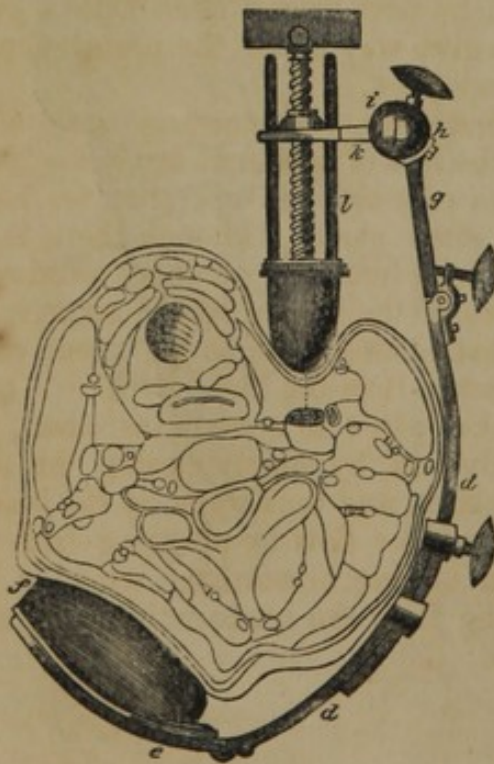
the lever is introduced through the loop, and made to rotate, until the requisite degree of pressure is obtained. Although this instrument may be very useful in an emergency, it should not be employed when a proper tourniquet can be obtained. The objections commonly urged against it, are, that it *cannot be gradually relaxed and tightened with as much precision as the common tourniquet*; that *it compresses the whole substance of the limb, and cannot, therefore, be employed for any length of time for fear of gangrene*; that *under all circumstances, by compressing the superficial veins, it favours venous hemorrhage*; and *lastly, that when applied in amputation, by paralyzing the muscles it prevents their proper retraction*.

Compressors.—In operations which involve the vessels of the head, face, neck, axilla and groin, where it is almost impossible to apply any thing like a tourniquet, and where our assistants cannot be relied on, it will be proper to employ agents of another sort, known to every surgeon as *compressors*.

Compressors.—The most simple of these, and at the same time as useful as any, is made by firmly wrapping the ring in the handle of a key; with this contrivance I have arrested completely the flow of blood from the axillary artery by compressing the subclavian from above the clavicle. The compressor usually met with consists of a firm pad, of a shape and size to suit the indication, and a handle to which it is attached; with this instrument an assistant compresses the vessels while the surgeon per-

forms his operation. But more complicated contrivances have been invented, many of which are useless, or even dangerous, and to describe all or even a part would be worse than useless. There is one, however, invented by Dupuytren, which deserves our attention, although it has as yet been rarely employed. "It consists of "two steel plates, half an inch broad, curved and joined at the centre of the instrument in such a manner as to allow of the curve being increased or diminished at will. To each of these plates two others, which support pads, are attached; one of the pads is movable, the other

Fig. 20.



fixed, and in applying the instrument the *movable* one is placed *over the artery*, the other rests upon the *opposite side of the limb*. The pressure is made by the movable pad, and is regulated by a screw.

Compression with cork or wooden compressors.—In wounds about the feet or hands, I have repeatedly arrested the hemorrhage by resorting to a method noticed by most surgeons, but more especially by the late Prof. Dorsey. In illustration of this mode I will cite a case. Some time since I was requested by Dr. Child to visit, in consultation, a little girl who had received a severe wound of the sole of the foot. The hemorrhage was profuse, and could not be arrested by direct pressure upon the bleeding vessels, nor could those vessels be reached, in consequence of their contraction. Pressure upon the posterior and anterior tibial arteries controlled the flow of blood completely, and I determined, instead of taking up those vessels, to apply compression. Two bits of cork, hemispherical in shape and covered with lint, were prepared and one placed over each artery at the ankle joint. Next a piece of roller was pinned over the corks to retain them in position, and as these corks were at least an inch in height, it is obvious that the bandage did not *touch the limb at all*, so that the circulation was carried on throughout, except in the tibial arteries. The garrot was then passed over the corks, and pressure adequate to the control of the hemorrhage applied. Prof. Dorsey once resorted to this method in a similar case, but fearing that, when the tourniquet was applied over the corks they would yield so as to allow compression of the whole limb, he first passed over them a *piece of tin*, which, being too firm to give way under the pressure, protected the parts between the compresses.

Compression by the tissues themselves.—Hemorrhage may often be arrested by simply drawing the lips of a wound firmly together. As an illustration of this fact we may cite the operation for hare-lip, or that for tumours of the same part. Although there is, in some cases, a copious flow of blood from the coronary arteries, it ceases immediately on the closure of the wound by the sutures.

Compression by blood.—In many cases there is no agent more useful for the application of pressure than the blood itself. When, for instance, the hemorrhage takes place in a cavity or canal, the parietes of which are sufficiently firm, by simply closing the outlets the blood is retained, coagulates, and thus stops up the bleeding vessels. In epistaxis we arrest the flow by plugging both the anterior and posterior nares; in uterine hemorrhage we plug the vagina; and in cases of bleeding from the bladder the urethra is to be closed.

POSITION.

We should always bear in mind, in cases of hemorrhage, that the *position* of the bleeding parts modifies, to a very great extent, the quantity of blood lost. We should therefore endeavour to place it in such circumstances that the arterial supply shall be diminished in quantity, or retarded in its flow. An elevated position is consequently the one in which the bleeding organ should be placed, at least whenever this is practicable, or when there is nothing to contraindicate its employment. In wounds of the head and chest, the upper portion of the trunk should be placed above the plane of the rest of the body, unless such a posture brings on syncope, which, in some cases might be hazardous. When the extremities are wounded there is, for the most part, no difficulty in carrying out the indication.

REFRIGERANTS.

In superficial wounds, or such as are made in the extirpation of tumours, or in the performance of plastic operations, where there is rather an oozing of blood than a free flow from large vessels, we often find it useful to have recourse to some refrigerant application. Exposing the bleeding surface to a current of cool or cold air, or covering it over with a piece of lint moistened in cool or iced water, will often suffice, and save us an immense deal of trouble. But we should recollect that to be useful, cold, when applied in the liquid form especially, must be maintained *without intermission* until coagula have formed in the wounded vessels. If this is not observed cold frequently does harm by exciting inordinate reaction. Nor must the cold applications be continued for too long a period, for fear of preventing ready union of the wound. The subjection of a part to long-continued cold will, it is well known, produce in its vessels contraction, whereby the blood is driven out, and the sensibility materially lessened. In such a condition there is no opportunity afforded for the pouring out of plasma, and hence union is often tedious; moderately cool applications, however, are not liable to this objection, for we often find a wound uniting rapidly under the cool water dressing, that would resist any other treatment for a length of time.

STYPTICS.

No hemostatic agent possessed, in former times, a more decided reputation than the styptic. But from the fact that nearly every

article of the class produces a more or less stimulant impression, and thus frequently lays the foundation of inflammation, suppuration, and a tedious cure, many surgeons of the present day discard the measure as one productive, in most cases, of more harm than good. While we admit that no styptic should be employed when it is possible to avoid its use, we are yet disposed to place more confidence in the remedy than it usually receives. In certain capillary hemorrhages, for example, where refrigerants have failed, and the other means of arresting the flow cannot readily be brought to bear, the application of a styptic often acts like a charm. A vast number of articles have been recommended for the purpose, some of which are gaseous, others liquid, while others again are solid; some act, too, by simply diminishing the force of the circulation in the part, as cold air, or cold water; others possess a powerfully constringent influence, as creasote, alum, the salts of the metals, turpentine, &c.; and lastly, some produce this effect by acting mechanically, as agaric, sponge, cob-web, hat-fur, lint, dry powders, &c. &c., which adhere to the bleeding surface, and being porous, allow the serous portions of the blood to drain away, but retain the fibrinous, and thus hasten coagulation in the vessels. We should never forget, however, that no styptic should be employed when we can possibly avoid its use, and especially is this to be observed when we desire union by the first intention.

ACTUAL CAUTERY.

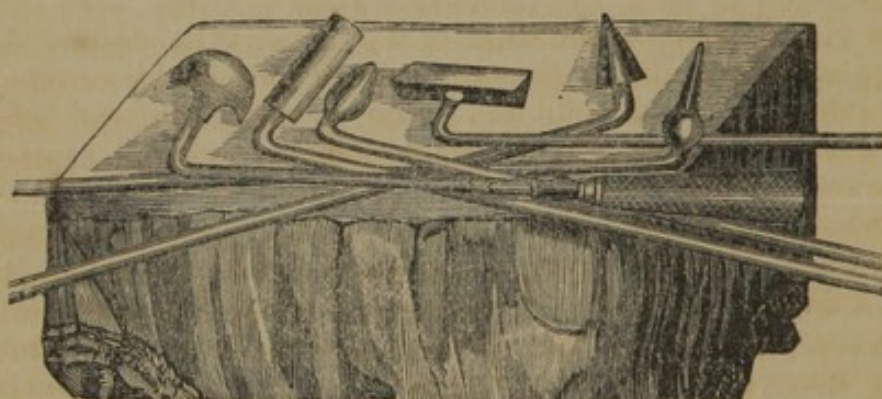
The high opinion which the ancients entertained of the efficacy of the actual cautery may be well conceived from the following aphorism of Hippocrates. "*Quoscunque morbos medicamenta non sanant, ferum sanat; quos ferrum non sanat, ignis sanat; quos vero ignis non sanat, insanabilis existimare oportet.*" In modern times, however, in proportion as surgery has attained a higher state of perfection, the popularity of the measure has declined, until at the present time its application is restricted to a very limited number of cases. In fact, it is only in bleeding from small vessels, as in leech bites, or where a tooth has been extracted, or oozing from the surface of a bone, cavity in a bone, a granulating or fungous surface, or where the vessel is too much diseased to bear the ligature, and where compression would be improper, that the cautery is employed. But in such hemorrhages there is no remedy of greater value.

When an iron body heated to whiteness is applied to a living tissue, it produces immediate *shriveling* or *contraction* of the entire mass subjected to its influence. The vessels included in the part are thus closed, but the barrier to hemorrhage is still further strengthened by the *thickening* and *condensation* of the destroyed

tissues, which now form a *hard eschar* of a depth proportionate to the intensity of the application. This dead mass is impervious, and so long as it continues adherent to the adjacent sound parts, no hemorrhage can possibly occur. It is only after it becomes loosened or detached by the process of ulceration and sloughing that bleeding is to be apprehended, and then, unless nature has taken advantage of the opportunity and effectually closed the orifices of the vessels, there is danger of a recurrence of the difficulty. We should, therefore, carefully watch our patient about the period of detachment of the eschar, at least when the vessels injured are of any size, and be prepared to resort to suitable measures in the event of secondary hemorrhage.

Irons of various shapes have been invented, and the accompanying cut is descriptive of those usually employed; but we should never, in cases of emergency, delay our application until the regular instruments are at hand. A piece of iron, the key of a door, or any metallic body that can be thrust into the wound, will answer our purpose.

Fig. 21.



Gold, silver, platina and copper have been preferred by some to iron or steel for the constituents of their cauterizing instruments; but the cheapness of the latter materials, their being nearly always at hand, and above all, their entire adaptation to the purpose, will effectually prevent any other metal from taking their place.

When the cautery is to be employed, its extremity should be placed in a chafing-dish, or something of the kind, filled with burning charcoal, the combustion of which may be increased by the bellows, or by the breath of an assistant. The colour which the metal assumes is the index of its degree of heat, and we find that before it reaches its maximum it passes through the various shades of *gray*, *dark red* and *cherry red*, until at length the *white red* makes its appearance, and then the iron is fit for use. The part upon which it is to be applied must be carefully deprived of its moisture by means of a bit of dry lint or sponge, and then

quickly touched, the iron being allowed to remain in contact with the flesh for some ten or fifteen seconds only. If we permit the iron to *cool* during its application, or apply it before it reaches a white heat, it adheres to the tissues, and instead of making an eschar that will hold its place firmly, it will bring away when removed a portion of the flesh, and thus give rise to hemorrhage. If one application of the iron is not sufficient to accomplish our object it must be again and again had recourse to; for we should never leave the patient so long as a drop of blood oozes through the burnt surface, this being a sure indication that the eschar is not sufficiently profound.

The best dressing, under ordinary circumstances, after the application of the cautery, is either the warm water or a poultice. When there is danger of a recurrence of the bleeding, or when it proceeds from a cavity, we should either apply nothing, or else a little mucilage, or cold water, which will prevent, to a certain degree, the occurrence of inflammation.

POTENTIAL CAUTERY.

The vitality and organization of a part may be destroyed, not only by metallic bodies sufficiently heated, but also by certain chemical substances, both solid and liquid, to which the term *potential cautery* has been applied. At one period this potential cautery, in some shape or other, was frequently employed for the arrestation of hemorrhages, but the pain produced by the application, and its insufficiency, in many cases, to accomplish that for which it was used, induced surgeons to abandon the measure almost entirely, and at the present day, with the single exception of the nitrate of silver, there is scarcely an article of the whole class in which any confidence is placed; and it is only in cases of oozing from small vessels, as in the leech-bite, &c., that even the nitrate of silver is employed.

The potential cautery operates in pretty much the same manner as the actual, producing an eschar of greater or less depth; but its impression is slower, and not so much to be depended upon. The nitrate of silver, however, has another action, for being more or less astringent it causes coagulation of the blood, and at the same time contraction or shriveling of the vessels. It thus not only partially obliterates the vessels, but likewise furnishes an external coagulum which blocks up their orifices and thus prevents the bleeding.

NAUSEANTS AND GENERAL TREATMENT.

One of our most important hemostatics, particularly in internal bleeding, or oozing from mucous surfaces to which other agents cannot be applied, is *fainting*. Now we are often called to cases in which an *approach to syncope* is desirable, while *syncope itself* might be productive of much mischief. Here the indication may be accomplished by the administration of small doses of some nauseant, as ipecacuanha, antimony, &c., with low diet, cool drinks, and rest of both body and mind. Whenever this treatment is had recourse to, however, we should be careful not to produce vomiting or extreme nausea, for the one occasions violent muscular exertion, and the other often dangerous reaction.

SYNCOPE.

It is well known that during syncope the action of the heart and arteries becomes almost imperceptible, and even when a vessel of considerable size has been wounded, the flow of blood ceases either in part or entirely, as soon as fainting takes place. Many a life has thus been saved, for although when reaction comes on there is risk of a return of the hemorrhage, yet frequently nature, taking advantage of the opportunity, has established a firm coagulum either external to or within the orifice of the vessels, which blocks it up long before the reaction is fully established. We should not, however, place too much confidence in this natural effort, and in every case of *external* hemorrhage where the vessel can be reached by any of the ordinary hemostatics, they should be employed in preference to trusting the patient to the somewhat doubtful agency of *spontaneous arrestation*. But in *internal* hemorrhage, where the vessel is beyond the control of the usual remedies, the production of syncope is our only resource, and to accomplish it with the least risk and most speed, the patient should be placed in the upright posture, if possible, and freely bled from both arms. Syncope is thus one of our most valuable hemostatics, but when resorted to we should be careful not to carry it too far. As soon, therefore, as the bleeding has been arrested, we must set to work to bring on moderate reaction, and the remedies for this purpose are such as produce determination of blood to the brain and spinal marrow, and surface of the body. The patient, for example, should be placed in the recumbent posture, with his head *lower* than the rest of the body; every thing tight about the neck and chest must be removed so as to facilitate free respiration; cold water dashed on the face; stimuli applied to the nostrils; frictions to the surface of the body; fresh air freely admitted into the room; and in obstinate cases sina-

pisms to the abdomen and extremities. When these measures fail, injections of warm brandy and water into the rectum, galvanism, insufflation, compression of the abdominal aorta and large arteries of the extremities, and lastly, transfusion, may all be employed.

VENOUS HEMORRHAGE.

The fact that in many cases a severe hemorrhage may proceed from the wound of a vein or veins, has at all times attracted the observation of surgeons; but the proper management of such a difficulty must be considered the result of modern researches. The amount of blood lost will depend not only upon the size of the vessel, but also upon the character of the wound inflicted. When a vein is simply punctured, as in bleeding from the arm, or pricked with the point of a knife in an operation, the flow of blood is comparatively trifling, provided the parts above the orifice are not subjected to pressure; a coagulum blocks up the opening, becomes speedily glued to its margins by the effusion of plasma, organization of the whole next takes place, and at last a membrane resembling in its properties the original coats of the vessel is formed, and all traces of the injury disappear; usually the vein, although obstructed in part at first by the coagulum, ultimately regains its accustomed perviousness, and in this respect the process differs essentially from that which occurs, generally speaking, in similar wounds of an artery.

If a vein be incised to a small extent we have nearly the same phenomena developed, that is, there is but slight hemorrhage, and the wound unites in a similar manner. Occasionally, however, according to the observations of some, *simple adhesion* between the lips of the wound takes place and no coagulum is formed. But if the incision be *extensive*, or *oblique*, or *transverse*, the flow of blood is always much greater, and the process of reparation somewhat more complex. We have, for example, not only a coagulum in the wound, but also one of some extent formed in the surrounding cellular tissue, which strengthens and supports the other. There is likewise a considerable projection, in some cases, into the cavity of the vessel. After the formation of these coagula the same changes take place in the margins of the wound, and in the coagula themselves, that occur in the ordinary puncture, and the entire mass is converted into a membrane uniting with the tunics of the vein. The external and internal clots, which resemble in their duties the provisional callus in fracture, are removed as is the callus, by absorption.

Now it is well known, that these changes readily occur provided the vessel is sound, and all obstacles to its proper healing are removed. These obstacles are, for the most part, *pressure between the*

wound and the heart, or, as in operations about the neck, some obstruction to the free circulation of the blood through the pulmonary vessels, usually the consequence of the screams or struggles of the patient. Bearing these circumstances in mind the surgeon is always prepared to apply the proper remedies, which for the most part are as simple as they are effectual. When, for instance, in an amputation we find the flow of venous blood continuing after the arteries are secured, and the stump ready for dressing, we should see that all pressure is removed from the limb, and the bleeding surface exposed to the action of the air; or the vessel may be gently compressed for a few minutes either by closing the wound, or directly with the finger. The pressure being removed usually we find the flow of blood arrested; if not it is necessary to apply a compress and roller, so arranged as to make lateral compression upon the vessels, the coats of which are thus forced together, and ultimately unite by fibrinous exudation. When the hemorrhage proceeds from a large vein of the neck, and there is reason to suppose that obstruction to the pulmonary circulation is the cause, the patient should if possible, be made to take several *deep and rapid inspirations*, and if we are operating at the time we should cease until these inspirations are accomplished and the respiration becomes more natural. Usually, however, in such cases we are obliged to resort to pressure in some form, and where this fails, the ligature is our only resource.

The application of a ligature to veins has been for many years a subject of discussion and controversy among surgeons, but I believe that nearly all of the present day, while they condemn the measure as one of general practice, nevertheless declare that under certain circumstances (as where a large vein is wounded, and the ordinary plans of treatment fail to arrest the flow of blood), it is absolutely essential. But while this point is conceded, the hazards of the operation are acknowledged, although it must be confessed that these hazards have been vastly exaggerated by those who base their opinion upon the cases of Sir E. Home and some few others. We have, in truth, facts in abundance to prove that the largest veins of the body may be tied with impunity. The chief danger to be apprehended from the action of the ligature, is *inflammation of the vein*, and this arises from the peculiar texture of the vessel. When an artery is ligated, the division of its middle and external coats causes an immediate effusion of coagulable lymph, which encloses the foreign body, and proves a barrier to the extension of any inflammation that may arise. When a similar operation is performed on a vein, however, instead of yielding under the pressure of the ligature, its coats are merely forced together, and present a puckered appearance around the loop. Here in consequence of the inner coat retaining its integrity there is no effusion, or at least but a small quantity of lymph is thrown out; the inflammation established having no barrier to prevent it, spreads and extends up

and down the vessel; suppuration ensues, and the patient is placed at once in imminent danger. In every case, before the ligature can be detached, inflammation, followed by suppuration and ulceration, must take place, and although this process may be completed without the occurrence of a single bad symptom, and the vessel become entirely obliterated, yet the risk of dangerous phlebitis has to be encountered. As already observed this risk has been exaggerated by some, but no prudent surgeon would ever subject his patient to the chance unless forced to it by the most urgent necessity.

In former times it was customary in tying a large artery to include the accompanying vein, but for obvious reasons this practice has long since been abandoned.

In the application of the ligature it is considered sufficient to draw it with *moderate firmness*, or just enough to cause a cessation of the hemorrhage, at least in cases where after the lapse of a few hours, it may be removed; but when the vessel is large, and it is deemed expedient to allow the ligature to remain, it is drawn a little tighter, as when applied to an artery, two knots are made, and one end cut off close while the other is brought out of the wound. We should also recollect that in large vessels near the heart, as those of the neck, chest, axilla, &c., it is proper to apply a ligature to each end, as hemorrhage may proceed from either or both.

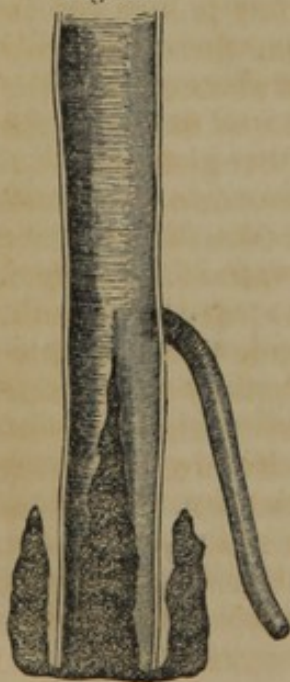
SPONTANEOUS ARRESTATION OF HEMORRHAGE.

We have repeatedly referred to the *spontaneous arrestation of hemorrhage*, and inasmuch as one is forced in many operations to rely solely upon the "*vis medicatrix naturæ*" for warding off the hazards of bleeding, the student should have the peculiarities of this highly interesting and important process clearly described.

When an artery of ordinary size is divided by a *sharp instrument*, we observe, *first*, that each end *retracts* and buries itself in the cellular tissue by which it is surrounded, or, as it is termed, *its sheath*; *second*, that it also *contracts*, so as perceptibly to diminish its calibre. This *retraction* and *contraction* (the existence of which, by the way, is denied by Hummel and others, but without sufficient authority) will of course diminish the quantity of blood flowing through the vessels, and thus facilitate coagulation; but the chief agent in the accomplishment of this end is the *cellular tissue*, into which the blood is poured. The action of the air, the diminished flow of blood occasioned by the diminution in the size of the vessel, and sometimes by the entire circulation being weakened from loss of blood, and the resistance of the cellular tissue, enables a *coagulum* to form partly within the mouth of the vessel, and partly in the cellular tissue around it, and along the walls. This is the *external clot*, which blocks up the artery, and acting like a

ligature produces *stagnation* and *coagulation* of the blood within the vessel as high up, usually, as the first anastomosing branch, and this is the *internal clot*. The internal clot is generally small, conical, adhering by its base to the mouth of the vessel, often twisted upon its axis, or rough, and extends, as just noticed, to the first collateral branch of any importance. The development of these coagula constitutes the *third* and *fourth* phenomena observed in the spontaneous arrestation of arterial hemorrhage, and inasmuch as the vessel is not yet obliterated the four changes just explained are termed by some *temporary hemostatics*. But if the process is not disturbed we very soon observe a *fifth* phenomenon, consisting in the *effusion of plasma* from the divided vessel, which is deposited between the *inner* and *outer* coagulum, and closes the mouth of the vessel completely. This (the mouth of the vessel) is ultimately glued to the surrounding soft parts by a portion of the effused lymph, and is thereby strengthened so much as to be able effectually to resist the force of the circulation within. This accomplished, a *sixth* change is observable, in which the internal coagulum undergoes the process of organization, thus described by Stilling, Blandin, and others. "The changes which the blood clot (*thrombus*) undergoes in the canal of the artery are the following: between the fifteenth and thirtieth hours, it becomes bright red in the middle, and especially towards its end, and also in some larger or smaller roundish and irregular spots, of a lighter colour on the surface. Vessels shoot into it, which are distinguishable with a lens, and can be injected. Hence the clot assumes the appearance of granulations, and has a fleshy colour. The union of the clot with the inner wall of the vessel proceeds correspondingly.

Fig. 22.



The extremity of the vessel at last loses its texture, shrinks up in the clot, the plastic lymph, which had been poured out between the coats of the vessel, is absorbed, and the end of the vessel, with the contracted clot, forms a fibro-ligamentous mass, which change takes place, in small vessels, in from *twenty* to *twenty-two*, and in larger vessels in from *forty* to *fifty* days. Gradually, however, the extremity of the vessel, as well as the clot, becomes absorbed up to the next collateral branch, and new tortuous vessels sprout from the vascular stump, as Jones, Ebel and others have observed." Although this explanation is not admitted by all, particularly some of the Germans, it is nevertheless the true process by which an arterial hemorrhage is arrested by an effort of nature alone. Fig. 22 represents the *external* and *internal* coagula.

When an artery is *torn* or *lacerated*, the same changes occur, but there is this difference. Instead of the *contraction* and *retraction* being *speedy* and *regular*, they take place *slowly* and the end of the vessel is *irregular*, much smaller than in the clean cut, and more or less *flaccid*. The *internal* clot, too, is for the most part *larger*, and occupies the *entire calibre of the vessel*. This is their usual form, but occasionally it is small, as where the artery has been divided with a sharp instrument. Fig. 23.

In cases of *partial* division of an artery, whether the wound be oblique, transverse, or longitudinal, nature is rarely, although occasionally, competent to the task of arresting the bleeding. The cause of this is referable to the fact that neither *contraction* nor *retraction* of the vessel can occur, which of course keeps the wound patulous, or at least prevents it from readily closing. Hence it is, that to arrest the bleeding we are obliged either to apply some surgical hemostatic, or divide the vessel completely. It should be borne in mind, however, in giving our prognosis in these cases, that nature occasionally accomplishes the most surprising cures, even in wounds of a large artery, or of the heart itself.

The amount of hemorrhage, as well as the difficulty of arresting the flow of blood, depends a good deal upon the shape and size of the wound. If there is a mere puncture the bleeding is usually trifling, and the blood infiltrates between the artery proper and its sheath, and also into the surrounding cellular tissue, where it speedily coagulates and blocks up the wound. The presence of the clot diminishes the flow of blood along the vessel, as well as checks the flow from the orifice; and in some cases still further guards against danger by altering the relative position of the wound in the sheath and vessel. At the moment of infliction, observes Miller, "the apertures in the sheath and in the artery correspond; but subsequently the track of the wound becomes oblique; and the sheath, where entire, comes to *overlap* the arterial wound, effectually preventing further escape of blood." Unless forced off by some cause the coagulum occupying the *cellular tissue*, the *wound*, and sometimes *projecting into the vessel*, becomes attached by lymph to the surrounding parts, loses its colouring matter by absorption, and ultimately becomes a part of the vascular wall. When the coagulum is small, the artery retains its perviousness like a wounded vein, but usually the exudation of lymph is such that it, along with

Fig. 23.



the basis of the clot, occupies the entire tube and produces its complete obliteration.

In *oblique* wounds, although the process of healing is the same, there is more gaping, of course more profuse hemorrhage, more difficulty in the closure of the orifice, and more probability of obliteration of the vessel.

In *longitudinal* wounds it is supposed by many that simple *adhesion* of the lips of the orifice takes place, but even here, at least where the artery retains its permeability, according to the observations of Saviard, Petit, Scarpa, and others, the process of healing is similar to that just described as taking place in other wounds.

In *transverse* wounds of slight extent we have also the same mode of healing, but there is more bleeding, and greater difficulty in arresting it than in other wounds. The artery, too, is almost invariably obliterated. When the solution of continuity involves *more than the half of the diameter* of the artery, the hemorrhage is always very profuse, and after its arrestation temporarily, *ulceration* occurs and separates the vessel entirely, when the usual process of obliteration in the case of a divided artery, is at once set up and completed.

Such is a brief sketch of the *spontaneous* arrestation of hemorrhage from an artery, but should the coagulum fail to hold its place, the blood wells out into the surrounding tissues and gives rise to *false* or *spurious* aneurism in some one of its various forms. Having so fully explained, under another head, the nature of the process by which a wounded vein is healed, I shall merely refer to what has been there stated.

HEMORRHAGIC DIATHESIS.

The surgeon is often placed in a most painful position, although the operation he performs is comparatively trifling, by the existence in the individual of what is termed the "*hemorrhagic diathesis*." By this we mean nothing more than that certain persons bleed most profusely from the slightest scratch, and in spite of all our remedies frequently die from loss of blood. In such cases we usually find an oozing from the capillaries without anything like a distinct flow from either arteries or veins. With the knowledge that such a habit of body may exist, no surgeon is justifiable in undertaking an operation of choice, until by proper investigation he ascertains that nothing of the kind obtains in the individual. This diathesis is, for the most part, hereditary, whole families being more or less affected; occasionally, however, it results from causes which operate subsequently to birth, such as bad food, impure air, a want of sufficient clothing, damp houses, &c., the blood becoming thin and watery in consequence of a deficient supply of fibrin and red glo-

bules. It is somewhat singular that males appear most liable to the defect; it is likewise peculiar, or nearly so, to young people; the tendency becoming less and less as we advance in years. Nor is the diathesis fixed, for we are often called upon to witness the most decided differences in the same individual at different times. I have seen patients, for example, who for months and years were apparently exempt, in the course of a short time experience a return of the disposition, from the operation of some causes calculated to alter the relative proportions of the different constituents of the blood. Others have observed distinct remissions and exacerbations of the peculiarity, the latter being marked by febrile excitement, with pains in different parts of the body, and the development of ecchymoses.

Generally, although this is far from being uniformly the case, persons thus constituted present a marked physical difference from those who are exempt. We have, for example, great irritability of the circulation causing frequent attacks of slight fever; the skin is pale and exceedingly delicate; the digestive powers feeble; the tendency to dropsical effusion from slight causes well marked; and the slightest blow is followed by ecchymoses, or if the skin is broken, by profuse and often alarming hemorrhage.

Many attempts have been made to determine the precise pathology of this disease, (for disease it should be considered,) but it must be confessed that so far we have nothing very satisfactory. It is generally conceded, however, that there exists some alteration in the blood, with more or less debility of the capillary vessels, which prevents their contracting upon their contents. Indeed, it is supposed by some that these vessels are deficient in the middle coat, which if true would explain their want of contractility. But I am not disposed to adopt this opinion, for the obvious reason that often we meet with examples, as I have already mentioned, of entire exemption from the diathesis for months, or even years, in persons who may subsequently have it developed in its most aggravated form.

In the management of this disease, our remedies may be classed under two heads. 1st. Those calculated to change the diathesis slowly and by degrees. 2d. Those which must be applied during the hemorrhage and for some hours after its cessation. In the first group we include everything tending to increase the quantity of fibrin and red globules in the blood, while at the same time the amount of serum is diminished. No class of medicines appears to fulfil this indication more readily than the ferruginous, and among the best we have the iodide of iron, the bitter tincture, and the sulphate of iron and quinia. Cold bathing, sea bathing, change of air, frictions, moderate exercise, and a nutritious, though at the same time easily digested diet, may be employed during the administration of the tonics and often with decided effect. The occasional

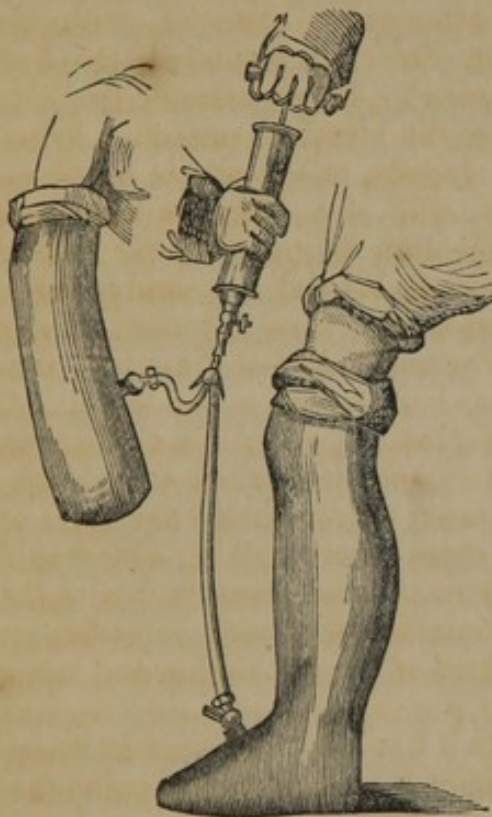
use of the sulphate of soda is also highly recommended with the view, in the first place, of diminishing the quantity of serum, which it accomplishes by its hydragogue properties, and in the second, of increasing the plasticity of the blood, which it is supposed to do by acting upon it as a chemical salt. The vegetable acids have likewise been employed to some extent in consequence of their favourable operation in scorbutic affections, in which the blood somewhat resembles that met with in the hemorrhagic diathesis.

When called to a case after the infliction of a wound, and while the hemorrhage is going on, the utmost decision and promptitude should be exerted, for the danger is materially enhanced by the duration of the bleeding. Both local and general agents may be required, and unless the wound is trifling and easy of access, such is generally the necessity. We commence, however, with the local treatment, and unless a large vessel is wounded, the best thing that can be done is to dip a *piece of lint in creasote and then bind it with moderate firmness* upon the bleeding surface. When creasote cannot be obtained, other styptics, as the nitrate of silver, the nitrate of mercury, turpentine, cold, &c., may be employed along with pressure. In the application of pressure we should bear in mind that the tissues are remarkably delicate, and inflame, ulcerate, or slough from the slightest cause; from a neglect of due precaution in this matter I have witnessed the most disastrous consequences in the shape of secondary hemorrhage when the slough was detached. We should also, if possible, avoid the application of the actual cautery here, for the reason, that when the slough, which it necessarily produces, is thrown off we shall have more or less bleeding, but I have met with cases where nothing else would answer; I employ it, however, only in *extreme* cases, and with the object of gaining time for the administration of such remedies as are best calculated to weaken the force of the circulation and cause inspissation of the blood.

When the hemorrhage is obstinate it has been proposed to set up either in the part itself or in the vicinity, such a degree of inflammation as would produce an increase of fibrin in the blood, and possibly the effusion of coagulable lymph. But as yet we have no example of any benefit accruing from this method of treatment. It has likewise been proposed, where such a thing is practicable, to establish counter-irritation or derivation, by dry cups, and simple irritants, and this measure I have seen productive of much advantage. But there is another remedy of this class even more useful, and the only objection to which is the expense of the apparatus. I allude to the process of derivation recently introduced in France especially, by Junod, De Bonnard and Polinière, and termed by them *Hemospasy* or *displacement of the blood*; (the word is derived from the Greek αἷμα, *blood*, and σπᾶω, *to draw*.) The apparatus

consists of a metallic boot for the lower extremity, and something of the same kind for the upper, furnished at its open extremity with a piece of india-rubber cloth, which fits accurately to the limb. There are likewise a stop-cock and tube attached to each, to which a common exhausting syringe may be affixed. When complete the whole affair is nothing more than an air-pump, which, when put in operation, produces a vacuum, and of necessity, a powerful determination of blood to the limb. This mode of derivation is unquestionably deserving our confidence in many cases of disease, and although I am not aware that it has yet been employed for the arrestation of hemorrhage, it appears to me eminently calculated to answer the purpose.

Fig. 24.



The apparatus applied to the arm and leg.

Fig. 25.



The right leg presents the natural condition of the limb; the left that which is produced by a few minutes use of the pump. The arm also represents the congestion produced by the action of the instrument.

It has been proposed by those of small experience I should think, to tie the main artery leading to the wound. But the very operation of denuding the vessel will give rise to fresh hemorrhage and increase the dangers of the case; indeed the experiment has been tried and has hitherto failed of accomplishing the end desired.

With regard to the influence of general remedies here, it must be confessed that while they afford some assistance, they fall far short of the expectations held out to us by certain antritics. Still it is our

duty to employ them, particularly when the hemorrhage is of any duration. We should, early in the treatment, carefully avoid the use of fluids of any kind which fill the vessels with watery blood and keep up the bleeding. Alcohol in any shape, from its stimulating influence, must likewise be avoided, and the diet of the patient should be as light as possible, barely sufficient, indeed, to sustain life.

As in all hemorrhages it has been the custom to administer the acetate of lead in combination with opium, and as this preparation is supposed to favour coagulation of the blood, and allay nervous irritation, it should always be employed when circumstances permit. The sulphate of alum in full doses and in the shape of alum whey is also a favourite remedy, and may be exhibited when the lead disagrees or cannot be obtained. Again, from the fact that nausea promotes the cessation of bleeding, by diminishing the action of the heart and arteries, nauseants in *small doses*, so as not to produce vomiting, may be administered. Lastly, the sulphate of soda may be exhibited in purgative doses, so as to diminish the quantity of serum in the blood; but this article must be used with caution for fear of producing extreme debility.

But often it happens that in spite of all our remedies the bleeding continues and prostration makes its appearance. We must here, in order to keep up the energies of the patient, and gain time for the operation of some of the hemostatics to which reference has been made, administer stimulants, and a nutritious diet of beef tea, jelly, wine whey, milk punch, &c. &c.

Where everything fails, and the patient is rapidly sinking, we may resort to *transfusion*, for here, "*anceps remedium, melius est quam nullam*," and although the operation may prove nugatory, we shall yet have the consolation of knowing that every agent in the power of man has been faithfully employed for our patient. The blood should be taken from a vigorous healthy adult, in whom there is an abundance of fibrin; and the quantity introduced must depend upon the effects. It is also a good rule not to wait for *positive collapse*, but as soon as we find that the bleeding cannot be arrested, and that sinking is rapidly developing itself, the operation should be performed.

SECONDARY HEMORRHAGE.

There are few accidents consequent to operations or wounds of different kinds, more hazardous to the patient or vexatious to the surgeon than "*secondary hemorrhage* or *after-bleeding*," by which we mean a discharge of blood that takes place after the injury has been dressed, or occurs at some subsequent period from sloughing, ulceration, or a deficiency of plasma. In the treatment of such an

hemorrhage, much depends upon the time of its occurrence and the character of the cause by which it is occasioned. To illustrate the subject more fully, let us suppose that a surgeon has amputated the thigh, and finding no apparent disease to contra-indicate such a course, dresses the wound in the ordinary manner, and places his patient in bed. Usually at this time reaction is not fully established, and the skin is cool, the pulse feeble, &c. &c. But in the course of a few minutes, or an hour or two, a change in the condition of the individual is observed, his skin is warmer, his pulse more vigorous; there is more or less thirst, and often throbbing in the wound. Now is the period of danger. If the ligatures have been applied in a clumsy manner, or too near a large anastomosing branch, they may be detached and thus allow the vessels to bleed profusely; or if this accident does not occur, the small vessels that at the moment of division contracted and thus escaped observation, may slowly relax, and the blood being forced on by the reaction, will escape into the wound or through its openings; or finally the vessels may have been diseased, and now when called upon to resist the violent action of the heart and larger trunks, yield, the ligature is detached, and the patient at once placed in imminent danger.

In the event of any one of these accidents, the surgeon is summoned in all haste, and finds his patient usually much alarmed, more or less prostrate, and the blood oozing, or sometimes gushing through the dressings. No time is to be lost, and if the tourniquet or pressure in some form has not been applied it should be had recourse to on the instant. This done, and the bleeding more or less controlled, the dressings are to be carefully removed, the wound opened, the coagulated blood sponged away, and the orifice of the bleeding vessel diligently sought for. Each vessel is now to be fully secured by some one of the numerous methods already explained, but in addition the wound should be kept exposed to the action of cool air, or covered with a cold damp cloth for at least half an hour, or even longer in some cases. It may then be redressed, a tourniquet applied (loosely) to the limb, and a careful assistant ordered to watch for several hours by the bedside. When the hemorrhage proceeds from the detachment of a ligature applied too near an anastomosing branch, it is proper to draw the *vessel well out*, or if this cannot be done to *slit up the tissues* so as to tie *above* the branch; but when neither of these processes can be employed, rather than apply the ligature in the original position, we must *take up the artery above the wound*. In bleeding from small vessels, the ligature is of course the best remedy; but where there is oozing from capillaries, cold, the various styptics, or the actual cautery may be required. When the artery is diseased, and a large one, we may resort to some of the means advised in such cases, but where these fail, the *actual cautery* applied at a *black heat* and through a *silver canula* passed up the vessel until it reaches a sound point,

should at once be employed. This mode of applying the cautery was introduced by the younger Cline, in bleedings coming on during the *healing process* of a wound; and I recollect perfectly well hearing it spoken of when in England in 1831. I have not seen the operation mentioned anywhere but in a note by South, in his edition of Chelius.

After closing the wound a second time, it is highly important to pay attention to the general condition of the patient. If he is plethoric, we should bleed from the arm, administer cooling cathartics, a low diet, rest, &c. If nervous and irritable, with a cool skin, a better diet, with opiates at bed time, and cordial draughts with anod. Hoffman or ether, may be given. If prostrated, with a tendency to syncope, stimulants and cordials should be employed until this condition is removed. If the hemorrhagic diathesis exists, the remedies already indicated elsewhere may be had recourse to.

But the most dangerous form of secondary hemorrhage is that which comes on during the healing process of the wound, and which results from *ulceration, sloughing* or a *depraved condition of the system*. Usually the loss of blood occurs at intervals, the patient gradually sinking day by day, and there is truly nothing more horrible than being called upon to witness the death of a fellow-creature under such circumstances. Sometimes, perhaps, a large vessel is opened, and a few moments suffice to put a stop to all necessity for further effort on the part of the surgeon.

When these daily bleedings occur, we should endeavour to trace out the cause, and if the general health appears to be in fault, a *pro re nata* treatment must be at once instituted, and the defect, whatever it may be, is thus occasionally relieved. I have, for instance, when syphilis was the cause, checked the bleeding by administering remedies proper for that complaint; and a similar result has followed the use of agents calculated to change the existing diathesis in other forms of disease. As local remedies, where the ulceration and sloughing are not very extensive, pressure, cold, styptics, and, as a *dernier resort*, ligature of the main artery, are those in which most confidence is to be placed. We should especially bear in mind that *ligature of the main vessel* is to be employed instead of laying open the wound and hunting for the open vessel in the midst of a mass of filth and corruption, as some would have us do. But where the ulceration is extensive and the vessel large, we may possibly derive more advantage from the use of the cautery, as recommended by Cline, for here we can generally reach the bleeding orifice without much difficulty. In cases of long standing, and where the constitution appears to be impaired, this mode of arresting the bleeding seems admirably calculated to answer a good purpose. The following extract from a note of Mr. South explains the views of Mr. Cline in reference to the operation of the cautery in such cases. "Eight or nine years since," observes Mr. Cline, "this sub-

ject passing through my mind, and reflecting upon it, it seemed to me that these bleedings arose in consequence of the want of adhesive inflammation; that instead of an effusion of coagulable lymph, an ulcerative process commenced, and perhaps I might say that the *ulcerative* inflammation succeeded the application of the ligature instead of the *adhesive*! Now, from what one observes to follow the application of a high temperature to living animal bodies, it seemed to me that the actual cautery would be most likely to bring on quickly the adhesive inflammation, just as in a scald or burn, though serum is thrown out so as to resemble a bladder of water, yet flakes of coagulable lymph are seen floating about in it." His object is, therefore, to change the action of the part, and rapidly induce adhesive inflammation. His mode of applying the cautery is thus described: "The artery having been slit up, the canula is to be passed into its sound part, having been first smeared with grease, which renders its introduction and removal easier, and also when heated burns the vessel with hot grease, and assists in exciting inflammation. The cautery iron, heated to a *black heat*, is then introduced into the canula. The object is not to destroy the parts, nor to bring on sloughing, but only to produce a higher degree of inflammation, so that an effusion of lymph may soon take place and seal up the vessel; and for this purpose the *black heat* is sufficient. After the cauterization is effected, the canula may be withdrawn; but if it will not come away, it is not of consequence, and may be left to come away of itself; for the process of closing the vessel goes on without inconvenience." The object of using the canula is to conduct the hot iron up to the spot to be cauterized; otherwise, as soon as it touches the vessel it is stuck fast, and you cannot pass it further up. Besides, if this did not happen, few have so good an eye and so accurate a hand as not to miss so small an orifice as that of the artery, which, however, does not occur if the canula be used.—T. D. M.]

So much for making an incision and arresting the bleeding.

Then we are to consider how wounds are to be put together after you have made them.

DRESSING WOUNDS.

In order to get the edges of the wound to come together, the incision must be made in a proper direction, and you have in many operations your choice in doing so. Accidental wounds can very seldom be put together so as to unite, even although they are made in the proper direction. The wound is inflicted with violence, and there is always more or less bruising of the surface. Under many

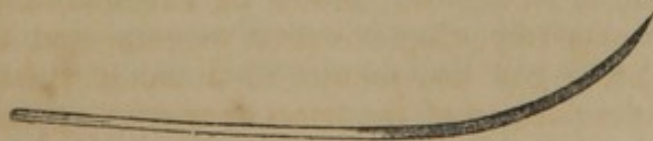
circumstances it is better not to attempt union by the first intention in accidental wounds. You put the patient to a great deal of suffering; there is a great deal of fever; and you will find, after all, that there is a suppurative wound, and the breach of surface must be cured by the second intention. But, in an operation, you have very often the power to make the incision as you like, and to save as much skin as is necessary.

In making an incision it is always right to carry it in the direction of the muscular fibres which lie underneath. If you do not follow this plan you will often get into considerable difficulty. I recollect very well a case of tumour of the abdominal parietes; I confess that I thought the tumour was exterior to the external oblique muscle. It was a movable swelling, soft, and had all the characteristics of fatty tumour. I cut down upon it, and fortunately I did not deviate from the rule of making the incision in the direction of the muscular fibres underneath. I got down through the skin, through the superficial abdominal fascia, to the tendon of the oblique muscle, but still the tumour was below. These fibres were divided in a proper direction, and the tumour was lifted out of its place. Had I made the incision in another direction, towards the spinous process of the ilium, the wound would probably not have healed for some months. The same observation may be made on wounds in other situations. You will frequently find, after an abscess has been opened, that there is a sinus, or rather a part of the contracted cyst of the abscess runs underneath the integument to some distance, and is not inclined to heal. Suppose an abscess in the scalp, say over the occipital region, which is discharging through an opening sufficiently large, but there is to one side a large cavity which refuses to heal. I have seen many people who would put a knife in, and without any hesitation cut open the scalp across. But you will find that if you do so the transverse cut will be a long time healing. Instead of acting in this way make an incision quite free of the other, enter the knife in a proper direction, that of the fibres of the posterior belly of the occipito-frontalis; make an incision upon the cavity of the abscess, so as to allow the matter to escape in that situation also, and you will have a more rapid cure, and with less difficulty, than by any other means. The same occurs in abscesses about the knee-joint and other articulations, when it is often a good practice to make at once and for all, two openings, so as to allow the cavity to be thoroughly emptied, and that without pressure. In the vicinity of joints it is of great consequence that the wound should be made in a proper direction—the direction of the limbs and of the fibres. If that be attended to you will find no great difficulty in putting the parts together and keeping them so. In the limbs you may require to attend to position, to relax the parts by the position of the joints as much as possible. It may

also be necessary to apply some compress in order to take the strain off the edges of the wound. And this is almost equally necessary, whether the muscular or tendinous tissues are involved. Some time back an Italian boy, a birdcage-maker, was admitted into the hospital on account of a lacerated wound over the back part of the leg, about the junction of its middle and lower thirds. It passed transversely, exposing the tendo-Achillis close to its junction with the muscular fibres, and was fully four inches long, and a flap of skin was turned upwards. It was caused by his falling against a rusty iron spike whilst quarreling with some of his comrades, and it bled but slightly. The edges were first put together by slips of isinglass-plaster, and the parts relaxed by position. No union, of course, took place, and sanious discharge ran from the wound. The plaster was all removed, water-dressing used, and the limb was secured, as if the tendo-Achillis had been ruptured or cut across. The edges of the wound sloughed, so as to leave exposed a surface at least a hand's breadth across; it became soon clean, however, granulations filled it up, and cicatrization advanced so rapidly, that though the injury was received on the first of November, he was discharged, cured, on the second of the following month. So much for common sense surgery.

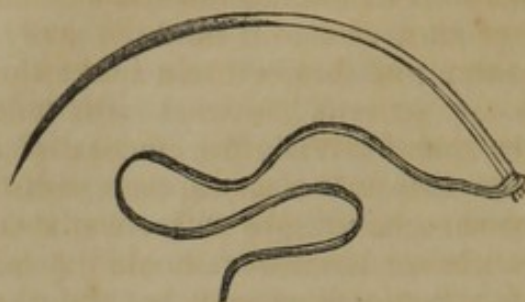
But all wounds made in a proper direction will be found to come together easily enough if you have not removed the integument to any great extent, and you must be careful not to remove any unless it is in an unsound condition,—not to remove skin, if possible, under any circumstances. If there is any strain upon the wound it is of no use trying to put the edges together; you tie the vessels up, and promote its healing by the second intention. But where the edges come neatly together they may be retained by such means as give the least possible irritation, and rapid union may be looked for. Some wounds cannot be kept in apposition without sutures. You would not commonly put a wound together while there was bleeding,—in ordinary circumstances you wait till that has ceased some hours. There are some wounds of the face in which you can put the edges together so that there shall be no interposition of blood to prevent the union. This you do at once; but in most others it is better to wait till the wound has become glazed, and then you use either what have been called bloody or *dry* sutures. By the latter is meant some sort of plaster. The bloody suture is generally of an interrupted kind. Here is the surgical needle now

Fig. 26.



generally applied. The old surgical needle is of this fashion. The

Fig. 27.



needle is sometimes useful in passing a ligature. You now and then meet with wounds in a situation where you cannot turn this needle very well, as, for instance, on the side of the nose, and therefore you should be supplied with both kinds, and of various sizes.

The suture commonly applied is, I have said, what is called the *interrupted* suture. You make one, two, or more sutures, according to the length of the wound, putting them at a distance of something more than half an inch from each other. But this will depend altogether on the state of the parts. They are inserted on the one side and brought through on the other, at some little distance from the edge of the incision. You use a double or a single ligature, according to circumstances. You then knot them, and tie a second knot; this is called a *reef* knot,—a knot that does not slip. When you have applied one suture you then put in another, and these are left quite dry and uncovered by anything except the blood, which is allowed to coagulate on the edges of the wound. At the end generally of two days the suture is snipped through and withdrawn. The parts may be supported for a short time afterwards by the application of a bit of silk, spread with isinglass, or by a slip of common court-plaster. The isinglass plaster is now made in webs, and spread on various tissues, oiled silk, gold-beater's skin (the prepared peritoneum of the ox), or silk gauze. This latter material is the best; it is first made water-proof by a coating of boiled oil, and then laid over with layers of isinglass dissolved in spirit. It makes an admirable adhesive application, which answers every purpose, and causes no irritation of the surface. It is prepared by various makers, and is to be found at all the wholesale druggists. Such a plaster as this I have been in the habit of using for the last fifteen or twenty years, and it is now only coming into general use. That is the way in which simple incised wounds are to be managed, and they will generally heal by the first intention in the course of two or three days.

[The isinglass plaster referred to by Mr. Liston is exceedingly

well made by Mr. Husband, of this city; and for some time past I have almost abandoned the use of the old adhesive plaster of the shops, which often in persons with a delicate skin, or children, produces troublesome irritation. In the first dressing of a wound, especially if a large one, we find it useful to apply strips of plaster to support the sutures, and before their application we should be careful to shave the parts if covered with hair, cleanse them thoroughly, and dry them. When the isinglass plaster is employed it should be cut into strips of an appropriate width and length, and then moistened on the glazed side with a wet sponge. When the ordinary adhesive plaster is used it should be heated by placing the strips around a bottle filled with hot water, or placing them upon a warm dish. In removing the strips we must always recollect to begin at *each end*, and having lifted up the strip until we reach the wound, we carefully *turn it (the strip) upon its side*, in doing which it is detached. I have seen much mischief result from an ignorant surgeon's tearing off the plaster, holding *one end only* between his finger and thumb.—T. D. M.]

What is called the *quilled* suture is sometimes employed, but very rarely. It has been recommended by surgeons in cases where wounds are deep. The object, in muscular wounds, is to bring the whole surface together. The ligatures are passed deeply, in order to make pressure on the deep parts. The barrel of the quill is placed on the surface and a ligature tied over it. Then another quill is put into the folds of this ligature, and also tied. This suture is only employed in one operation—that for lacerated perineum. I have used it two or three times in cases of this kind.

A third sort of suture is employed—the *sutura circumlata*, or *twisted* suture. I shall apply this when I come to speak of wounds of the face.

Now there are a great many wounds which will not heal by the first intention. They are so made that they are attended by a loss of integument. This, I have no doubt, Mr. Cooper explained when treating of different wounds. These solutions of continuity must be dressed with a view to encourage suppuration as speedily as possible. It is well to relax the parts thoroughly, and to put them in such a position that their edges shall not be pulled much asunder. So long as there is bleeding you apply cold cloths to the part, and then by-and-by, as giving great relief to the patient, and being more congenial to the feeling of the part, you will apply warmth, either in the form of poultice or water-dressing. Lint, dipped in tepid water, may be applied, the pledget being double, of perhaps the patent lint, and barely larger than the sore; this is covered by a more ample bit of oiled silk, to prevent evaporation, and this is to be continued till suppuration is freely established, and the wound begins to get clean; then, perhaps, you have to moderate the discharge a little by some astringent application.

Now and then the cure will be promoted by giving support to the part by the application of bandages. Bandages have been used to retain the dressings, but you are aware that in hospital practice we have dispensed, in a great measure, with heavy loads of dressing. The time was when all wounds were covered over—and perhaps are yet in some places—with pledgets of lint, with linen spread with some sort of healing or drying ointment, as it was stupidly called; this, again, was covered over with a quantity of tow, then compresses were placed over that, and a bandage over the whole. This was the plan adopted in wounds of every part of the body, and a very filthy and disgusting practice it was. We do not require to use tow or compresses; a simple roller, carefully applied, to retain the dressing—the water-dressing the most simple of all, is generally all that is necessary. But now and then, during the cure, it is advisable to apply a bandage with a view to getting rid of the swelling. By this means you support the vessels and encourage the healing process. The bandages used now-a-days are sufficiently simple; it is very seldom that anything is required but simple rollers. After injuries of the head, over the dressing you may put split cloths, or you may use the capelline bandage, which is nothing more than a double-headed roller, twisted, so as to admit of being adapted to the whole scalp. I shall show you how to apply bandages to stumps, and when we come to treat of injuries of the head I shall show the mode of applying a simple roller to it.

[There is nothing for which Mr. Liston deserves more credit, than his constant effort to simplify and improve the dressing of all descriptions of wounds. The old method, by which union by the first intention was in most cases effectually prevented, has almost disappeared from the practice of every well-informed surgeon, and this truly useful result has been achieved mainly by the efforts of Liston, M'Cartney, and a few others of like judgment and discretion. When we read such directions as the following for dressing a stump or any external wound, we cannot avoid the conclusion that he who orders them must certainly possess strange notions of the influences requisite for the proper healing of such injuries: "After the vessels are secured and the adhesive plaster and sutures applied, then lay on a *cerate cloth*, over this a *bundle of charpie*, over this a *Maltese cross*, and lastly to *secure the dressing*, a *roller* should be made to surround the part and extend some distance up the limb!" If a wound thus dressed unites by the *first intention*, it does so in spite of the doctor.

In lacerated wounds, to which Mr. Liston refers in the text, no dressing is comparable to the "*water*" in some form or other, and for several years I have employed as a *first dressing* nothing else. In summer I use *cold*, in winter *warm* water, and apply it as recommended by Liston and M'Cartney, viz., after cleansing the wound,

and approximating its edges, whenever this is proper, pledgets of *patent lint* dipped in water are to be gently placed upon its surface, and the whole covered with a piece of oil silk to prevent evaporation. In summer I have found it best not to apply the oil silk, as it keeps the part too hot, and in its stead apply *two thicknesses* of wet lint, which will retain the moisture much longer than one. An assistant should also, about every half hour, pour a spoonful or two of water over the dressings, but without removing them. Thus treated, I have seen the most terrific lacerated wounds from machinery or gunshot, heal almost by the first intention. Only a few weeks since I treated the son of a professional friend, who had received a severe lacerated wound with the loss of a portion of two fingers from the bursting of his gun, by the cold water dressing, and nearly every fragment of skin that could be placed in a proper position, united by the first intention.—T. D. M.]

Having made these preliminary remarks, we may say something of affections of the scalp.

AFFECTIONS OF THE SCALP.

ABSCESS.

Abscesses are met with here as the result of inflammation or of injury, and it is necessary to make incisions in order to prevent sloughing, and sometimes with a view to allow matter to escape. After punctured wounds of the scalp you meet now and then with erysipelas of the part, and very serious it is. Sometimes it is attended with a great degree of inflammatory swelling, and a great degree of tension. In cases where it is very violent, unless you interfere actively there will be a serious constitutional disturbance, and sloughing not only of the skin but of the other coverings of the cranium. Abscesses may form in different parts, and large sloughs and exfoliations of the bone may occur in consequence. It is very desirable to prevent this, and it can only be done by making free incisions in proper places. Look over the head and find where it is most puffy. Perhaps the integument will be swelled to the thickness of an inch and a half; you find a part where it is boggy and soft, and there you make your incision. In the first place very few and very limited incisions may answer all the purposes; there is no necessity for opening the scalp from one end to the other. Select the parts where the tissues are most disorganized, and make an incision of an inch and a half or so, freely through them. In that way you get rid of the tumour, prevent the disorganization, and allow the matter to escape as soon as formed. You must not wait till matter is formed, but take the case in time, and prevent, by

judicious means, the production of matter and the destruction of tissue. These incisions are to be made in the direction of the fibres of the occipito-frontalis. Then you may be called upon to lance the scalp and lay it open, to allow matter and putrid blood to escape. You saw in the hospital the other day a child who had fallen down and struck the head, and where, in consequence, ecchymosis formed. But this, instead of disappearing, gradually began to increase, and the swelling got softer. Blood had been effused, the clot had become broken up, and was putrid. Instead of decreasing by absorption it was increasing, and we should have had a very unhealthy and bad abscess, had not the scalp been opened by free puncture.

But now and then you find a collection of matter formed in consequence of injury or disease, and that requires to be opened. You perform this operation by employing such an instrument as already shown you for making incisions; by the broad-bladed sharp-pointed bistoury, and entering it in the way I have described, at the most dependent part, you make an incision of sufficient length in the direction of the fibres. That is a far better instrument than the old-fashioned things (abscess-lancets they were called) that were thrust or dug into all sorts of collections. A great deal more pain was caused by the coarse thrust of such instruments than by a bistoury with smooth and steady introduction. There is another sort of abscess-knife, a short, slightly bent, double-edged bistoury, not a bad one for opening small collections with; but the common sharp-pointed bistoury is the best.

TUMOURS.

You require to make incisions into the scalp to remove tumours. These are of various kinds. You sometimes meet with solid tumours, but very seldom, what have been commonly called *talepæ*. Fatty and fibrous tumours are sometimes seen here, but the tumours most frequently observed are of an encysted nature. These are common enough, and they seldom occur singly. You generally meet with them in different stages of growth, some of the size of filberts, some smaller, and some larger. If they attain a very large size you may be under the necessity, in making a dissection of the tumour, of taking away some portion of the integuments adherent to the cyst. In general, some inflammatory action has taken place in the cyst and the integuments are adherent to each other. These you must take away along with the tumour. You make two elliptical incisions at some distance from the base, meeting on each side, and these incisions must be made also in *the proper* direction. You then cut freely through the integuments, down to the cyst, and dissect it out from the neighbouring parts. You preserve so much of

the integuments as will cover the wound, bring down the flaps, and retain them by a suture, perhaps a bandage. But the tumours commonly met with are not of considerable size; they are loosely connected, and may be got rid of with the greatest facility. They are found in various parts of the hairy scalp. If the patient has plenty of hair, you cut it away with the scissors, so as not to cause deformity, and expose the tumour a little. If it is pretty prominent, you use a narrow knife, such as that already shown you. Supposing that you stand in front of the patient, the instrument is entered in the direction of the fibres of the muscles, from before to behind. It is pushed into the tumour and out at the opposite side; then, drawing the knife, you divide the cyst and the integuments, and then, with the dissecting forceps, separate the edges of the incision. On laying hold of the edge of the cyst you are able, in the majority of cases, with great ease to lift it out of its bed. There is no dissection required; no dressing. Wipe off the blood, put the parts together, and lay the hair over them. If the tumour is very small you will find it more convenient to use a narrow curved knife, to divide the cyst completely. You will find it impossible, without pushing the point downwards, to divide the cyst and to lay hold of the edges; but you pass the knife in this way freely into the cyst, bring it out, and divide the cyst; and then, pressing the parts together, squeezing them gently, and laying hold of the edges, the tumour is easily lifted out. It is as simple an operation as can well be conceived.

ULCERS.

You may find on the scalp malignant ulcers, but, fortunately, they are not often met with. I have seen a few, and I have been obliged to dissect out a considerable part of the scalp, leaving the bone uncovered. You may have, in consequence, an exfoliation of the bone to some extent.

OPENING TEMPORAL ARTERY.

Now and then an operation is practised on the temple, and sometimes at the desire of the physicians, that is, the opening of the temporal artery. If you go properly about it, the operation is not one of difficulty. You must not think of cutting the vessel as it comes over the zygomatic arch, and where it lies at a great depth embedded in the parotid, covered by fascia and the fibres of the platysma. You take one of the branches covered by the common integument only, the anterior or middle branch. It may roll about a good deal, but still you are able to fix it. It is quite visible, in

general, when the integuments are thin. You enter the point of the instrument, a common bleeding lancet, so that it may penetrate the vessel, and then, in bringing it out, carry the shoulder forward, so that you may make the superficial incision a little larger than the deep one. The objects in making the external incision larger than the internal one are to allow the free escape of the blood and to prevent extravasation into the cellular tissue. There is no necessity for exposing the vessel by dissection with a knife, and then opening it with a lancet, as has, I think, been recommended. The operation is done at once, and is almost as simple as opening a vein at the bend of the arm. This is all very well, but sometimes bad consequences follow the partial division of this artery. There is no difficulty, generally speaking, in stopping the bleeding. You have a firm resisting bone, and you can put a compress on the vessel. You stop the flow of blood by putting your thumb below, and then you raise the compress sufficiently high for a bandage to act; you then turn a roller a few times round the head, and secure them. But sometimes this is not sufficient, and in order to arrest the bleeding it may be necessary to extend the incision, to cut to a slight extent deeply. You put the lancet into the original wound, and you endeavour, by moving its point freely from side to side, to divide the vessel thoroughly. Thus you allow it to retract, its extremities shrink, and the bleeding is effectually arrested.

From the intentional or accidental opening of the vessel you have sometimes to dread the formation of aneurism, and troublesome bleedings, with ulcer. I have seen this happen when the vessel has been opened unintentionally by the application of a scarificator. You can easily recognize an aneurism of the temporal artery; it is an oval swelling, gradually increasing in size, and beating very distinctly. The pulsation ceases upon pressing the vessel betwixt the heart and the tumour, and the tumour may be made to disappear by direct pressure upon it. You cannot mistake this swelling for anything else.

You may attempt the cure of this aneurism by pressure, but it is always done at the risk of the excoriation and sloughing of the integument. The better plan is to tie the vessel on each side of the tumour. If the tumour is recent, and small, you make an incision through it, and you very easily get hold of the vessel on each side, and pass a ligature by means of a sharp needle. There is nothing to take in along with the vessel; no nerve or vein of importance. The vessel must be taken up above and below the aneurism; the anastomoses of this artery are so great and free that it is not sufficient to tie it in one place.

A much more troublesome affection is an ulcer following upon any operation or accident. When the temporal artery has been divided, you sometimes find that the bleeding is arrested by a compress and bandage; but after three or four days, on taking off the

compress, you find that the wound has not closed, but ulcerated, and it goes on extending by ulceration if the pressure is continued. The bleeding may not occur for some time after the wound, but after it does it is apt to occur every two or three days. There is, at each time, a considerable effusion of blood, and the patient is gradually weakened. It is, perhaps, stopped for a time by firmer pressure; a coin is put on over it, or a bit of lead, to make the pressure more complete. This is effectual for a time, but the ulceration goes on extending, and this may have continued for two or three weeks before you see the patient. At last he gets so weak that it is necessary to interfere actively, and in cases of that kind you must cut freely through the ulcer. The probability is that if you cut in the direction of the vessel you will divide it on either side of the sore, and then all you have to do is to take hold of the ends with the hooked forceps and secure it; if the parts are much condensed, as they generally are, you must pass the ligatures by means of a sharp curved needle. I have seen a great deal of trouble arise from cases of this nature, and I have met with some half dozen where the patient was brought so low, by repeated hemorrhages, that it was necessary to have recourse to this proceeding in order to save life.

LECTURE II.

INJURIES OF THE SCALP, OF THE CRANIUM, AND OF THE BRAIN. LACERATED WOUNDS. FISSURES OF THE CRANIUM. THE TREPHINE AND ITS INDICATIONS. ILLUSTRATED CASES.

AT the conclusion of my last lecture I spoke shortly of the operation of opening the branches of the temporal artery, for the purpose, as is supposed, of emptying the vessels more particularly in the neighbourhood, in inflammatory affections of the contents of the cranium, of the orbit, &c. I should have stated that sometimes the blood does not flow so freely and rapidly as might be wished, owing to the form of the opening, or to the size of the branch punctured. The blood can always be made to flow if the wound is at all free externally and direct, by the application of a small cupping-glass, care being taken to raise its lower edge, so as to allow the blood to enter that part of the vessel embraced by its mouth. The opening of the temporal artery, though a simple enough proceeding, and one which generally may be accomplished without risk, is not now-a-days often resorted to. The blood-vessels can equally well be relieved of any superfluity of their contents by scarification and

cupping of the temple or of the nape of the neck. General blood-letting is most frequently practised, as I shall by and by describe to you, and as you all know full well, by opening a vein at the bend of the arm. The lancet, I believe, is an instrument that I use less than any other; nevertheless I can tell you, possibly, something of its use and abuse. Bleeding may often be required, but it is, no doubt, often resorted to unnecessarily and improperly, and many patients are thrown into a bad state of health, or even die in consequence. Death may occur from the too frequent and too great abstraction of the vital fluid, and it not unfrequently happens from the local effects of injury to the vein. All these risks, however, must of necessity be incurred in many severe cases of inflammatory action. But think twice, and well, before you resort to this expedient; the same good effects often enough follow less hazardous means. I alluded to the subject of abstracting blood from the branches of the temporal artery more with a view to advise you about the treatment of the accidents which result from it, and these often require no small share of surgical skill and boldness in their management.

I now proceed to say something on the injuries of the scalp, of the cranium, and of the brain. This subject, I know, has been so far discussed already in this course. Mr. Cooper must have told you all about the symptoms arising from concussion and compression, and pointed out the distinction betwixt them. He no doubt described the symptoms arising from inflammation of the membranes of the brain, and of the brain itself, the symptoms and signs of collections of pus that form between the cranium and the dura mater, and of deep-seated abscess. These affections are all of a very serious character, but you may sometimes see patients escape from very extensive mischief in the cranium. It has been said, and truly, that no injury of the head is too slight to be despised, or too great to be despaired of.

Injuries of the scalp are of themselves sometimes serious enough; and although the bone is not injured, although there is reason to think that there is no separation of the dura mater from the interior of the cranium, still alarming and sometimes fatal consequences result. Sometimes, from a slight punctured wound of the scalp, in spite of all the care that can be taken, violent inflammation will ensue, the scalp is puffed up and undermined by pus; a large portion of the tendinous expansion may become dead throughout, and sometimes even portions of bone perish.

This is to be guarded against by strict antiphlogistic measures in the first instance, and also by free incision of the scalp, through the wounded part of it. But before you are called possibly the coverings have become excessively tense; there is great effusion under the occipito-frontalis muscle, or worse than that, under the pericranium, and then a free opening must be made to prevent the forma-

tion of matter, or to allow of its escape if already formed. By timely incision, however, the tissues are prevented from being disorganized.

The treatment of open and lacerated wounds will consist in applying soothing applications, and encouraging discharge from the exposed surfaces. In cases where the wound is extensive, and where a great portion of the scalp is separated from the parts underneath, you must endeavour to put the tissues as nearly in their place as possible without any strain upon them. It will not do, when a portion of the scalp is stripped off, and thrown over the ear, for instance, to allow it to hang there, nor will it answer any good purpose either to set to work and stitch it closely up. There is a well-founded prejudice against stitching in these cases; it is apt to irritate the parts, and the matter may burrow beneath. But there is no objection to putting the parts in their place, and keeping them there by compresses. After the scalp has been divided, a few strips of plaster may be applied, but the fewer and the less irritating the plaster the better. None of you, I am certain, after what you have seen, would employ in recent solutions of continuity, in any situation, the common irritating resinous adhesive compositions. The plaster which I spoke of at our last meeting is so very transparent that you can see what is going on beneath it, and it causes no irritation of the surface; besides which it is very adhesive, and will not be separated by lotions or washing. It seems to be getting into fashion, and I believe that it will soon be used everywhere. Mr. Macord, of the Minories, who manufactures it remarkably well, tells me that he has obtained recommendations of it from various surgeons whom he has induced to make trial of it. You would not, although a portion of the scalp appears to be much lacerated, take the scissors or the knife and cut it off, as was the practice of the old surgeons. They did not care much about saving skin. It was their custom, for instance, before performing the operation of trepan, to scoop out, with a large scalpel, a piece of skin, so as to expose the bone. You will find that even Mr. Pott, whom I have often had occasion to quote to you as one of the best surgeons of the last century, who was cotemporary with John Hunter, and, if I am not mistaken, a better surgeon, though not so good a physiologist, recommends the removal of circular portions of the scalp before the application of the trepan, and gives all sorts of cautions as to the gentle use of the knife, the not pressing too hard with the "scalping-knife in the case of large fractures," so that the brain or its membranes may not be wounded. "If the integuments be not wounded," says he, "or if the wound made in them be so small as not to admit a proper examination of the bone, and the circumstances of the case be such as render such inquiry necessary, a portion of the scalp should be removed. The manner of doing this has formerly been the occasion of much difference of opinion, but

there can be no doubt about the greater propriety of removing a piece of the scalp for this purpose by an incision, in a circular form, it being that form which must afford the clearest view. If there be no wound, the point stricken should be made the centre of the incision; if there be a wound, such wound should be made the centre of the piece to be removed; and such piece should always be of size sufficient to render the application of the trephine easy. If the scalp be wounded, and the wound be large enough to render the fracture visible, the course of that must be the operator's direction in making his incision, and if the skin be much torn and bruised, or spoiled, it will generally be found advisable to take away all that is spoiled at once, as the removal of it will add very little to the patient's pain or the length of the cure, and the leaving it in this state may be attended with great future inconvenience. Scalping (as it is called) should always be executed with a knife, and that knife should be so held as to cut through the skin and pericranium, in a perpendicular manner, down to the bone at once, that the size of the bare bone may be fully equal to that of the wound in the scalp." Yet Mr. Pott knew well the disadvantage of leaving bone uncovered, and insists, over and over again, that "no part of the scalp should be wantonly or unnecessarily cut away."

Wiseman, who lived a long while before, seems to have been well aware of the risk and inconvenience of removing the scalp, and he abuses a man very much for scalping a patient. He was a "horse-courser," and was thrown against the bars in Smithfield; his scalp was lacerated and thrown over his ear. He was taken to a barber, who cut off the piece, and hung it up in his shop, to show how good and bold a surgeon he was. However ragged the integument may be, however ingrained with mud or sand, or anything of the kind, you will replace it, and leave it to nature to determine how much and which part is to be separated. Very likely the sloughing will be but to a slight extent,—the greater part may adhere. Suppose that a portion of the flap adheres, in a great measure, but matter forms underneath, you must in that case make one or two counter-openings. You make an incision, perhaps, at the most dependent part, altogether clear of the original wound, in order to allow the matter to escape. It must be made sufficiently deep and free to permit the discharge of the pus without any thumbing or squeezing of the parts.

Deeper parts are injured also. Portions of the bone may be exposed, and the bruising may be such that death and exfoliation, to a certain extent, must necessarily follow. This is a work of time and a process of nature. Though the bone is stripped of periosteum you will act wisely in laying the scalp over it. Perhaps it may not adhere to it, and after a time you find that by ulceration and sloughing the bone is more exposed than before. You must wait patiently, and so must the patient, until separation has taken place between

the dead and the living parts. You are not to expect that absorption will remove the portion that is dead. This process will assist so far as to separate it from the living, but the part which is dead must separate spontaneously, or be removed by the surgeon, when loose, if it is in any way confined by the soft parts. It does not, however, follow that because a bone is stripped of periosteum it should be dead. Very often you find that instead of becoming white, dry, and dead, that after a while it presents a brownish hue, retaining its vascularity and vitality. The granulations from the surfaces coalesce, and a permanent cicatrix is effected.

Besides injury to the integument you may find that the bone has suffered; there is a solution of continuity in it also. This may be extensive,—a large portion of the bone may be driven down or fractured, or it may be to a very slight extent. There may be no depression at all, merely a fissure of the cranium, and that, as you are very well aware, may exist to a considerable extent in the upper part, without any serious consequences resulting. You would not think of denuding the part to ascertain its extent and then applying a trephine. This practice was adopted by many surgeons formerly, and even Mr. Pott does not seem very clear about letting the fissure alone. You will find all sorts of things in books about ascertaining whether the cranium is sound or not, just as you would test the soundness of a piece of crockeryware. If they found a crack they would have no hesitation about opening the part to the full extent at once. Directions are besides laid down in old books for distinguishing between these fissures, or cracks, of the cranium and the sutures. The old surgeons never hesitated to apply the trepan in such cases to an amazing extent. In the work of Mr. Gooch, of Norwich, there is a picture of one of his operations. The holes were made at two sittings, and the trephine applied all round the fracture. There was no necessity for it; there was nothing to raise, but all this boring of the skull was resorted to in order to prevent inflammation of the brain forsooth. Mr. Pott did not get rid of that prejudice; he reasons about it, and in the end seems rather inclined to favour the trepanning of the skull as a precautionary measure. There is a story in the late John Bell's great and admirable work, the "Principles of Surgery," of a certain Count of Nassau having been trephined twenty-seven times, and he recovered so far that he could write a certificate to that effect:—"I, the underwritten Philip, Count of Nassau, hereby declare and testify that Mr. Henry Chadborn did trepan me in the skull twenty-seven times, and after that did cure me well and soundly." The latter part of the certificate is truly wonderful,—that a man should recover in spite of such barbarous proceedings.

You would not trephine a patient because the cranium was only fissured, but there are circumstances in which the operation is still absolutely required. It may be necessary to apply the trephine

where the cranium is perfectly sound in order to allow of the escape of purulent matter. A person, for instance, receives a blow on the head; there is, perhaps, an external wound, perhaps none at all. The integuments are uninjured, or there is merely a slight wound, and the symptoms are met as they occur. But perhaps at the end of ten days, or longer, he begins to get drowsy; he complains of headache and pain in the back of the neck; this is preceded by shivering; then the scalp gets swollen up and puffy; or, if there is a wound, the discharge becomes gleety, and the bone is seen, perhaps, bare and discoloured, at the bottom. There is reason, then, to suppose that matter is collected somewhere within the cranium—it may be betwixt the cranium and the dura mater, or still deeper, in the substance of the brain. However, under circumstances of this kind, the surgeon will be called upon to expose the bone by incision of the puffy part, or by enlargement of the original wound, if it is not sufficiently open, and then to apply the trephine. This he may do within a fortnight, or a month after the accident, or even later. He will be guided by the symptoms to suspect the formation of matter, and the wound or tumour of the scalp will lead perhaps to the place where the mischief has occurred. You find now and then, however, that the collection of matter is far distant from the injured scalp. A man came under my care in the Edinburgh Hospital who had fallen down and hurt the back of his head. He did very well for some weeks; he then had an attack of shivering; he complained of an uneasy feeling about his head; there were drowsiness, feverish excitement, and confusion, together with violent convulsions, and along with all this there was a puffy swelling at the back of the head. It was clear that he would die if no attempt was made to relieve him. I cut down upon the puffy swelling and trephined him, but found that the dura mater was healthy and sound. He died two or three days after, and we examined him. It is true that there was an abscess in the cranium, but it was on the opposite side, and under the dura mater. You may not, perhaps, succeed in your diagnosis as to the exact side of the matter, but in many cases you are warranted in performing the operation. It is attended with no risk to the patient under these circumstances.

TREPHINING.

In order to prepare for the trepanation of the skull you must, of course, in the first instance, expose the bone. Suppose that there was a puffy tumour, or an unhealthy wound, and the patient had laboured under the symptoms I have mentioned, we should then set about making a perforation, in order to allow the matter to escape. You must not expect to find a great quantity of matter,

but there is still sufficient to cause a good deal of constitutional disturbance. The matter does not accumulate in ounces; you find, perhaps, a few teaspoonfuls lying on the surface of the dura mater, and that is covered with lymph; sometimes it is in a sloughy state. Your apparatus must consist of a good strong common dissecting knife, a pair of forceps, and a trephine. These are all the instruments that are required. You must have something, perhaps, to raise the circular portion of bone after it is detached—an elevator to put into the fissure you have made, to raise it up. There are different forceps contrived for this purpose. Here is the instrument now generally employed for perforating the cranium—the trephine (fig. 28). It is turned by the wrist, and is just as good as the old instrument—the trepan. Here is the instrument which used to be employed (fig. 29). It was quite right when so many holes were

Fig. 28.

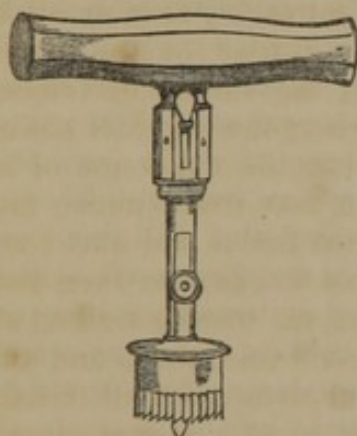


Fig. 29.



bored in the skull that there should be a facility of doing so. We do not now make so many as formerly, nor do we perform the operation so frequently. A certain portion of the cranium can be taken out easily enough with this instrument—the trephine. You perform the operation in many cases when the patient is insensible to pain; he is in a comatose state, and there is no great hurry about it.

There are other instruments put into a trepanning case which I think are more for the benefit of the instrument-maker than the patient. There is a raspatory, as it used to be called, for scraping off the pericranium, and another to smooth off the opening in the

bone. There are contrivances also attached to the perforating instrument to prevent the brain being injured. These, however, in the hands of a good and careful surgeon, are certainly quite unnecessary.

Supposing that we had a patient labouring under abscess within the cranium, we should uncover a portion of the bone presumed to lie over the matter. You cannot get at that by a small and simple incision; you must divide the coverings in such a way that you can readily uncover a sufficient surface of the cranium. You will be guided, perhaps, somewhat by the nature of the injury and by the state of the integuments. If there is a considerable opening you merely extend it—carry the incision through, make a cross incision, and turn the integuments on one side. If the integument is sound you make a T-shaped incision, or one in the form of the letter V, and you cut down to the bone at once. With the scalpel you take off quite a sufficiency of the pericranium for your purpose; and you must not remove it further than is absolutely necessary. Denuding the bone to a sufficient extent, we then push the centre-pin of the instrument forward and fix it firmly. The old instruments had centre-pins, which we were under the necessity of screwing out by means of a key. A perforation was made first, the centre-pin was then fixed in that hole, and you went on boring till you had got the teeth of the instrument to take effect and well fixed in the circular perforation; you then unscrewed the centre-pin and went on with the operation. I recollect borrowing an instrument of this kind from an old practitioner in the country to trephine a child. I think the child had been struck by a spinning-top, or rather a peg-top, on the top of the head, and for some weeks went on very well, till at last symptoms of suppuration within the cranium supervened. On visiting the little patient I found that there was a small perforation in the skin, into which a common probe could be introduced, and through this a little matter was oozing. The child was insensible, and it was plain that nothing would save him but the application of a trephine, if even that would. I sent into the neighbouring town to borrow that instrument, and commenced the operation, but I found that if I had gone on I should have made another hole, not only through the bone, but into the brain, with the centre-pin, long before I could have got the same to act on the bone. I was obliged, therefore, to take it out, and complete the operation as well as I could.

You place, then, the centre-pin of the trephine in the bone and make a hole with it. When the saw is sufficiently fixed you then withdraw the centre-pin and work the instrument, as I now show you, but it must be done with a light hand. The impression on the bone is made by turning the handle of the instrument. You press gently on this, turning it from left to right, and you draw it back lightly. The teeth are set forward, and this instrument is

fluted a little, so that if you find the cranium unequal in thickness and require to perforate more at one place than another, you can incline the instrument and make it bear on those parts as yet undivided. You often find when you have got through the outer table by the change of sound. You use a tooth-pick—a wooden or a silver one, the barrel of a quill properly cut, or the flat end of a probe, to clear out the groove. As you go on with the perforation you begin to feel round about to see that you have not got through the cranium. At any rate you must be careful not to leave a circular dotted line upon the dura mater.

The operation of trepanning is very, very seldom required now-a-days. In the mining districts you may have occasion to perform it now and then, and in military practice; in civil practice very seldom indeed. You have seen it performed a few times in this hospital. You have seen it resorted to successfully for the purpose of evacuating matter, both in the practice of myself and colleagues. Some of you may recollect the case of a boy who had a good many weeks before being brought to the hospital been upset, tumbled like a cat out of a basket, from a cart containing ginger-beer bottles. He had tumbled out among the bottles; some of them broke, and a portion of one of them struck on the vertex and penetrated the cranium. He was treated by my old pupil, Dr. Bain, at Poplar, for some time, but at last he began to get very bad; there was a great deal of fever, shivering, and headache, and then he became comatose, and continued so a day or two. Relief was afforded by a spontaneous escape of matter from the wound, and having had two or three alarming attacks of the kind, he was brought to the hospital. On examining him there was found a small ulcer of the scalp and a perforation of the cranium. This was about a month after the infliction of the injury. I had the wound exposed; he was sensible at the time, and there was an opening in the bone. The trephine was applied to the edge of it and a circular piece of bone was taken out. We then found that the inner table had been broken away, and there was a spiculum adhering to the portion of bone which had been removed. A little splinter or two were taken away, and a considerable quantity of matter escaped. The patient never had an unfavourable symptom and recovered rapidly.

The cranium in the subject before us is much of the same thickness throughout, and I have brought away a circle of bone in the trephine without using the forceps.

On the removal of the bone you find, in all probability, that a little matter escapes. If you do not, what would you do? You could not go safely much deeper. Some surgeons have opened the dura mater and carried their knives still deeper: but I would not advise you to follow such rash practice. Supposing, however, that you had found matter and relieved the patient, you then put the

flaps you have made over as well as you can, and perhaps you would retain them on by a slip or two of plaster. You would not cover the opening altogether, but leave a small space for the water to escape. You find after a time that granulations spring up from the dura mater, from the edges of the opening and the flaps. They thus come together, and the opening will be closed not by bone but by membrane.

[It occasionally happens in young persons where the bones are vascular, that a deposit of lymph takes place upon the dura mater and in the orifice made by the trephine, in which deposit after a time, ossific points are discovered, and at length coalesce and thus close the opening entirely. From the fact that in the vast majority of cases no such union occurs, the older surgeons were in the habit of introducing into the opening plates of gold or silver, for the purpose of protecting the brain, but no such precaution is requisite, and the plate always does harm by acting as a foreign body and preventing union of the scalp. Its use has for many years been entirely abandoned.—T. D. M.]

You now and then meet with cases where a patient receives an injury to the head; he is stunned, perhaps, and after a little time recovers from this state of stunning and then falls into a state of coma. This sometimes occurs after injuries upon the temples. You can easily understand that when the effects of the concussion have gone off and the patient is suffering from an extravasation of blood on the brain, from an interruption to its circulation, and so on, you have nothing to lead you to the exact seat of the internal injury. You may easily enough conjecture that the cranium has been split in the temporal region—that the middle meningeal artery has been torn, and that the patient will in all probability die. You will find, on examination after death, a large clot between the bone and the dura mater—a clot consisting of some five or six ounces of blood, quite enough to account for the deep coma and the patient's death. Now, are you warranted in looking out for this extravasation of blood? I think Mr. Cooper is of opinion that you are, but I regard it as very doubtful whether you ought to subject the patient to an operation in such a case. Though it might do no harm, yet the probability is that the clot would not be discovered, and if it were there would be great difficulty in removing it. It would only be by a very extensive operation with the trephine, by applying it over and over again, and taking away a large portion of bone, that you could hope to succeed.

A case of this nature was some time since treated by one of our able physicians in the hospital.

D. K., a tall, robust man, ætat. 47, brought to the University College Hospital, March 26, 1839, by the police, who found him, last night, lying in the street in a state of insensibility. The man

had been drinking freely the evening before. When admitted he still appeared in a state of stupor; breathed heavily, but without stertor, and was with great difficulty roused to answer questions; his face pale; mouth open; pupils active; pulse frequent, and rather full. He did not appear to have received any injury. In the evening reaction came on; the pulse rose; skin became hot; patient appeared more conscious, and complained of very severe pain in the head; face flushed.

March 26.—He was bled to a pint, which relieved the pain considerably. Ordered a calomel and colocynth purge.

27.—The next day he had quite recovered his consciousness, but was found to be paralyzed on his right side, principally as regards motion; right eye rotated outwards and fixed; upper eyelid of that side drooping; pupil dilated and inactive under the stimulus of light; right angle of the mouth drooping; still severe pain in the head; urine passed involuntarily. Cupping over the temples to ten ounces. Purged with croton oil.

28.—Cupped again to eight ounces, and head shaved, when, *for the first time*, a slight bruise, without abrasion, above and behind the right ear, was discovered. He then took five grains of calomel every three hours, until his gums were made sore, when (April 1st) it was discontinued.

April 3.—A little erythematous redness appeared in the situation of the bruise, which, during the next few days, extended gradually over the right side of the skull and face.

On the 8th of April he became frequently delirious, and seemed to suffer from great pain and tenderness of the epigastrium, with occasional sickness.

On the 11th he appeared better, and quite conscious.

On the 12th he again lost his consciousness, sank rapidly, and died on the morning of the 13th.

Autopsy fifty-four hours after death.—Slight extravasation of blood under the skin above the right ear. Simple fissure of the skull, extending from the orbital process of the frontal bone, across the parietal, to near the centre of the occipital bone. Slight laceration and rupture of the coats of the middle meningeal artery, opposite the fissure. Large oval coagulum of blood, weighing about five ounces, between the skull and dura mater, adhering pretty firmly to the latter, and deeply indenting the substance of the right hemisphere opposite the fissure. Pia mater a little congested. Substance of the brain natural beneath the coagulum.

On the left side there was no injury to the skull; the pia mater was more congested than on the right side, and there was a little serous effusion under the arachnoid. Under the anterior lobe of the left hemisphere, opposite the orbital plate of the frontal bone, but within the dura mater, a coagulum of blood, weighing about

four drachms; extravasation of blood also in the neighbouring part of the brain and between the convolutions. Nothing unusual in the cavernous sinuses. No source of direct pressure in the course of the third nerve of the right side. A little serous effusion in the ventricles.

Here, if the existence of extravasation could have been ascertained, and its site, no good could have come of any operation. The fatal extravasation, the effect of *contre-coup*, was completely out of reach.

[We find that much difference of opinion exists at present in relation to the proper treatment in cases where the symptoms of compression of the brain are referable to effusions of blood. The high authority of Mr. Liston is evidently opposed to the application of the trephine, and many excellent surgeons agreeing with him, trust all such cases to the operation of depletion, both general and topical, active derivation, free purging where the bowels will act, the use of mercury carried to salivation, and positive tranquillity. That such is the correct practice in a vast majority of these accidents there cannot be a doubt, but unquestionably in certain cases trephining will not only prove useful but is our sole remedy. The great objection to the operation is the uncertainty of diagnosis, for unless there exists some external injury or mark to guide us, it is often impossible to say upon what spot the instrument should be applied, and the attempts to render this point more clear have so signally failed that I shall not cite the numerous symptoms laid down by some as indicating effusions at the *base* of the brain, at its *summit*, in its *substance* or *external* to it, on *one side* or *the other*, and lastly its *amount*. Some importance it is true may be attached to the position of paralysis where this exists, for experience has proved that where one side of the body is more affected than the other, and one pupil more dilated than that of the other eye, the extravasation is chiefly on *the side on which there is least paralysis, and least dilatation of the pupil*, but this is not *invariably* the case, and hence the symptom is not entitled to implicit confidence. But there are cases, as I have already remarked, in which trephining is indicated, and one of the most striking I have ever heard of is the following reported by Dr. Norris as having occurred in the practice of Dr. Physick. "A boy was struck on the os frontis; he complained of pain in the part, but in every other respect was apparently very well. Dr. P. was sent for, and found him relating with minuteness, how he had been injured. Suddenly he fell down insensible; the attendants thought him dying, and objected to doing anything; but I insisted upon perforating the bone, and evacuating a large quantity of blood. The boy recovered!"—(*Physick's Lectures*.) Having carefully investigated this subject, and balanced the weight of authority for and against the measure, I am induced to

advise the operation whenever there exists *an external wound or bruise over a vascular region of the cranium*, and the *symptoms of compression are suddenly developed and urgent*, as in the boy operated on by Dr. Physick.

When the operation is performed and we are successful in reaching the deposit of blood, if this be lodged between the membranes and the bone, it is for the most part thrown out by the pulsations of the brain. Hence it is unnecessary to attempt its removal with scoops, &c. &c. And as all such efforts produce more or less irritation they are carefully to be avoided. Where, however, the blood is coagulated and cannot escape in consequence of this circumstance, we may break down the mass with a probe used with the utmost caution. When the blood lodges between the dura mater and the brain, the membrane projects into the opening made by the trephine and forms a purplish tumour. In such a case there is obviously but one course to pursue, and that is to puncture the membrane and thus give egress to the blood. I am aware that some surgeons oppose this operation, but surely as we cannot relieve the compression without removing its cause, and as the blood cannot escape so long as the dura mater retains its integrity, a division of this membrane becomes absolutely essential. No surgeon, who values either his feelings or his reputation, would resort to *punctures and probings of the brain itself*, in cases where no blood is discovered at the trephine opening. That some have had recourse to such measures is but too true, yet I hardly think that any one will be induced by the results to pursue a similar course of practice.—T. D. M.]

But you will be called to trephine the cranium in consequence of fracture, whether simple or compound, with depression of a portion of the bone. I think it is laid down as a rule by the late Sir Astley Cooper and some other modern surgeons, that in cases of compound fracture you should apply the trephine, but that in cases of simple fracture, unless there are very severe symptoms, it should not be had recourse to. There is no doubt that in a great many cases of compound fracture the trephine does require to be applied, not in consequence of the integuments being wounded, but from the kind of injury that accompanies such wound. If the head be struck by a sharp-pointed body, and the integument has been divided, in all probability the internal table will be splintered and driven on the dura mater. Again, if the head is struck by a blunt body, the integuments may not be divided, the fracture will probably be extensive, and the depression will cover a considerable portion of the dura mater, and the pressure on the brain will be more uniform. The patient may get over the symptoms arising from the depressed portion of bone, the brain getting gradually accustomed to the pressure. In cases of compound fracture I think we are very

frequently called upon to apply the trephine and remove the splinters of the internal table, although the patient has recovered from the loss of the functions of the brain immediately consequent on the injury. A maid servant has, for instance, a smoothing iron fall on her head from some height, and a corner of it strikes on the cranium. There is a wound of the scalp and you find, on inserting your finger, a small wound of the cranium also. She is knocked down; she is stunned, but recovers from it. There she is, in all probability, with a fracture of the inner table to a great extent. Or a man is knocked down and falls on the corner of a sharp stone; the same injury is inflicted; he is carried to a chemist's shop possibly, and recovers after a time from it. You see him the next day labouring under fever, but not comatose. I have cases in my eye which occurred under circumstances of that kind; and you are called to apply a trephine, although the patient is perfectly sensible. There is a case related in one of my surgical treatises, I think "The Practical Surgery," of a man who came to my own house one evening, having walked there after his day's work. He had been employed in a quarry, working to a very great depth. There was a large mound of earth and rubbish thrown up in the neighbourhood, and a piece of stone came rolling over the mound, and falling from a considerable height struck him on the head. He was knocked down and lay quite insensible; there was some bleeding from the head, but after a little time he recovered from the stunning effect of the blow, and went on with his work. On coming to me I examined him, and found a small wound, into which I could insert the point of my little finger, and a corresponding depression of the cranium. I ascertained that there were a number of loose pieces of bone lying on the surface of the dura mater. I represented to him the danger which he incurred from their presence, and urged him to have them taken away; and in order to effect this, I told him that it was necessary to remove a bit of the bone. He was a sensible man and determined to have it done, but he was sure, he said, that if he went to his own house, his friends and relations, ignorant, bigoted people, would interfere to prevent it. He begged that it might be done there and then. He sat down accordingly, with the utmost courage and determination, to submit to the operation. I trephined him, took the splinters away, sent him home in a carriage, and there was not afterwards a single bad symptom. I have no doubt that if some of these splinters had been left, there would have ensued a most dangerous class of symptoms indicating inflammation of the brain and its membranes. I have related some other cases very similar in the same work. In these cases of mere fracture of the cranium, with more or less splintering of the vitreous table, it is advisable either to embrace the opening in the circle of the bone to be removed, or generally it will be unavoidable to apply

the trephine, so as to take in one edge of the opening, as you see represented here.

Fig. 30.



Here is a piece of stone that was extracted from a punctured wound of the cranium. A man was knocked down at night by some cowardly blackguards, and being found insensible by the police, was carried home. The next day he had this piece of stone extracted from the cranium by a practitioner to whom he applied, and then, being a hackney-coachman, he drove a party of people to church, who had engaged him; after this he went home, and partook, I believe, of a considerable quantity of whisky; I saw him on the following day, Monday, and he was then suffering under fever and other violent symptoms. A considerable quantity of blood was extracted, a trephine applied, and these splinters of bone [presenting them] taken from the internal table. I think he ultimately died. Here is the bone taken from the man injured in the quarry, and also the bone taken from the child struck by a spinning-top. You can have no doubt, I think, from what I have said to you, that it is absolutely necessary to apply a trephine in cases of this description.

The application of a trephine is also required in cases of more extensive fracture with depression, and where the depression is so deep as to interfere permanently with the functions of the cerebrum. You operate, then, with a view to the elevation of the bone to its own proper level, and to remove any splinters that are lying upon the membranes of the brain. You may, in such cases, apply the straight saw in order to make room for the elevator, and save the necessity of removing one or more circular portions of bone.

The circumstances, then, in which a trephine is now-a-days employed are these:—1, to allow matter collected under the cranium to escape, and blood, if you will, compressing the brain; 2, to remove splinters of bone in cases of compound fracture; 3, in order to relieve the symptoms of oppressed brain when a portion of bone is lying much beneath its proper level and causing deep coma and other serious symptoms of compression; 4, to remove foreign bodies. But of all this we shall treat more fully at our next meeting.

LECTURE III.

INDICATIONS FOR THE USE OF THE TREPHINE. STYS, OR CYSTS OF THE EYELIDS. EVERSION AND INVERSION OF THE LIDS. PTERYGIUM. TUMOURS OF THE CONJUNCTIVA. OPERATION FOR SQUINTING. STAPHYLOMA. TUMOURS OF THE ORBIT, &c., &c., &c.

I HAVE had the skull of the subject before us fractured, and, in order not to detain you by applying the trephine, a circle of bone, embracing the perforation, has been removed. There is, as you perceive, a large splinter broken off from the inner part of the cranium, towards the sagittal suture. Sometimes there are a great many such very sharp pieces of the inner table broken away, driven down upon the dura mater, and even sticking in its substance. These must, of course, be picked out. When the dura mater is wounded ever so slightly, as by a splinter of bone, or sharp weapon of any kind, the danger is much increased, and more so still if the substance of the brain is injured. There is then great risk of hernia of the brain—*fungus cerebri*, as it is called. A patient labouring under this affection is in very great jeopardy. Instances have, it is true, occurred in which the protruded part has sloughed away, the breach of surface in the brain has granulated, has healed up, and the patients have recovered; but in the majority of cases the prognosis must be very unfavourable, for the chance of recovery is very slight.

My late excellent house-surgeon, Mr. Potter, has noted, in his case book, the circumstances attendant upon an injury of the head treated by my colleague, Mr. S. Cooper, some time ago, very interesting and very instructive. I have already remarked that matter may be evacuated, by the use of the trephine, from betwixt the bone and dura mater. The surgeon is hardly warranted in opening this membrane to look for purulent deposit, far less in plunging an instrument into the substance of the brain, as has been done, it

is said. In case of perforation of the bone and dura mater, however, with discharge of matter through the punctures, these openings may be enlarged with safety and propriety.

F. R., ætat. twelve years, admitted into University College Hospital, under the care of Mr. Cooper, March 14th, 1839.

History.—About three weeks ago a door fell upon him, and a nail, projecting from it, penetrated his skull near the right parietal eminence. He felt giddy at the time, but was not completely stunned. Swelling of the scalp took place, with a little pain and tenderness, for which a surgeon applied a leech and administered purgatives. For ten days the boy played about and ate as usual, apparently suffering very little inconvenience from the wound, which, however, remained open, discharging pus. On the eleventh day he complained of pain in the head, general indisposition, loss of appetite, and occasional sickness; and on the sixteenth day he became delirious. A surgeon again visited him, and purged him freely. On the eighteenth day he recovered his consciousness, and since that time he has complained less of headache and has been less frequently sick.

Present state.—A small, but deep wound, large enough to admit an ordinary quill, exists near the right parietal eminence. The integuments around are swollen, red and puffy. The discharge is extremely fetid. A probe passes readily into the cavity of the skull, the rough edges of the punctured bone being felt on every side. The patient complains of pain, not very severe, on the right side of the head and across the forehead. He answers questions perfectly rationally; but, when left alone, appears drowsy and inattentive to what is going on near him. Frequent vomiting, of bilious matter principally, as he takes little food. Pupils slightly dilated; pulse 100; tongue furred and white; skin hot and dry.

Treatment.—The day of his admission Mr. Cooper saw him, and immediately proceeded to trephine a portion of the parietal bone, immediately around the puncture. The dura mater beneath was found thickened and inflamed, and presented a small aperture, through which the fetid pus flowed copiously. About eight ounces of blood were allowed to flow. No arteries were tied, but lint dipped in cold water was applied over the wound until oozing ceased. He was ordered to take chloride of mercury, three grains, twice a day, and a draught, every four hours, containing sulphate of magnesia, half a drachm; tartarized antimony, a quarter of a grain; water, three ounces. The same evening, the bowels not having acted, an injection, containing an ounce of castor oil, was administered, which produced three copious evacuations.

The next day (March 15th) the symptoms were all decidedly relieved. Pulse 94, soft; skin moist; pupils natural; pain in the head less. To keep up the action on the bowels the sulphate of magnesia was increased to one drachm in each draught. The sickness continued at intervals during the day.

March 18. He passed a very quiet day yesterday, but to-day, the bowels not having been opened for twenty-four hours, he experienced a little aggravation of the pain in the head, and vomited several times. The wound is filling up with healthy granulations; discharge copious, and not so offensive. Chloride of mercury, five grains, immediately, and half an ounce of castor oil in the morning.

21. Again a little recurrence of vomiting, arrested, however, as on the 18th, by a brisk purgative.

With a little fluctuation for the next few days, depending, apparently, on a torpid state of the bowels, the patient gradually improved, and in the beginning of April left the hospital well in health, and with the wound rapidly filling up.

I spoke of fracture of the cranium with extensive depression. A part of the bone has been driven under its proper level, so as to compress and interfere with the functions of the brain, and the patient then remains, *from the first*, in a state of deep stupor. This may go off, but if it continues for a great many hours, if the coma is of a very serious nature, deep and continued, and not likely to pass away, then you ought to interfere and raise the depressed portions of the cranium. In doing that you may be under the necessity of applying the trephine once and again. There is no occasion to make perforations all along the fissure, as of old, but you make an opening only to allow of the insertion of the elevator to raise the bone to its proper level. You can sometimes dispense with making a circular perforation of the cranium by using what has been called *Hey's saw*. This instrument was well known to the ancients. It is figured in the works of Paré, who wrote some hundreds of years ago. He represents different forms of "saws fit to divide the skull," and I have in my possession some very old ones. What is known as Hey's saw was re-introduced in practice by the

Fig. 31.



first Mr. Hey, of Leeds, and is found very useful in some cases. By means of this instrument the fissure can be so widened as to get the point of the elevator insinuated. This is the elevator, and the most simple form of it, for there are elevators of all kinds. Some have

Fig. 32.

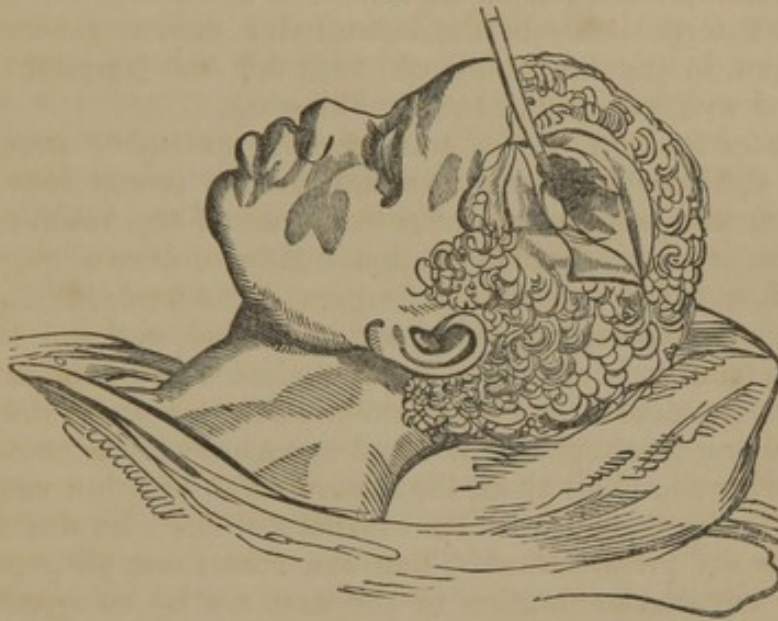


tripods as fulcra, which rest upon the solid cranium, but there is no necessity for that. You fix the simple elevator firm upon a part of the skull, get it beneath the depressed portion, and making a

fulcrum of the fixed part of the cranium, you have in general no difficulty in raising up the bone to its proper level. You can, so as to allow of its introduction, take away any part of the bone you choose, either an angle or any little projecting part of the fractured edge.

[Professor Liston then demonstrated the mode of performing the operation of applying the elevator.]

Fig. 33.



But it is not necessary to trephine in all cases of pressure of the cranium. A great portion may be driven down, and yet, after a time, the patient recovers his senses, and has no return of the coma. All you have to do is to watch the symptoms, to avert inflammatory action by proper antiphlogistic measures, to dress the wound lightly, and leave the rest to nature. You will see patients constantly labouring under depression of the cranium who have no bad symptoms whatever. They recover from the effects of the concussion; the appearances of compression, if any, of the brain pass off; the brain gets accustomed to the pressure; and nothing occurs to alarm the surgeon. I have here a cranium which was taken from a man who had received a fracture five or six weeks previously to his death. It was what has been called a camrated fracture (like an inverted tile). He fell from a great height. It was found that he had suffered a compound fracture of one leg. An extensive abscess formed near the sacrum, which had been broken longitudinally and much shattered, and of this injury he died; but he never had a bad symptom from the injury of his head. He was stunned and confused when he was brought to the hospital, but he gradually recovered, and although there was depression, as you perceive, to a great extent, it had caused no mischief. We had a young woman in

the hospital, not long since, on whose head a chimney-pot had fallen. There was a large wound on the scalp, and depression to a considerable extent, but she soon recovered from the confusion of the brain. She squinted dreadfully, but she had sense enough to say that this had existed previously, and she recovered without any unfavourable symptoms. The treatment consisted in her being kept quiet, and on low diet, for some short time.

Independently of those cases which I have spoken of as requiring the operation of trepan, there are some others which call for it. In Mr. John Bell's works there is an interesting case related of a young man who met with a contusion of the cranium from a cart-wheel grazing the head, sliding over his skull as upon a stone. The integuments were so lacerated, so ingrained with mud, and the bone so rubbed, that no adhesion could be expected. The bone became dry and black; the skin fell away from it; the patient had shiverings, and great constitutional disturbance. The trepanning could no longer be safely deferred. The bone cut quite dry, and was of extraordinary thickness; it cut like a button-mould. At last a gush of matter took place by the sides of the instrument; the outer table only had been perforated. The operation was gone on with, the precise circumstances not being immediately apparent. The cutting of the inner table was attended by profuse bleeding. The circle was at last taken out, but it adhered firmly to the membrane beneath. The inner table, you thus see, very often retains its vitality, whilst the outer one perishes. The dead portion is usually thrown off, but as here, though rarely, indeed, abscess may form in the cancellated tissue.

You sometimes meet with cases where foreign bodies are impacted in the cranium—a piece of stone or a piece of metal of some kind or other. Occasionally a musket ball has been found fixed in the bones.

A very interesting case is recorded of a master of a French vessel, who had defended his charge very gallantly, and in the engagement got shot in the forehead, right between the superciliary ridges. Thirty days afterwards he was put under the care of a good old surgeon, Mr. Alexander Wood. The wound had nearly closed, but by the probe the presence of a foreign body could be made out. The wound was enlarged, and the crown of a large trephine applied over the small ragged opening in the bone so as to embrace also the pistol-bullet. There was no way of disentangling it otherwise. The internal table, the posterior wall of the frontal sinus was seen shattered, and the splinters lying in the dura mater. These were picked out, and the patient had an uninterrupted and rapid recovery.

Mr. John Bell, who was an admirable surgeon, and a powerful writer, deprecates, in strong language throughout, the heedless and reckless application of the trephine, and in support of his opinions

quotes Ravaton, an old French surgeon:—"I have seen surgeons (says he) so infatuated, so desperately bent on discovering abscess on the dura mater, that, after applying six crowns of the trepan, they would, I verily believe, have pulled away all the remaining bones of the cranium had not their patients been delivered by death from such operations. In short, their doctrines and practice outraged common sense; everything was to be done by the surgeon, nothing left to nature; every depression was to be elevated; the whole matter to be evacuated; the whole extent of the extravasation to be covered by trepan holes, and the limbs and whole extent of a radiated fracture were to be cut away. There were no limits assigned for these openings, but the extent of the extravasation or fracture, and they were well contented to find that forty crowns of the trepan might, upon necessity, be applied to the human skull."

The late Mr. Abernethy likewise did a great deal to put trepanning out of fashion, and now surgeons consider the circumstances well and fully before they set to work to remove any portion of the cranium. Recourse used to be had to the operation of trepan in order, as I have told you, to prevent mischief, but it must be plain to all of you, that opening the skull, and tearing a portion of it away from its attachments to the dura mater, must lead to serious results, tend to light up inflammation, and thus seriously endanger the patient's life. It is quite right to trepan when matter is forming, and before the patient has suffered from its accumulation; but it is altogether wrong when there is no accurate indication of its formation, or no sign to lead you to the seat of the collection. You would be to blame if you did not remove foreign bodies within reach, or loose and detached splinters of bone; and in deep coma from depressed bone, you must take means to relieve the important organ whose functions are thus interfered with,—no farther.

[In enumerating the indications for the use of the trephine, Mr. Liston has neglected to mention *epilepsy*. In former times the operation was a favourite remedy in the disease just named, and truly, judging from the reports of cases, it must have been productive of the most disastrous results. Nor was it confined to epilepsy alone, for we learn that it was often employed in chronic *cephalgia* and *hypochondriasis*. No surgeon of the present day is hardy enough to recommend a similar practice, but that the operation is often of immense advantage in cases of epilepsy resulting from fractures of the skull, or diseased bone, is acknowledged by all. Many examples of *entire* relief are on record, and we consider every surgeon authorized to perform it whenever the disease can be traced to some affection or injury of the cranium, the evidences of which are still distinguishable. The operation has repeatedly been performed in cases of old depressed fracture, and it appears that the prognosis is more favourable here than in any other form of epilepsy. La Motte, Marchetti, Sala, Cline, Sir A. Cooper, Dudley,

Hayward, Rogers, and many others, report examples of cure, and the following interesting case, drawn up by my intelligent young friend, Dr. Squibb, one of the secretaries of our clinic, adds another to the list.

Epilepsy from Compression of the Brain cured by Trephining.—David Black, ætat. 27, three years since received a blow from a stick of wood thrown down a cellar, which caused a depressed fracture of the upper anterior part of the right parietal bone. No symptoms of compression being manifest, the injury was treated as a contusion, and the patient recovered without immediate difficulty, the depression still existing. Some three months after the patient suffered from a slight epileptic fit, which, in the course of another month, was followed by a more severe one of the same character. Subsequently to this period these epileptic attacks constantly augmented in severity and frequency, so that, at the expiration of two years from the occurrence of the accident, a week very rarely passed without a fit of such severity as to require the most prompt and copious bleedings, &c., in order to prevent a fatal termination. On the 6th of November, 1844, the patient presented himself at Prof. Mütter's clinic, at the Jefferson Medical College, for the operation of trephining, which was performed by the Professor in the presence of his class. The operation was done with facility and speed, although the case presented great difficulty on account of the depth of the depression in the bone. Upon the removal of the portion of bone a prominent point was found upon its inner surface, which, with a membranous layer of semi-organized lymph, had compressed and indented the brain. The patient expressed himself as *immediately* relieved from a sense of weight and tension in his head. A shred of lint was placed so as to project from under the flap, and the cold water dressing, with the ordinary antiphlogistic treatment, ordered. The patient speedily recovered, having had no recurrence of fits of any kind, and feeling better than he has done for two or three years.

N. B.—Sept. 5, 1845. There has been no recurrence, or any sign of a recurrence of fits up to this time, the patient being now a healthy man, supporting his family in good circumstances, which he was entirely incapable of doing before the operation.

We find in most of the systematic works on surgery great stress laid upon the *points of the cranium* to which the trephine should or should not be applied, but it is obvious that no positive rules can govern us in the matter, for we may be forced to violate them in case after case; the point of operation must always depend upon the location of the injury, and the object we have in view: yet it is proper constantly to bear in mind that certain regions present difficulties and dangers from which others are exempt, and hence, unless forced to perform these operations upon them, we should carefully avoid so doing. And again, when it becomes necessary,

from the peculiarity of the case, to employ these regions, preparation should be made to ward off the dangers to which the patient is inevitably exposed.

When, for example, we are obliged to trephine through the *frontal sinus*, recollecting the hazard we run of wounding the *dura mater*, we should resort to the ingenious method of Sir C. Bell, who first opens the *anterior wall* with a *large trephine*, and then introducing a *smaller one*, and *depressing the handle* so as to act smoothly upon the inner table, completes the operation without wounding the membrane. Except in children, or unusual conformations, where the tables are in contact, this process essentially wards off the danger. Again, where a fracture occurs at or near the *anterior and inferior angle* of the *parietal bone*, and it becomes necessary to trephine, we must recollect that the *middle artery* of the *dura mater* runs in a groove or canal just along this region; should it be divided it may be tied, as was done by Dorsey, others and myself, or it may be plugged with a piece of wood or wax, as advised by Physick; or it may be cauterized, as recommended by Larry; or it may be compressed with lint, as was done by myself in the case reported by Dr. Squibb.

Also, if obliged to trephine over the *sagittal suture*, or over the *junction of the sinuses*, at the occipital region, we must recollect the danger of wounding the longitudinal sinus, or some of these vessels, in which event our only remedy is *compression*, and fortunately this is, for the most part, sufficient.

Lastly, if obliged to operate in the *temporal fossa*, we must anticipate bleeding from the numerous arteries which are assembled in this region, and also an extensive dissection through the belly of the temporal muscle.—T. D. M.]

OPERATIONS ON THE EYE.

I shall now say something about operations on the appendages of the eye. I believe that diseases of the eye have already been fully discussed in the previous divisions of this course of lectures; but there are some diseases of the parts around, and some operations required on the parts connected with the organ, which are deserving of notice and attention.

AFFECTIONS OF THE LID.

In the first place, then, you will have now and then forming, in the upper lid especially, small tumours. I do not mean to tell you

about a sty—a trifling, though painful enough, little abscess of the edge of the eyelid, but a chronic swelling. There is a projection of part of the upper lid and a trifling discoloration; sometimes there is more than one, and these, in young females more particularly, must be looked to in consequence of their causing a great deal of deformity. In examining a case of that kind you evert the lid, take hold of the eyelash, and, as common people would say, turn the eye inside out. You thus expose the inner or conjunctival surface of the upper lid. These tumours now and then, though rarely, occur in the lower lid, but more frequently in the upper, and sometimes they seem to form in the very substance of the cartilage of the tarsus. The tumour consists of a thin cyst, containing a glairy fluid. Sometimes it becomes inflamed, and there is a little puriform matter in the cavity. It is desirable to get quit of these swellings. You would not make an incision on the outside, for it would create some deformity, although a clean division made of the fibres of the orbicularis palpebrarum muscle, in a right direction, would not probably be noticed after a time. But it is better to operate from within, and you thus expose the tumour, the parietes of which are generally exceedingly thin. You have only, then, to open the cyst. You make a crucial incision with the point of a lancet, or a fine bistoury, or a small keen cutting knife of any kind. You must not on any account attempt to dissect out the cyst; for if you do, the probability is you will make an opening like a button-hole right through the lid. There is no means of taking away the cyst, it is so exceedingly delicate and so incorporated with the substance of the lid. You must endeavour, however, to get rid of the disease. There is, by the way, one great difficulty in everting the lid in the living body. You may fail in the first instance, and be under the necessity of using a probe. You lay on the probe behind the cartilage, cant the cartilage over, and turn the lid inside out. But with a little practice and a little dexterity you will be able to turn the lid out without any such contrivance or assistance, by merely taking hold of its edge, and using a slight motion with the point of the forefinger. You will be under the necessity of turning the eyelid over thus, in many cases, in order, for instance, to discover and remove foreign bodies irritating the surface of the eye, and to destroy granulations of the conjunctiva, which act somewhat as foreign bodies do. Having everted the lid, then, with the point of a bistoury, you make a very small incision into the cyst, and then perhaps you make a little cross cut. This is very easily done. You stand behind the patient, and support his head upon your breast, and then with a small sharp-pointed probe, slightly bent at the point, you endeavour to tear up the cyst. You allow the bleeding to stop, turn out the glairy contents, lacerate the cyst a little, and let the eyelid resume its customary place. It discharges for a few days, but it then gets well, and usually there is

no return of the disease. Now and then, however, the disease will return, and if you have a patient in whom the operation has been ineffectually performed previously, or in whom the disease has reappeared in spite of its due performance, though it very seldom does, you may be under the necessity of taking still more certain and effectual measures. You open the cyst, allow the contents to escape entirely, and stay till the bleeding has ceased; it will do so all the sooner that the lid is permitted to resume its normal position. You may then dip the end of a small probe slightly in nitric acid, and put it with much care into the cyst, or with a probe such as this (presenting it) you may introduce a minute portion of caustic potass into the cyst, and it is strange, indeed, if it is not then effectually destroyed. The surface of the eyeball must be protected against the potass, but there is no chance of its being injured if you use a portion only about the size of a pin's-head, and keep the eyelid away from it, or you may rub the surface of the conjunctival membrane over with olive oil, or you may apply a small bit of lint over the opening, previously soaked with dilute vinegar, or you may leave a thin bit of lint, spread with some bland ointment, between the lid and the ball of the eye for a short time. This, however, is scarcely necessary. By this means you effectually and safely remove these encysted tumours; they are very troublesome, and it is well that you should know how to treat them properly.

BLEEDING FROM THE CONJUNCTIVA.

It is sometimes necessary to take blood from the surface of the conjunctiva, the lining membrane of the lids. This may be done by the application of leeches internal to the lid, where there is much congestion; or you may perform the old operation of scarifying the conjunctiva. The latter mode is almost out of fashion, but sometimes it is useful; you can thus unload the lids when they are granulated, and their vessels full of blood before applying stimulants. This operation is practised by turning out the upper and lower lids with the fingers, and drawing along the exposed margin the old-fashioned chisel-pointed scarificator; but there is no necessity for your providing yourselves with an instrument for this express purpose; a common lancet, with rather a broad shoulder, will answer the end perfectly. It must be drawn once or twice along, in order to divide the vessels above and below. If you wish the blood to flow, which of course is the object of the operation, you will keep the lids open for a considerable time, and mop up the blood with a small bit of soft sponge or lint. You thus remove a great deal more blood than half a dozen leeches would do. The blood will run for a considerable time, and I have seen it continue till the patient has even become a little faint from its loss. If you pursue the opposite

plan, and after the scarificator has been removed shut the lids, and set the patient to work fomenting, the bleeding stops at once, the blood coagulates, and no good is done.

DEFORMITIES OF THE LIDS.

Then, again, we have to deal with faults in the lids, *inversion* and *eversion*, and the *irregular growth of the cilia*.

Eversion, in the majority of cases, is not easily remedied. Sometimes the affection arises from a congested state of the lining membrane of the lids. This not unfrequently occurs in old people. There is redness round the eyes, and loss of the cilia. This may be remedied by taking away a part of the conjunctiva, raising it up and clipping it off. But in the majority of cases eversion, ectropeon as it is called by the very learned, arises from the cicatrizing of sores in consequence of burns or other injuries, attended by loss of substance. Occasionally you find the under lid pulled down and fixed by strong bands of cicatrices, whilst, again, the upper lid is drawn up and affixed to the bone, often in consequence of abscess, with exfoliation of parts of the superciliary ridge. There is no remedying such deformities. You may cut away the cicatrices, try to detach the parts from the bone, but there is no purpose answered by it. It is inconvenient to the patient, the eye is constantly in a state of inflammation, frequently the conjunctiva is thickened, even the covering of the cornea, and the patient loses his sight.

[Where it is impossible to relieve the eversion of the lids by the ordinary processes, we often find decided benefit from the performance of *plastic operations*, by means of which the lid may be either partially or entirely restored. I have repeatedly had recourse to this measure, and have as yet to find cause for regret. In the older works which treat of plastic surgery, the operation of blepharoplasty (from *βλέφαρον*, the eyelid, and *πλαστική*), is not mentioned, and even Celsus lays it down as an axiom that a lid once lost cannot be restored. "*Si palpebra tota deest nulla id curatio restitue potest.*" It was first performed in 1816 by Græfe. The complex organization and delicacy of the tissue to be restored, render this an operation of great interest and difficulty, and it is impossible, as Zeis well observes, to produce an artificial lid from the common integuments which shall possess mucous membrane, muscle, glands, ciliæ, cellular tissue, &c. &c., but we can imitate nature very closely, in the *form* of the protection, which it is our object to supply to the tender organ that has been deprived of its natural covering.

Various plans have been adopted to carry into effect the object of the surgeon, but it must be obvious that no one method is appropriate to every case, nor will it be proper to attempt the execution of any plastic operation, unless there exists in the vicinity of the

eye, an abundant supply of healthy integument and subcutaneous cellular tissue. In cases of simple eversion of the lid from any cause not malignant, Dzondi proposed "to divide the cicatrix and allow it to heal by granulation, so that the broader scar might remedy the defect!" A very strong objection to this operation at once presents itself in the fact that the incision, in healing, will contract, and may in consequence of this, increase the deformity. Nor is the operation of Sir William Adams, the one chiefly in vogue, applicable to any other cases than those in which there exists simple eversion of the lid, without much alteration in its structure, and wherever the entire organ is to be restored nothing short of plastic surgery will prove of the least utility.

The operation of Dieffenbach for ectropium of the lower lid is much more to be relied on. He removes the cicatrix by an incision of a triangular shape, the basis of which is towards the ciliary margin, and the apex downwards; he next divides the integuments laterally, the incision being curvilinear, then cuts out the diseased tissue, and finally raises the lateral portions forming the sides of the triangle; the cut margins are then brought together, and united by suture. (Figs. 34 and 35.)

Fig. 34.

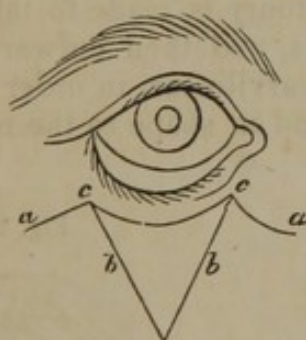
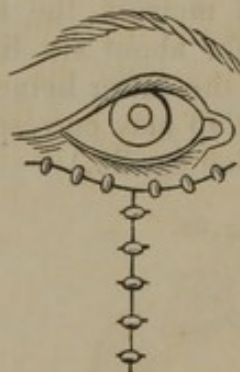


Fig. 35.



The operation of Fricke and Græfe, of Hamburg, for making a lid or patching it, has many advocates, among whom are Jünghen, Blanden, Gerdy, Jobert, Berard, Carron, Liston, M'Clellan, Warren, Mott, J. Kearney Rodgers, and Post, of New York; and is undoubtedly an operation to be relied upon in many cases, although my own experience with it leads me to prefer another plan. The operation consists in cutting away the diseased mass, or dividing the lid, so that its ciliary margin may be separated from the lower portion, and thus leave a space between them. Into this space, or upon the raw surface, where the whole lid is removed, a flap of integument of the proper shape and size, taken from the temple, is then placed, and attached by sutures to the edges of the wound.

The objection to this method is, the necessity always existing for *torsion* of the *pedicle* of the flap, by which the probability of union

is much diminished, and the danger of sloughing from a want of blood increased.

Another method of operating has been proposed by Dieffenbach, which deserves our highest confidence, and must undoubtedly become the favourite operation of every one where the case admits of its being carried into execution. It has already been repeated by Professor Von Ammon, of Dresden, Zeis, Von Ekstrom, Fricke, Peters, Lawrence, Tyrrell, and others, and is the one performed by myself in a number of cases.

The object being to remove the whole of the diseased tissue and substitute for it a flap of healthy skin, the operation is commenced by making an incision, starting from the inner canthus, and continued downwards and outwards, until it ceases about an inch and a half below the inferior orbital ridge; another incision is then carried from the external canthus downwards and forwards, to meet the first; the whole of the diseased mass is thus included between the two, and then immediately dissected out, leaving a space of the shape of the letter V.

The oozing of the blood having in a great measure ceased, and the parts being carefully examined, in order to prevent the least particle of the diseased tissue being left behind, the second step of the operation is commenced. Starting from the superior extremity of the external incision, the bistoury is made to take a course, at first upwards for about six lines, and then outwards for an inch and a quarter, the latter being curvilinear, in order that the upper margin of the flap may correspond in shape to the natural curve of the eyelid. (See fig. 36.)

Fig. 36.



Fig. 37.



From the terminal extremity of this incision another is carried downwards and forwards, until it reaches a point opposite the union of the two first. The flap included in these incisions is then dissected up, brought over the raw surface from which the diseased

tissue has been removed, and attached to the sound skin by twisted or interrupted sutures. The surface from which it has been removed is next closed, by drawing the edges of the wound together by the twisted suture and straps. A compress is then applied over the flap and secured with a roller, *firmly* applied, so as to prevent by pressure the oozing of blood, which, in all operations of this kind, is one of the chief obstacles to union by the first intention. The patient is then ordered to be kept quiet, the compress to be saturated with cold water; the head to be maintained in an elevated position, and the diet to be absolute.

The advantages of this method, which belongs to plastic operations by "*inclination of the flap*," are, the facility with which it is executed, the little risk of sloughing from the pedicle of the flap being scarcely, if at all, subjected to torsion, and the trifling scar which it leaves.

Professor Jaeger, of Berlin, has proposed a plan of operating that may do very well in some cases, which belongs to the class of plastic operations by *sliding the flap*, (*glissement du lambeau*), and is peculiarly adapted to cases of lagophthalmos and ectropium. It consists in first cutting through the everted or shortened lid in its whole thickness by a transverse incision, including its whole breadth; he then cuts out a perpendicular piece, so as to bring the lid to its proper width; he next loosens the integuments of the cheek, if he is operating upon the lower lid, or of the forehead if the upper is the seat of disease, with a double-edged knife carried between the orbicularis muscle and the bone, so that they can be drawn upwards or downwards to a sufficient extent. The wounds are then united by sutures. A method somewhat similar to this has been proposed by T. W. Jones, of England. He includes the cicatrix or contracted portion in two incisions, which unite at an acute angle, so as to form a V, and must extend into sound tissue. He then draws upon the flap, so as to stretch out the cellular tissue beneath it, and when this does not yield readily, he dissects up a portion of the flap; and, by thus sliding the skin, he expects to gain the object in view. This operation might possibly answer in some cases, but I do not recommend it, as we have other means more worthy of confidence, and it could rarely, if ever, be performed where it is necessary to form the entire lid.

Professor Horner has recently performed an operation for ectropium, which differs a little from the operations mentioned, but belongs to the class of *operations by "displacement of the flap."*

Professor Pancoast has recently reported two cases of blephero-plastic operation, in which he combined the methods of Dieffenbach, Sir William Adams, and Jones, and in both cases his success was complete.—T. D. M.]

ENTROPIUM.

From the inversion of the lid sad discomfort is produced. The eye is kept in a constant state of irritation; it is inflamed from time to time; chronic inflammation is kept up; and in consequence of this the cornea is rendered opaque, and the vision is much interfered with. The cornea is vascular, it is covered with vessels carrying such a quantity of blood that they are visible to the naked eye, and very few rays of light can pass through the membrane. It is desirable, to remedy this congested state of the covering of the eyes, to remove the cause. But you now and then meet with cases where constitutional means have been employed, and all sorts of local applications made without the least benefit. I have known patients put through courses of mercury, bled from the arm, cupped over and over again at the back of the neck, blistered behind the ears, and put to great torture, without any benefit being derived from it, and I have seen this occur in the practice of clinical physicians, in cases where even portions of the lid had been removed previously in order to remedy the annoyance.

In these cases you must be guided by circumstances as to the mode of operation. If the upper lid is turned inwards, and the hair is constantly tickling the surface of the cornea, and it arises apparently from some relaxation of the parts, you may make the lid turn outwards by taking up a little bit of the skin with the fingers, or with flat forceps made for the purpose, and with a pair of bent scissors you clip out a considerable portion of skin, and, putting the edges together, you turn the edge of the lid outwards. It has been proposed to effect this object by the application of an escharotic, by applying the sulphuric acid to the skin. But you cannot be sure how far this may penetrate or extend, and it is, on the whole, a much more painful proceeding than taking away a sufficiency of the skin by means of a knife or scissors. The latter is easily effected, and it is quite sufficient.

There is at present under treatment, in the hospital, a very aggravated case of inversion of both upper and under lids, in the person of a respectable old lady, about fifty years of age. Her health has been excellent till eighteen months or two years ago, when the disease for which she entered University College Hospital commenced. About this time she ceased to menstruate, and was also suffering from mental depression, owing to some family matters. She had occasionally fits, in which she felt faint, lost her consciousness, but did not lose the power of moving her limbs or face on recovering. One evening, eighteen months back, she had a sensation as if sand or some foreign matter had got between the lids and eyeball of the left eye, (before this her eyes had never ailed anything,) and in the morning the eyelids were glued together so that she could not open them till she had washed them well with

warm water. A day or two after this she had another fit, and after this she found herself unable to keep the eyelid open; she could raise it, but could not keep it elevated, on account of the pain that it occasioned. Her sight was not affected. To cure this she used Goulard's lotion, leeches and blister, but without relief. From that time she says that the sensation of sand in the eye has always been present on moving the lids, there has been a discharge glueing the lids together in the morning; occasionally she has had pain in the head, but the transparency of the cornea or her sight has not been very much impaired. It has been, however, very inconvenient to her, for she has been obliged to keep the eye continually shut to avoid pain. She has seen several medical men, who told her that all women of her age must expect some ailment, and that hers could not be removed—small consolation. A few weeks ago, however, she was told that an operation might be performed to cure her, but unwilling to submit without further advice, she came to this hospital.

Present state.—The skin of the eyelids is loose; the fissures are rather small. The direction of the tarsal cartilages of the upper and lower lid of the left eye is so much changed that, instead of projecting from the eye, the eyelashes, when the lids are approximated as nearly as possible, which is not within a line and a half or two lines, rest on the cornea and the sclerotic conjunctiva. The eyelashes are diminished in number, there is some lachrymation, but the cornea is tolerably transparent, the vessels of the eye not much injected. Her health is very good.

April 3.—An elliptical fold of skin was removed from both upper and lower lids, sufficient to bring the eyelashes into their proper direction, and the edges of the incision brought together by means of interrupted suture.

8.—The sutures were removed, the wound had partly healed; it was closed with isinglass plaster. Has lost all uncomfortable feelings about the eye since the operation was performed.

10.—Wounds healing slowly. Water-dressing to the wounds.

18.—Wounds looking well; will probably be well in a day or two.

20.—The lids are much inflamed; instead of healing the wounds have ulcerated, and put on an unhealthy appearance; the vessels of the eye also are rather injected. Liquor of lead, diluted, half a drachm; distilled water, eight ounces. Make a collyrium.

23.—The inflammatory redness of the lids is gone; the ulcers are painful. Water-dressing to ulcers.

27.—Ulcer on lower lid much better; the upper one has thrown out large flabby granulations. Apply nitrate of silver to it.

28.—The ulcers are better; the eyelashes retain their proper direction, the tenderness and lachrymation have ceased, and her sight, she thinks, is much improved.

TRICHIASIS AND DISTICHIASIS.

You sometimes find that the hairs grow irregularly, and instead of one row of cilia you have two; one grows in upon the eyes, and the hairs are more numerous than they ought to be.

Under these circumstances the turning out of the edge of the lid will not suffice; you will be under the necessity of cutting away its free edge along with the bulbs, and you must take care that it is done effectually. Some persons will try to get relieved by having the hairs plucked out from time to time, but generally the annoyance is so great that they are glad, in the end, to submit to a more certain though severe proceeding. If you wish to take away the edge of the lid, you will catch hold of it with a pair of forceps, such as are used for tying arteries, but without a spring. Here is a pair (presenting them), and I can assure you that they are uncommonly useful in many small operations. It is a capital instrument in making a dissection for taking out small tumours, and in many operations about the eyes. Having applied the forceps, with a pair of common scissors or a small knife, you find no difficulty in cutting away the margin of the lid. You remove only as much as is felt to be inconvenient—perhaps half the lid, or less. If the hairs grow regularly along the margin, you take away the entire of the second row. This is very effectual; no more hairs can grow from that surface.

PTERYGIUM.

You meet with what is called *pterygium*. A web grows from the angle of the eye, generally the inner, spreads over the cornea, and interferes very materially with the vision. Sometimes it grows from the under surface, and gradually encroaches upon the cornea, so that it causes a greater loss of sight than if it showed itself in any other part.

It is necessary sometimes to take away these webs, and for that purpose you must fix the eye securely, perhaps with a speculum, or by the fingers of an assistant below, and then you take hold of the adventitious vascular membrane as it lies on the cornea, with a delicate hook or a pair of forceps, dissect it carefully back as you would any delicate membrane in the dead body, and remove it from its attachments at the base.

[I have occasionally seen much trouble in cases of *pterygium* from a free dissection of the membrane. In consequence of the large surface exposed, cicatrization takes place with considerable *contraction*, and in one or two cases I have seen an incurable squint from this cause alone produced. My attention was first directed to this point by my excellent friend Dr. Thos. Harris, surgeon-in-chief

of the navy. To avoid this difficulty, I usually cut out a large piece from the centre of the membrane, and then cauterize the edges of the wound with nitrate of silver. Treat it as you will, however, this is often a most vexatious complaint, returning over and over again, and of course requiring repeated operations.—T. D. M.]

TUMOURS.

You meet with tumours in the corner of the eye growing from the conjunctiva, and sometimes involving the *caruncula lachrymalis*. Sometimes warty tumours grow from the conjunctiva covering the ball of the eye; these are seldom of a bad character, and they may be taken hold of and dissected off freely enough. In removing tumours of this kind you must take away the tissue from which they grow, or they will return. Those tumours which grow in the inner corner of the eye require to be dissected off carefully so as not to injure the *puncta lachrymalia* or the little canals going from them. These must be avoided if possible.

DEFORMED FISSURE.

A person is sometimes brought to a surgeon on account of congenital deformity, with the fissure of the lids badly placed. The fissure, perhaps, is out towards the temples, and in consequence of this he sees very indifferently; he cannot see right in front of him. This is not an uncommon occurrence. One of the pupils here, five or six years ago, laboured under this deformity, and it was remedied in the manner I shall describe. The fissure may be too small, and you may enlarge it; but in some cases something more is required. There may be too much skin in the middle line, and the fissures therefore are placed much too far on each side. This is very easily put to rights by pinching up a portion of the skin in the middle line over the glabella, and taking away the portion included by two elliptical incisions, the edges are then put together by a point of suture. The fissure of the lips is thus brought to its proper place, and you not only remedy the deformity but enable the patient to see better than he did before.

[PTOSIS.

The terms *ptosis*; *blepharo-ptosis*; *lapsus palpebræ superioris*; *atonia palpebrarum*, and *ophthalmoplegia*, have been applied to an affection of the upper lid, characterized by a loss of power in the muscles of the part, or preternatural elongation of the integument,

in consequence of which it remains prolapsed either partially or entirely, and covering the pupil more or less completely destroys the usefulness of the eye.

The causes of this complaint are numerous, and hence we find Juengken divides it into four groups, taking for the basis of his classification the character of the cause. We have, for example, 1st, *blepharo-ptosis senilis*, old age being the cause; 2d, *blepharo-ptosis traumatic*, proceeding from wounds of the part; 3d, *blepharo-ptosis symptomatica*, accompanied by diseases in other organs or in the vicinity; 4th, *blepharo-ptosis congenita*, occurring at birth.

This division, though somewhat arbitrary, is nevertheless useful, for we find that each variety requires for itself a peculiar treatment. In the *first*, little or nothing can be accomplished by either local or general remedies, and we are forced at once to the performance of either the operation of Helling or Quadri, or the removal of a fold of skin as in ectropium, or lastly the operation of Hunt, of Manchester. The operation of Quadri consists in the application of a little nitric or sulphuric acid by means of a pencil of wood, to the outer surface of the lid, which causes a slight ulcer, and this as it cicatrizes will shorten the lid and thus relieve the difficulty. It is better, however, to remove a fold of skin, which may be done by simply pinching up with a pair of small forceps, a portion of such breadth as may be sufficient, when cicatrization is completed, to restore the organ to its natural condition. After removing the skin the edges of the wound must be brought together by three stitches of the interrupted suture.

When this operation fails, the very ingenious plan of Mr. Hunt may be employed. The following is his description of the method of operating, and we see at once how in many cases it may produce the most decided benefit. "My object," observes Mr. Hunt, "is to attach the superciliary border of the occipito-frontalis muscle to the skin of the lid, so as to make it perform the office of the impaired levator. The eyebrow must be shaved, and immediately below it a curvilinear incision made, corresponding with the direction of the orbit, and of a length equal to that of the fissure between the lids. From the ends of this another is to be made, convex in the opposite direction, towards the free edge of the lid. The dimensions of the piece of skin thus included must depend upon its state of relaxation, and will sometimes require to be more than an inch in breadth. The circumscribed integument must then be extirpated with the knife. The edges of the divided skin are next to be drawn together by sutures. The eye will be opened by this forced elevation of the lid; and after cicatrization, the edge of the occipito-frontalis muscle will be found to have contracted an indirect adhesion to the lid, so as to endow the patient with a voluntary power of raising it, while the orbicularis oculi retains its office of lowering it as under ordinary circumstances!"

In the *second* form of ptosis, we are sometimes obliged to resort to some one of the operations just described, but usually the paralysis disappears under the use of leeching, blistering or the moxa; strychnia applied externally and administered by the mouth; moderate doses of mercury, and in chronic cases electricity or galvanism.

In the *third* variety, we must carefully trace out the lesion with which the nerves of the lid are sympathizing, and remove it as speedily as possible. But occasionally it happens that even after this the paralysis continues; we must then resort to some of the remedies enumerated as proper in the second form, being governed in the choice by the circumstances of the case; and should these fail, we have always the operation as a *dernier resource*.

In the *fourth* variety an operation is, I believe, invariably indicated, as no remedy can change the habit of body upon which the defect depends, and often, in these cases, it is a primitive malformation.

LAGOPHTHALMUS.

When from any cause the upper lid becomes permanently shortened, so that it cannot cover the ball properly, the term *lagophthalmus*, or *oculus leporinus*, is employed for the designation of the defect. Usually injuries of various kinds resulting in extensive cicatrices are the exciting causes, and along with the shortening there may exist eversion or inversion of the margin of the lid. These deformities, at one time considered almost hopeless, are often readily relieved by plastic surgery, the character of the operation depending of course upon the extent and peculiarity of the case. The indication is to *lengthen* or *increase the breadth* of the lid, and the process of Fricke is that usually preferred.

COLOBOMA PALPEBRÆ.

This term has been applied to a rare malformation of the lid in which there exists a *cleft* as in hare-lip. Usually the upper lid is the seat of the defect. Its cure is easily accomplished by simply freshening the edges of the cleft and afterwards bringing them together by the twisted suture. According to Mr. Wilde, the deformity was observed a century ago at least, and spoken of particularly by Bannister.

PHIMOSIS PALPEBRARUM.

Kimberger, Von Ammon, Chelius, and others, have described under this term a congenital defect of the eyelids, in which the

palpebral orifice is too small, in consequence of which the patient can scarcely see. Mr. Liston alludes to the deformity, and I have seen it myself. Generally speaking it is readily relieved by dividing the adhesions in the proper direction, and then carefully guarding against reunion by daily moving the parts or passing a blunt probe between the edges.

ANCHYLO-BLEPHARON.

By this we mean adhesion of the tarsal margins of the lids. It is usually the result of inflammation or ulceration, but occasionally it is met with as a congenital defect. Indeed, Meckel, Von Ammon, Himly and others, contend that such is the natural condition of the foetal eye up to a certain period, just as we see that it is in many of the lower orders of animals. A simple arrestation of development, therefore, would be sufficient to produce the difficulty. By some the closure is supposed to be the result of *simple mucous adhesion*, by others, of *membranous union*. The treatment is similar to that employed in phimosi palpebrarum.

SYMBLEPHARON.

When from some inflammatory affection of the conjunctiva, ulcerations, or effusions of coagulable lymph in large quantities occur, adhesions between the lids and the globe of the eye may be occasioned. It is by no means a rare complaint, and unfortunately very little can be accomplished towards its relief. When partial in the shape of membranous bands passing from the lid to the ball, a cure may sometimes be established by their division and the daily introduction of a probe between the raw surfaces so as to prevent reunion. But when the adhesions are extensive, I have invariably failed in accomplishing my object, for in spite of all my care the raw surfaces would coalesce and reproduce the defect. There is also another objection to any attempt at an operation here, viz., the loss of the eye, for in nine cases out of ten the injury has occasioned loss of vision, so that even when most successful, the sole benefit resulting is the removal of slight deformity. The introduction of an artificial eye after cicatrization of the wound will improve the appearance of the patient very much.—T. D. M.]

STRABISMUS.

You may expect that I should say something about the operation for squinting, about which so much noise has been made of late.

There is not much to be said regarding it. It was originally performed by a German surgeon, Stromeyer, and has since been very extensively adopted on the continent and in this country. It is still practised, but there is not the same opportunity of performing it now as formerly, because a great number of patients have been cured—the cases have been used up. The operation has been performed in a variety of ways. It has been proposed by a French surgeon, Guerin, to divide the tendons of the straight muscles by subcutaneous incision. Here is the knife (presenting it) used for the purpose. This, however, must be an uncertain and hazardous proceeding. Subcutaneous division of muscles, tendons, and ligaments, answers very well in many cases of deformity; but this, like other methods, may be abused and perverted. I saw a patient, a young girl, the other day, with abscess of the spine in consequence of caries of the vertebræ. I met in consultation with a very respectable practitioner, and also a person whom I did not expect to see,—a man who practises, it appears, exclusively in disorders of the spine. I question whether he knows what the various deviations in the form of the spinal column really arise from. I dare say he expects that they all come from the same cause. This abscess required to be opened, and the individual suggested that it was a very dangerous thing to open an abscess directly communicating with a carious bone. These abscesses are certainly not much disposed to heal quickly, and therefore it would be better to do it by the subcutaneous section. He brought out of his pocket two enormously long and large skewers which he had been using, it would appear, for dividing the long muscles of the back, and proposed to open this chronic abscess by inserting one of them at a distance some five or six inches, and cutting across the cyst containing the matter. Had he been left to himself, I dare say he would have gone to work as he proposed, and as a consequence the matter would have been diffused in the cellular tissue. The subcutaneous method of dividing tendons is not applicable any more in strabismus than in the opening of abscess. I shall describe very shortly that which I consider the most approved method of performing it.

The operation consists in dividing one or more muscles of the ball of the eye. It is well to confine yourselves to the division of one only in any one eye, otherwise you may have great reason to regret your interference in the case. The eye may possibly take a more awkward position than before, and may project so as to cause great and lasting deformity. You divide then the internal or the external straight muscle, according to the form of squint with which you have to deal. If the eye is turned inwards, and which is the most frequent—in order to remedy the deformity you catch hold of the internal straight muscle and divide that singly. The deformity arises most frequently during childhood, but from bad habit it may occur even at a later period, ten or twelve years of

age. It may arise from some spasmodic affection during the diseases of childhood—hooping-cough or measles. It is said to be congenital, but I doubt whether that is the case. One old medical man who had assisted at the delivery of some of his own children, brought one of his daughters to be cured of this defect, and declared most solemnly that he had observed the child to squint the instant it was brought into the world. I have often heard of congenital squint, but this is the only instance in which I have heard any attempt made to authenticate such a case. However it comes you find people growing up squinting terribly, and it is desirable to remove the deformity and to improve their vision besides. For this purpose you divide the internal straight muscle, and in order to effect it the eye must be fixed. The patient sitting in a chair an assistant supports the upper eyelid, whilst the under lid is secured by means of this speculum, with a spring and catch to hold under the chin. The conjunctiva is then taken hold of by means of these spring artery-forceps close to the semilunar fold and caruncle. A slit is made in it with a pair of fine scissors, the eye is pulled a little outwards, and a blunt hook passed under the tendon of the internal straight muscle, which is distinctly brought into view. Letting the forceps hang on, with the scissors you divide what has been taken up, and the operation is thus completed speedily and safely. If you set about pulling the eye outwards and cutting from above or below, under the impression that you will get it to turn quite straight at once, you may do much and irremediable mischief; the eye may turn up or down, or it may project, as I have already remarked. By dividing one tendon rely upon it you have effected your object, and perhaps the eye comes straight immediately. But in cases of bad squinting where both eyes are affected, or where the squinting seems to affect only one, and it is not put straight by the division of the muscle of the one apparently most in fault, you may deem it advisable to divide the internal straight muscle of the opposite eye. In very aggravated cases you do that at once; but where you divide in one eye only, and that is generally sufficient, care must be taken that the patient uses that eye immediately afterwards. You send him home, and put him in a darkened room; make him sit with his back to the light, and tie up the eye upon which you have not operated, in order to make him use the one the muscle of which has been divided, and to direct it straight forwards. You do this with the view of causing the muscle to attach itself further back than it was originally, so that the eye may afterwards remain straight. I believe that this is the main secret of success, and that if you adopt this plan you will seldom be disappointed. In a day or two the muscle will have healed, and there is nothing further required. The patient must dispense with wine for a few days, take some cooling medicine, and wear a shade over both eyes, when he begins to go about. It is always advisable to make him tie up the

eye *not operated upon* for twenty-four or forty-eight hours. In this way you can effect this proceeding with the greatest facility, and it is very seldom attended by bad consequences. I have seen two or three cases where the eye has been lost, but for that the patient might, in some measure, have himself to blame, from his having lived irregularly. The inflammation in the orbit has ended in the destruction of the ball, but that will perhaps not happen once out of many thousand cases.

[As is ever the case with any supposed novelty, several have laid claim to the origination of the operation for strabismus; but, alas! we find the merit due to an itinerant quack, who flourished in 1738, and who, in a pamphlet entitled *De Verâ Causâ Strabismi*, gave an account of this very measure. The operation was also alluded to only to be condemned, however, by Heurman, a German surgeon who flourished in 1756. Mr. White, of London, several years since, certainly demonstrated its practicability by performing it on the lower order of animals; and Dr. Ingalls, of Boston, it is stated by Dr. Atwill, (see *Med. Examiner*, 1842,) proposed such a measure in his own case in 1812. Stromeyer also suggested something of the kind, but unquestionably Dieffenbach, of Berlin, more than any one else, deserves the credit of having successfully performed it on the human subject in 1839. Since this period it has been attempted by almost every one, and I think I may with safety assert, that no surgical measure of modern times has been more shamefully abused. Reports upon reports have been circulated by men calling themselves surgeons, but who, in many instances, have turned out the veriest quacks, in which it has been declared that in *every* case success attended the operation. Such assertions, known to be false, have induced the profession generally, in this country at least, to receive "*cum grano salis*," the statements of all who have written upon the subject. But notwithstanding all that has been said and done to discredit it I have no hesitation in declaring, that when properly performed, and the case carefully selected, (for there are many altogether unfit for the operation,) it richly deserves being ranked among the most useful modern improvements in our art.

That it often fails to relieve, and not unfrequently gives rise to deformity almost as great as that for which it has been performed, cannot be denied; but in the vast majority of such cases, the *operator* and not the *operation* is most in fault. The defect usually encountered is a peculiar staring appearance, the eyeball projecting much beyond its proper limits; and this undoubtedly is the result of *too free dissection*. Mr. Liston is obviously correct, and in this as in everything else shows his practical acumen, when he cautions us against cutting "*too much!*" So unsightly is this projection of the eyeball that numerous operations have been proposed to relieve it, either partially or entirely. Rognetta, Guerin, Baudens, and

others, have "stitched the inner angle of the lower lid to the corresponding part of the upper one, the operator having previously removed with the *curved* scissors a crescentic fold of the integuments." So bungling an operation scarcely deserves mention, and besides it in reality increases the deformity, for while it does not diminish the projection of the ball it establishes an epicanthus as disfiguring as the original deformity. Cunier proposes instead of this plan, to excise a vertical fold of the mucous membrane between the cicatrix and the caruncula, and then to bring the edges of the wound together and maintain them in apposition by one or two stitches. "The loss of substance in the conjunctiva and the fibrous membrane, induces a shortening and a closer adhesion of them with the ball, so that this will no longer retain its abnormal prominence, and at the same time the caruncula which may have been more or less displaced, regains its natural situation!"

Different methods have been proposed by Dieffenbach and others, but it is hardly necessary to enter into their description, for they are all useless so far as I am able to learn; and our only resource where the deformity exists to any great extent is to cause the patient to wear coloured glasses.

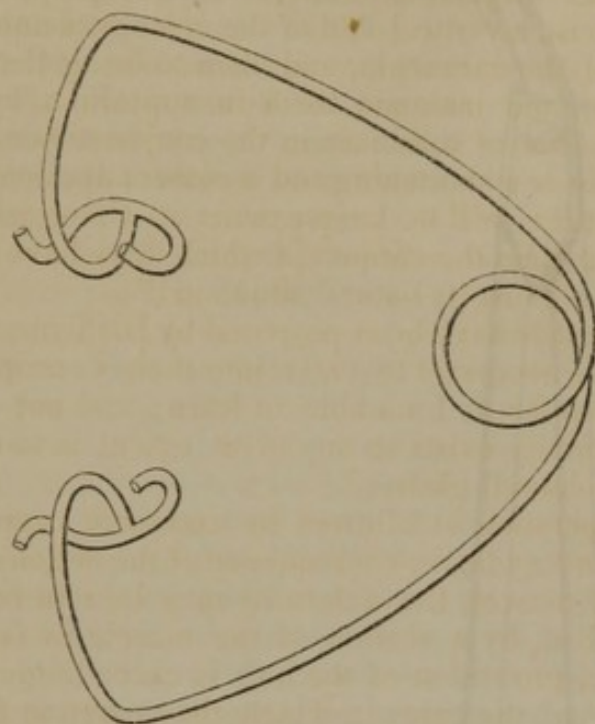
When the operation is followed by excessive eversion or inversion, as the case may be, in consequence of the action of the antagonizing straight muscle, the deformity may be relieved and useful vision established, by a section of the muscle in fault. In such cases, however, protrusion of the ball is exceedingly apt to occur.

A "resumé" of the cases in which the operation for strabismus has been performed, was sometime since published by Velpeau, and according to its showing the general utility of the measure is more than problematical, not more than *half* the persons who submitted to it being relieved. It is exceedingly probable, however, that many of these cases were totally unfit for the experiment, and hence we should be careful how we receive as correct the statements there given. In my own practice, which with this operation has been very extensive, I should say that *at least two-thirds* of my cases have been perfectly cured, while a larger proportion have been materially relieved. In most patients I have found it necessary to operate on *both* eyes before the cure was rendered perfect.

The general directions laid down by Mr. Liston are those followed by almost every operator, but we find great diversity among surgeons as to the manner of dividing the muscle. There is no necessity for passing in review these different processes, and indeed all such displays usually do more harm than good by confusing the young operator. I shall therefore merely explain the method employed by myself, which is somewhat more simple than that of Mr. Liston. The patient being properly placed with his head resting against the chest of an assistant, I next carefully bandage the eye *not to be operated upon*, so as to prevent the *sympathetic movements*

interfering with the steps of the operation. The lids are then separated by an assistant or the *spring speculum* of Goddard and Ruschenberger, which being small is less in the way than any other. (Fig. 38.) The patient is then directed to *turn the eye out* if we

Fig. 38.



are operating for strabismus convergens, and while in this position, a fold of the conjunctiva, between the edge of the cornea and the caruncula lachrymalis, is seized with a pair of sharp-toothed forceps, lifted up and rapidly divided with the curved scissors of Hays. (Fig. 39.) The few drops of blood which escape from the wound may then be sponged away, and we next proceed to search for the anterior attachment of the muscle. The outer margin of the wound is to be held upon the stretch by means of the forceps, and this effort is usually sufficient to evert the ball as far as is requisite, and keep the wound patulous. While in this position the surgeon holding in the other hand a silver hook of this form, (fig. 40,) carefully inserts its point beneath the muscle just behind its attachment. Disengaging the forceps, the hook is drawn forwards until the muscle is easily distinguished, and then with the scissors we divide every fibre so as to place the ball completely under the control of the rectus externus. The eye is now closed, and after the lapse of a minute or two again opened.

If the operation is successful we find the pupil in the centre of the orbit, and all voluntary motion of the ball inwards or towards the nose, entirely lost. Sometimes, however, I have seen the pupil

Fig. 39.

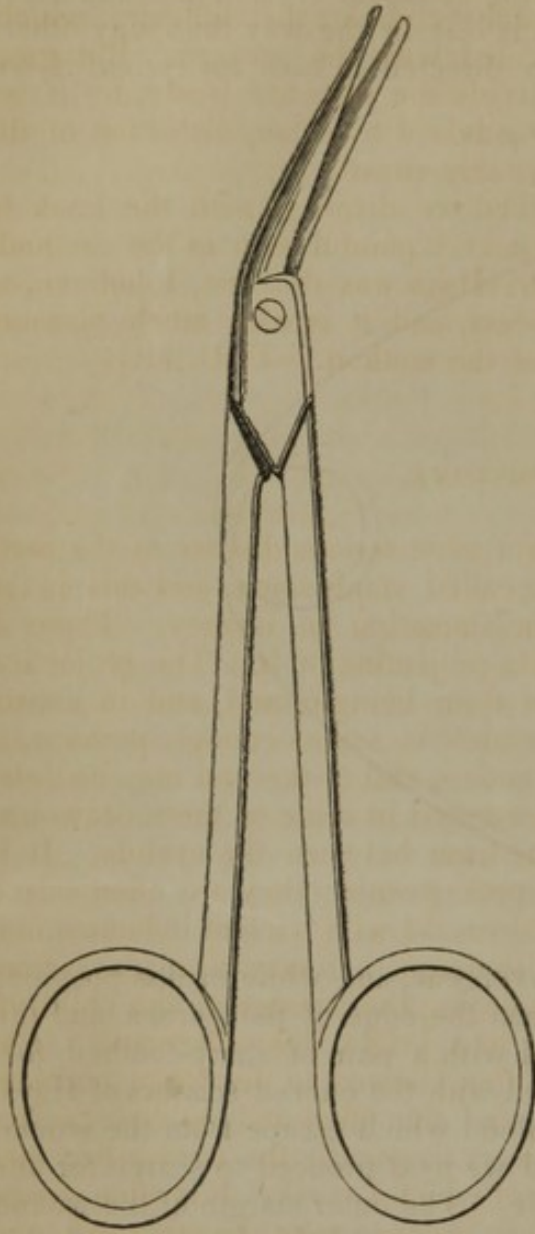
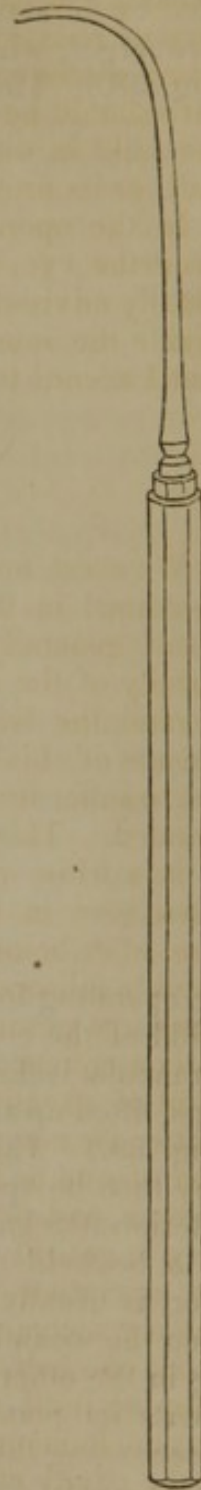


Fig. 40.



in consequence of the partial paralysis of its antagonist, occasioned by its long-continued extension, remain in its unnatural position for some time after the section of the muscle in fault, and yet in the course of a few hours assume its proper place. Usually when the pupil does not immediately assume its proper position, it is owing

either to some of the muscular fibres remaining undivided, or to the existence of bands of fascia. To ascertain the true cause it is necessary to re-introduce the hook and search for the difficulty, which, when discovered, must be divided with the scissors. But great care should be taken lest we divide the parts too freely, for if we are bold in our dissections, as advised by some, distortion of the ball, or its projection, will inevitably ensue.

In the operation just described we dispense with the hook to evert the eye, and thus avoid a very painful step in the methods usually advised. My friend Dr. Hays was the first, I believe, to divide the muscles by this process, and it is with much pleasure that I accord to him the merit of the method.—T. D. M.]

STAPHYLOMA.

We meet now and then with a most serious disease of the parts contained in the orbit, what is called staphyloma, and this is the result generally of purulent inflammation in infancy. There is opacity of the cornea and a great projection of it. The projection beyond the lids prevents them from being closed, and in consequence of this the other eye, which is sound enough perhaps, is apt to suffer from inflammatory action, and in the end may be deteriorated. This affection is represented in some of these drawings. It is a white projecting tumour from between the eyelids. It is often seen in the children of poor people; they are often seized soon after being brought into the world with violent inflammation, quickly followed by purulent discharge. It may take place from discharge getting into the eyes during the passage of the child, or in consequence of its exposure to a bright light afterwards. For want of attention the eyes are often allowed to discharge purulent matter for many days or weeks, and this often ends in disorganization of one or both of them. Very frequently the cornea becomes opaque, and projects in the way of which I speak. It is often necessary to get rid of the projection in order to save the other eye, and the operation is sometimes performed in infancy. It consists in passing a common bistoury across the tumour, making a section of about one half, and then taking up this so far detached portion and clipping it off with a pair of scissors. The consequence of this is that the humours are discharged, and some inflammation takes place in the cavity of the bulb of the eye. It suppurates, and gradually sinks down to a proper level. Of course the deformity can afterwards be remedied by the employment of an artificial eye.

[Although the operation for staphyloma is easy of execution, it is often very painful, and occasionally followed by serious hemorrhage. I have also had one or two cases of protrusion of the hyaloid membrane coming on an hour or two after the performance of

the operation, which produced the most intense agony. Mackenzie describes this difficulty with great accuracy, and likewise points out the treatment to be pursued. "It occasionally happens, especially in cases of staphyloma attended with varicosity of the internal vessels of the eye, that either immediately, or some hours after the operation, hemorrhage takes place, both from the eye and into its cavity. A *bloody, dark-coloured mass, of pretty considerable consistence, protrudes to such an extent from the wound, that it is impossible to keep the eyelid shut.* The eyeball is painfully distended, while the conjunctiva and lids become greatly ecchymosed. The hemorrhage into the eye gives rise in some cases to agonizing pain, and may even bring on convulsions. Under such circumstances, we ought to cut away with the scissors the protruding substance, which perhaps is in some cases the hyaloid membrane injected with blood, but in other cases is nothing more than a clot of blood, hanging from the front of the eye. After this is done, the bleeding ceases, and the pain abates. Left to itself, the protrusion dies away in the course of a few days. The eye is apt in either case to shrink below the usual size of a staphylomatous eye after operation!"

Prof. Pancoast has recently described a new mode of operating for staphyloma, the character of which may be readily understood from the following extract. "The operation consists, after placing the patient in a proper position, in making *two elliptical and vertical* incisions through one margin of the cornea, selecting the part which is opaque, and leaving any transparent portion that may exist, in the hope of rendering it useful for the purpose of vision. The incision should be made with a delicate sharp-pointed knife, and carried at the lower part through into the aqueous chamber.—Through this opening the aqueous humour will escape; the edge of the piece loosened at this point is then to be raised with a cataract hook, and the circumscribed elliptical portion cut out with a pair of delicate scissors. The piece removed will consist usually not only of the cornea, but of the thickened and adherent iris. The eyelids are then to be closed, as in the ordinary operation!"

Although the opening made by any of the operations in vogue usually closes in a short time, it occasionally happens that the pseudo-cornea is a long time in forming, the humours of the eye meanwhile remaining uncovered. In such cases fungous granulations are apt to form around the margin of the wound, and must be removed by lunar caustic before healing can be accomplished.—T. D. M.]

TUMOURS OF THE ORBIT.

In the orbit you find tumours of various kinds. Fibrous tumours occasionally are formed in the substance of the orbit, and they are

sometimes loosely connected with, or are altogether independent of, the bulb of the eye. The tumour may have grown slowly, and have increased very gradually, till at last it has interfered with the functions of the organ so as to destroy or only to impair the vision to a certain degree. The tumour by its increase may have pushed the eye nearly out of the socket. These tumours are generally to be felt with the finger, by a careful manipulation; they grow above or far behind the eyeball, and perhaps you may ascertain that they are pretty movable. Under these circumstances you are warranted in attempting to take away the tumour without interfering with the bulb of the eye, and sometimes you may succeed. There are specimens on the table which I have thus succeeded in taking away. Here is a tumour as large as a chestnut which I removed many years ago; there has been no return of the disease, and the man has since enjoyed the perfect use of the organ. A great many tumours grow behind and amongst the muscles of the eye and involve the nerve; others commence in the interior of the organ; they adhere perhaps firmly to the posterior part of the bulb, they gradually fill up the chamber occupied by the vitreous humour, come forward to the pupil, and then it is said the disease may be mistaken for cataract. The affection occurs at all periods of life, but frequently in children two or three years of age. It is rapid in its progress, and presents characters which cannot be mistaken for cataract. The

tumour which projects through the pupils is not only opaque, but irregular on its surface, and perhaps there are vessels seen ramifying upon it. It appears flocculent on the exterior, it comes rapidly forward towards the anterior chamber, then falls on the cornea, this gives way, and then a fungus appears. Here are drawings representing the disease both in the early and latter stages. Sometimes the fungus assumes an enormous size, the glands of the neck become involved, and they also present a frightfully diseased aspect. Little good can be done by surgical interference; its progress cannot be checked by internal means;

if the bulb of the eye be cut out there is a very great probability of the disease returning. Sometimes from the first the optic nerve is affected, and the disease goes back into the cavity of the cranium.

But there are some tumours of the bulb of the eye which can be

Fig. 41.



taken away with perfect propriety—tumours of a melanotic character. I have repeatedly removed them without the disease returning. Sometimes they are superficial, occurring only over the surface of the conjunctiva, and they can be taken away with the bulb of the eye. The extirpation of the eye, although it is an operation in the majority of cases not promising much to the patient, may, in some instances, very properly be had recourse to, and the disease will not return afterwards.

LECTURE IV.

EXTIRPATION OF THE EYE.—DISEASES OF THE LACHRYMAL PASSAGES.
—FISTULA LACHRYMALIS.—CATARACT.—EXTRACTION OF FOREIGN
BODIES FROM THE NOSTRILS AND EARS.—OBSTRUCTIONS OF THE
NASAL DUCT.—POLYPI.

EXTIRPATION OF THE EYE.

IN the last lecture I spoke of various diseases of the eyeball. In cases where disease commences within the bulb, and is of a malignant character, or where it is situated at the posterior part, it is probable that if you remove the organ the same disease will spring up again from the orbit; some of the lymphatic glands of the neck may be diseased; there will be the same profuse sanious discharge; and the disease will run its course as though nothing had been done, or perhaps even more rapidly. There are, however, some diseases which occur in the cavity of the organ that may very properly be removed, such as melanotic tumours of the bulb of the eye. You must, in cases of this kind, and in every possible case, take care to form a correct diagnosis. There is a sort of chronic dropsy of the eye, attended with an enlargement of the bulb and a dark discoloration of many parts of it, which may be, and has often been, mistaken for a melanotic tumour. The disease occurs at various periods of life. A patient presents himself with a large projecting eyeball, and upon raising the lids you see here and there a dark prominence. All this may take place without there being any solid matter in the eye. It arises from a thinning from behind of the sclerotic, so that the choroid is projected and shines through it. These tumours fluctuate distinctly. Some cases of this kind can be remedied without the extirpation of the eye; all that you have to do is to puncture one of the projecting parts of the bulb in as dependent a position as possible, and keep it open. Inflammation may perhaps arise, a suppurative process take place, and the eye is then lost. When this occurs the deformity may be remedied by

an artificial one of enamel. But in cases of solid tumour of the bulb, where the disease is increasing, you may be called to extirpate it, and I shall now show you how to perform the operation.

For the extirpation of the eye all you want is a sharp-pointed narrow knife, or a scalpel of small size. The old plan, which I have seen pursued, was, with a large coarse needle, to transfix the bulb of the eye from above downwards, and then transversely. The eyeball was by these pulled forcibly from its bed, the conjunctiva was divided with a scalpel, traction outwards being persevered in, and the operation was finished by means of a variety of curiously crooked knives. But, for various reasons, the less you mangle the bulb of the eye, the better. You must take hold of the tumour by means of a vulsellum, not of large size, (the *pince à l'airigne* or *pince de museux*, as they have been called by the French authors on surgery;) thus you hold it securely, and steady it during the necessary incisions. You make room for getting out the affected parts by cutting the external commissure a little. Here, from my *armamentarium chirurgicum*, a collection of old-fashioned instruments, of which Scultetus might have been vastly proud, are knives intended to cut right and left. Here is an instrument for dividing the nerve. None of these antiquated affairs are used now-a-days, I presume, though I am old enough to recollect their being employed. Under any circumstances this operation is a frightful and appalling one; one which a surgeon would not willingly undertake. Well, then, when you are engaged in such a proceeding, and, as I have said, there are cases in which the surgeon will find himself called on to recommend and perform this operation, you seize hold of the tumour, pull the bulb forward, and then, the assistant keeping the lids out of the way, you introduce the knife, carry it deeply into the orbit, thus dividing the straight and oblique muscles from their origins, and then passing the knife into the very bottom of the cavity, the optic nerve also is cut across. Of course, in these incisions, you divide all the nerves and vessels going to the eye. You are recommended to look into the cavity and see that there is nothing left, and it is said that you are then to seize hold of the lachrymal gland and take this away also. I believe that this is an unnecessary precaution; the gland is of no further use, but I do not believe that disease very often commences in it, or that it is likely to take a diseased action afterwards.

Having removed the bulb of the eye, you must then look to the stopping of the hemorrhage. You introduce a small piece of very fine sponge into the bottom of the orbit, and hold it there till you have prepared, or have handed to you, some small dossils of lint. Taking out the sponge you put one dossil upon another, and thus fill up the cavity. Take care not to leave a clot, for if you do, you cannot properly apply the dossil, the bleeding is certain to continue, the patient will suffer great pain from the blood accumulating, it

will go on oozing out, and you will be under the necessity of taking out the entire dressing and re-applying it. A large compress must be placed over all, but the dressings must be sufficiently raised above the margin of the orbit after the cavity is filled, and then you apply a common roller. After a time the parts will probably kindly cicatrize, and the patient will be able to have the deficiency supplied by artificial means. It is astonishing how little the loss of an eye is noticed—how well artists in enamel imitate the appearance and hue of the remaining organ. I was well acquainted with a gentleman for years, met him often at table, and it was only by chance that I learnt, for I did not myself observe it, that one of his eyes was what is vulgarly called a glass one. I have known several people for some time without being aware that they wore artificial eyes.

HYPERTROPHY OF THE LIDS.

There is an affection of the upper eyelid, though not of frequent occurrence, yet, from the deformity it gives rise to, of some interest to the practitioner of surgery; this is an enlargement of the part to a greater or less extent—a hypertrophy of the skin and mucous lining. You can easily conceive the inconvenience arising from this condition of the covering of the eyeball. The sight is necessarily destroyed so long as the affection continues; there is a profuse and fetid discharge from the parts, and the countenance is rendered very unseemly. You have here an instance of it.

Fig. 42.



E. H., ætat. 34, admitted under Mr. Liston's care; a single woman; has generally enjoyed good health.

History.—She states that the left upper eyelid has been enlarged since she was quite an infant; she believes she was not born with it so, and has heard that it began with the appearance of a small pimple at the inner angle of the eye. Up to the age of ten years she could raise the lid, and the sight of the eye was not impeded. At about fourteen years of age the lid quite covered the eye, and at seventeen hung pretty low on the cheek; at this time she consulted a medical man; he

applied strapping and compresses to the lid, and under this treatment the advance of the tumour was retarded. After two years of this treatment it was given up, and since that time the increase in size has been more rapid, especially during the last two years.

State on admission.—The left upper eyelid very much enlarged and thickened, hangs down pendulous upon the cheek, reaching as low as the ala of the nose; the skin covering the inner two-thirds of the lid is natural in appearance, but on the outer third the sebaceous follicles are enlarged, and towards the outer angle there are two flat oval elevations, like soft warts, studded with the above-mentioned follicles. The mucous membrane, which is more hypertrophied than the skin, and granular, protrudes below the margin of the lid, and forms the lower part of the tumour. There is a considerable quantity of muco-purulent discharge from the inner surface of the lid, by which its margin has become slightly excoriated. The skin of the cheek upon which the lid rests is whiter and softer than natural, and the substance of the cheek wasted, so that on lifting up the tumour the eye appears more sunk and hollow than that of the opposite side; it is, however, quite sound, and the sight perfect, though rather weak.

Besides this hypertrophy of the lid, she has a number of small tumours, like soft warts, varying much in size, all over the body, but especially upon the back of the neck and on the chest. Her health has lately become impaired; her digestive organs are out of order, and her tongue is white, and the papillæ at the tip red and enlarged. To take two teaspoonfuls of castor oil and the following mixture:—

R.—*Diluted sulphuric acid, sulphate of magnesia*, of each, half an ounce; *infusion of orange-peel*, eight ounces. Two tablespoonfuls twice a day.

June 17.—The patient's health having been got into a better state, an operation was performed to remedy her deformity. An elliptical portion of skin, an inch wide at its middle part, and embracing the diseased structure, was removed, by means of a small knife, from the upper surface of the eyelid, and the edges of the wound brought into accurate contact by four points of the interrupted suture. A little water-dressing was afterwards applied, and the lid supported with a couple of strips of the isinglass plaster.

19.—The sutures were removed; union had taken place, with the exception of a small spot at the outer angle of the eye. To continue the water-dressing and the support.

22.—Considerable contraction has already taken place. A compress and bandage to be firmly applied to support the lid.

28.—The lid continues to contract. A weak solution of sulphate of zinc to be applied to the conjunctiva; bandage and compress continued.

July 1.—The lid is now very much smaller, its margin does not

extend much beyond the edge of the orbit; the mucous membrane protrudes more than it did, the chief contraction having taken place in the skin.

The exuberant conjunctival membrane has been removed. It was considered the safer plan to diminish the bulk of the eyelid by two operations. The vitality and union of the edge of the tarsus were thus more ensured.

FISTULA LACHRYMALIS.

Not unfrequently the lachrymal passages fall into a diseased state. Cases are occasionally met with in which the tears run over the cheeks, causing much inconvenience to the patient. He cannot expose himself, if there is any wind blowing, without the eyes weeping, and the discharge will sometimes excoriate the cheek. This may arise from some slight inflammatory swelling about the parts, which passes away, or it may prove continuous, and in that case search must be made for the cause. It may take place in consequence of some chronic inflammation of the lids and the lachrymal passages, attended with a vitiated fetid discharge from the Meibomian glands. This has been well pointed out by Scarpa, in his admirable work on diseases of the eye—a work which is almost forgotten, but from which much valuable information is to be gained. He has attributed its origin to an affection of the lining membrane of the lids or of the mucous glands. Some of the German writers have given it the fine name of “blepharo-ophthalmitis glandulosa.” The secretion, I have stated, is vitiated, it passes down and obstructs the passage, and the tears therefore cannot pass downwards. The inflammation may run further and higher, attacking the sac and duct, the obstruction becomes greater, and, at last, the ductus ad nasum may be almost completely obstructed. Some cases are irremediable. Ulceration has existed for a time in the nostrils, the membrane has been destroyed, the bony canal itself has become entirely obliterated. The disease is a serious one, and in the slightest cases requires to be looked carefully to and remedied. If the disease is neglected, inflammation is set up, and an accumulation takes place in the lachrymal sac, which may be removed from time to time by the patient himself squeezing the part three or four times a day; but then from some slight exposure to cold, or some irregular living, the parts become still more inflamed; the patient finds it impossible to cleanse the cavity, the canaliculi and ductus ad nasum are interrupted, and the sac is over-distended; suppuration takes place, an abscess presents itself in the form of a small hard lump in the lower part of the inner corner of the eye, deeper down than the canthus; at last the skin gives way, and pus is dis-

charged together with the secretions of the surface of the eye and its glands. When this state of things occurs, and not before, the disease is properly termed *fistula lachrymalis*.

Slight cases may be relieved by applying to the eye a weak solution of the sulphate or the acetate of zinc, by means of an eye-glass; or the patient is placed in the recumbent position, a small quantity of the fluid is poured into the corner of the eye by the side of the nose, the eyelids are separated, and then the head is inclined so as to allow the fluid to run along betwixt them, over the mucous surfaces. You thus endeavour to remedy the condition of the eyelids and the Meibomian glands; the patient continues to relieve himself by pressing the part and emptying the cyst from time to time, and in this way he may go on for many years. Sometimes benefit is derived when any excitement arises in the part from accidental causes, by taking away a little blood, as by the application of one or two leeches, at most, over the swelling; or a blister, about the size of the finger-nail, may be put over the sac, or a strong solution of iodine may be applied over it with a camel's-hair brush.

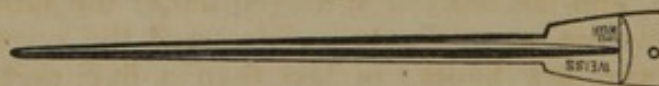
If the disease becomes more troublesome something else must be done. It has been proposed to clean out the passage from below by means of some sort of probe. This is a very old proposal, and it has been practised successfully by various surgeons. An old and very excellent practitioner at Dumfries, the late Dr. Maxwell, was in the habit of using catgut bougies, of various sizes; these he wetted, and in drying them in a sort of mould, got them to take the curve he desired. A metallic instrument, a silver or steel probe, suits better; the one recommended by M. Gensoul, of Lyons, is to be preferred. These probes are made, as you see, for the right and left nostrils. When I was a student this operation was talked about, and it used to be demonstrated on the dead body on the dry bones. Probes are made for the right side and the left. There is no difficulty in putting a probe into the nasal duct in the dry skull; but when all the parts are in their situation, when the inferior spongy bone and other parts are covered with their membranes, and still more when this is excessively irritable, as in the living body, it is sometimes difficult to effect it. If you pass the instrument under the inferior spongy bone by a *tour de main*, you get its point in contact with the lower end of the ductus ad nasum. But this is covered with a sort of fold or doubling of the Schneiderian membrane, and this fold is put there for a very necessary purpose, to prevent the sac being distended with air, and its contents, if any, thrown into the corner of the eye every time an individual attempts to clear the nostrils of mucus. This sort of valve, in the first instance, at least, opposes some obstacle to the entrance of the probe. The difficulty is, however, readily got over in the dead body, as you see. The probes are made here to pass with the utmost facility, and you can feel the end of them at the corner of the eye in the sac.

In the living body, by careful and gentle manipulation, the operation is happily accomplished, and often with advantage, with relief of the symptoms and palliation of the disease.

I have in many cases of epiphora, where there was an obstruction of the nasal duct, passed these probes apparently with advantage, but in very irritable patients you cannot always effect it readily. In inflammation of the sac it has been proposed to clear the passages from above, and small probes have been contrived for passing through one of the puncta down the canaliculi into the sac, and then into the duct. You may try this on the dead body, if you please, it is of no use in the living, and you must dilate the punctum with a large pin first of all till you get the instrument insinuated into the passage. It has been proposed, moreover, to throw injections into these passages, but all these methods are now abandoned. If the puncta and little canals are clear, a fluid introduced between the lids will pass readily enough into the sac and duct; if these latter are obstructed you cannot, by means of a syringe, or bristle-like probe, use sufficient force to displace or remove any such obstruction.

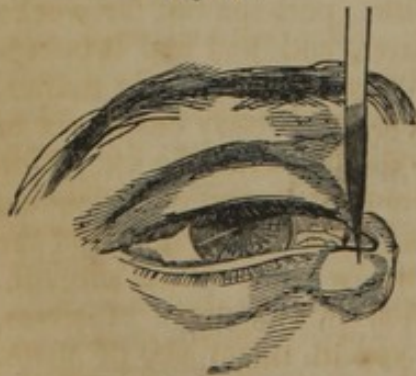
Suppose that you have a fistula lachrymalis to deal with, that there have been inflammation and suppuration of the sac at the inner corner of the eye, and that this collection has been opened, or has been evacuated by ulceration, and the coverings may have so far contracted, but still the fluids from the eye and sac are discharged upon the cheek, you must endeavour to restore the nasal duct. For this purpose an incision must be made into the sac. It is of no use to attempt passing a probe through the fistulous opening. You must introduce a narrow bistoury through the sac down into the duct, and lodge it fairly in the bony canal, or you may employ a sort of sharp-pointed grooved director, which has been recom-

Fig. 43.



mended by Dr. Lubbock, of Norwich, a very old pupil and house-surgeon of mine, who, though he is a doctor of medicine, still practises the higher branches of the profession.—

Fig. 44.



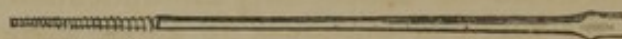
You are told that it is necessary to feel for the tendon of the orbicularis palpebrarum, but when there has been inflammation present, and this always precedes the formation of matter and fistula, you can feel nothing of the kind,—you must trust to your eyes and to your anatomical knowledge. Knowing the direction of the canal

you put your knife behind the margin of the bone, behind the nasal process of the superior maxilla, push it down at once, and lodge it fairly in the canal. In that way you are in a position to make the passages pervious. If you follow the knife with a probe, withdrawing the knife whilst you introduce the blunt instrument, you come at once into the nose, and there will possibly be some slight flow of blood from the nostril. If, after a few days, you close the nostril and make the patient expire forcibly, the blood and matter will be thrown up into the corner of the eye, and then you are sure that you have properly effected your object. You must remember that the bony parietes of the nasal duct are, in some respects, very thin. The intentional perforation of them was contemplated, proposed, and even practised by our forefathers. When any difficulty arose in getting the natural canal restored, the *os unguis* was bored through with a large *trois quarts*, and even the actual cautery was by some resorted to, in order to make a more permanent opening for the passage of the tears and discharges into the nose. This proceeding is now, happily, abandoned, and, I may say, forgotten. But unintentionally, and from ignorance, the posterior part of the canal is occasionally penetrated by the knife or probe. If the point of the instrument, instead of being directed downwards and slightly backwards in the course of the canal, is pushed more directly backwards, it may be made very readily to penetrate the ethmoid bone, and it will then be lodged above instead of below the inferior spongy bone,—a serious blunder enough. But it is necessary to keep the passage pervious, and with this view it has been recommended to introduce into the nasal duct, from above, various sorts of tubes,—a very unsurgical proceeding it seems to me,—but one practised by many good surgeons, and by one in particular, very eminent in our profession, the late Baron Dupuytren. Here is his tube; it is to be pushed down, and the head of it lodged under the skin. The immediate effects are exceedingly satisfactory; the opening will be closed in a very few hours; in less than a day, perhaps, all the inflammation will have abated, the tears will pass readily into the nostrils, and everything promises uncommonly well. But you must not expect that the patient is cured; in all probability fresh inflammatory action will be set up in a little time, perhaps not for weeks or months, but it will occur sooner or later, and you find it necessary to take out the tube, which is not always a very simple matter. I at one time practised this method in a good many cases, six or eight times in one season, and all the patients, with the exception of one, came back to have the tube removed, some experiencing one inconvenience and some another, and I have no doubt that the tube in the excepted case was taken out by some other surgeon. Various forms of tubes have been recommended, some of silver, some of gold, but I would not advise you to insert any of them, whatever their composition or shape, because, as foreign bodies

they must cause inflammation, you will be under the necessity of removing them, and if this be done, the patient, after all his suffering, will be in the same state as before.

But suppose that a patient comes to you who has had a tube put in by some one else; it is productive of great irritation of the parts and suffering to the individual; how are you to get it out? The tube is out of sight, the skin has closed over it, there is an abscess about it. You divide the skin, and you feel the end with the point of your bistoury or with a probe, but you cannot insinuate a pair of forceps to seize or extract it. The tube is generally lodged deeply and pretty well fixed, and you must introduce a probe, such as this, made with a screw, into the metal tube; by a turn or two

Fig. 45.



you fix it firmly, and thus remove it. These probes are often very useful in ascertaining whether portions of bone are loose, in removing small sequestra.

I have stated that you are not to employ a tube in the treatment of lachrymal fistula, but you may, with great propriety, use what is called a style. You introduce a bit of small wax bougie in the first instance, or you had better provide yourself with a silver probe of proper length, and use that at once, making it follow the knife or grooved director. If there is a large ulcerated opening you may put a bit of thread to prevent its slipping down out of sight, which sometimes takes place. If you have not a very large opening you lodge the style in the duct, and leave the nail-head projecting. You must have styles of different sizes and lengths to suit different individuals. You, of course, do not expect that a style suited for an adult male should lie comfortably in the nasal duct of a young female, in whom the bones of the face are much smaller. The style should be of such a length that the head merely appears at the corner of the eye, whilst the lower end rests on the floor of the nostril, or nearly so. There may be a little excitement for a time consequent on the lodgment of the style, with some discharge, but this soon finds its way along the sides of the probe, and into the nose, gradually diminishing in quantity. The actions of the parts soon become quiet, and the patient wears the style without inconvenience, and it can be taken out night and morning, wiped and replaced without pain. If he chooses he may leave it after a while during the day; there is a mere pin-hole, which is scarcely observable, and through it a small style may be introduced at night and removed in the morning. This is a rational and proper mode of proceeding to keep the parts pervious. How long the style is to

be worn, and at what period it can be discontinued without risk, must depend on circumstances.

[CATARACT.

The term cataract has, for a length of time, been employed to designate an affection of the eye characterized by partial or entire opacity of the crystalline lens, its capsule, or the liquor Morgagni. Usually the disease is confined to one of these localities, but it may occupy any two, or all conjointly.

Systematic writers have much complicated the subject of cataract by making an almost endless variety of the complaint, but while we shall avoid the unnecessary multiplication of forms, it is yet requisite for practical purposes, to adopt some classification, and that which follows seems as simple as any that can be made.

- 1st. Lenticular. When the lens alone is involved.
- 2d. Capsular. The capsule being the seat of the opacity.
- 3d. Capsulo-lenticular. Here both capsule and lens are involved.
- 4th. Morgagnian. The opacity here is seated in the liquor Morgagni.
- 5th. True.
- 6th. False.
- 7th. Cataracts of different forms.
- 8th. Cataracts of different consistence.
- 9th. Cataracts of different colours.
- 10th. Congenital.
- 11th. Acquired.
- 12th. Mature.
- 13th. Immature.
- 14th. Complicated.
- 15th. Secondary cataract.

1st. *Lenticular.—Hard variety.*—By far the most common variety at least in adults, is the first, and here the lens usually presents, when examined in situ, a grayish appearance, with a yellowish tinge in the centre. This is by no means invariably the case, however, for it may exhibit any one of the various colours met with in this complaint. When removed from the eye the centre of the mass is always much darker than the margin, and feels, when pressed between the fingers, like softened wax; sometimes it is much firmer, and we have indeed cases of conversion of the lens into cartilage or bone. Under all circumstances the central portion is much the hardest spot. In the diagnosis of this form we should always pay attention to the colour, and it will be found, according to the observations of nearly every oculist of distinction, that the *grayer* the cataract, the *softer*

is its consistence, and when the *yellowish or amber tint* is very marked it is almost sure to be either very *hard* or very *tough*. In young persons, however, nearly every cataract is gray. This form has been called *hard*, to distinguish it from others of softer consistence. Usually it is met with in old persons, and in such the lens is diminished in size, and shrunk away, as it were, from the capsule. When the opacity does not involve the entire lens, it may assume a variety of forms, and hence we hear surgeons speak of the *radiated*, *arborescent*, *stellated*, and other varieties of cataract. Usually, these peculiarities belong to the capsular or capsulo-lenticular variety.

Soft variety.—When the lens is *soft*, by which we mean not merely softening of the edges, but of the whole body, the cataract appears much *larger*, and often projects so as to press upon the iris and cause the margin of the pupil to bulge; soft cataracts usually occur in early life, and are “grayish-white, bluish-white, or milky, streaked or cloudy,” and have little or none of the yellow tint which characterizes the hard. The opacity is generally diffused throughout the lens, and hence vision is much more imperfect than in most cases of hard cataract.

Fluid variety.—There is yet another form of lenticular cataract in which the lens is *fluid*. It is usually met with in young persons or infants at birth, although I have seen a case or two in those advanced in years. It is characterized by an appearance of *fullness of the capsule*, a *uniform density throughout*, and a *yellowish-gray or creamy colour*. Lawrence compares it to thick *gruel*. As the fluid is composed of two sets of particles, one heavier than the other, a separation sometimes takes place, the more weighty subsiding to the bottom. If in such a case the pupil is dilated, globules may be distinguished floating about, or sometimes two distinct strata are formed.

Central variety.—Mr. Lawrence has described under the name of *cataracta centralis* a peculiar form of cataract, in which the opacity is confined to the centre of the lens, and does not exceed in size a pin's-head. Hence, when the pupil is dilated, vision is more or less perfect, the light passing in through the transparent margins of the lens. In strong lights the patient is blind. This corresponds I think to the *mixed lenticular* or *demi-soft cataract* of Sichel.

2d. *Capsular Cataract*.—This variety is occasionally, though rarely met with, and we find that the opacity may be located either in the *anterior* or *posterior* wall of the capsule, and also that it may involve the *entire* membrane. According to Scarpa, *anterior* opacity, in consequence of the anterior wall being thicker and more vascular than the posterior, is most frequently developed.

Anterior.—Anterior capsular cataract is characterized by the formation of opaque streaks or spots in different parts of the tissue, and rarely, according to Beer, is detected in the centre, at least in

the commencement of the disease. These opaque spots are more brilliant and shining than those developed in the lens, and appear to be *on a level with* the pupillary margin of the iris, and may even project, as Lawrence observes, into the aperture itself. A very singular variety of this form of cataract has been described by Dupuytren, in which there exists a white or pearly prominent spot in the centre of the pupil, from which pass off towards the circumference of the capsule, whitish shining rays; as the membrane remains transparent between these rays, vision is more or less perfect. The chief inconvenience consists in a constant rolling of the eye, occasioned by the effort to place the transparent spaces in a favourable position for the transmission of light.

The arrangement of the opaque striæ or spots varies exceedingly, giving rise to the *arborescent, dendritic, barred, stellated*, and other forms of cataract.

Posterior.—When the *posterior wall* of the capsule is the point attacked we find the opacity more deeply seated, evidently at some distance from the pupil, less distinct, and apparently concave. It is a very rare form, and usually exists in connection with complete capsular or lenticular cataract. The diagnosis between this and other opacities of the capsule and lens is often difficult, and until the introduction of the "*catoptic examination*," was sometimes impossible. In all cases of doubt this mode of ascertaining defects of the eye should be at once employed.

Complete.—It is exceedingly difficult to ascertain the existence of complete capsular cataract in consequence of the anterior opacity preventing a satisfactory examination of the condition of the posterior wall. When the opacity is partial the catoptic test will much assist us in the diagnosis. According to Weller, Lawrence, and the best authorities, we cannot have complete capsular without lenticular cataract, for the lens soon becomes affected when once the capsule is entirely or extensively involved.

Capsular or membranous cataract, as it is sometimes termed, usually results from some inflammatory affection of the eye, and may attack persons of all ages. It is called *primitive* when it occurs without any appreciable previous disease, and *secondary* when the performance of an operation, inflammation, or some malady, precedes its development. The *secondary* frequently makes its appearance after an operation for *soft cataract* in young persons; the fluid escapes or is absorbed, and the walls of the capsule becoming opaque, gradually approach each other, unite, and form a dense parchment-like membrane, so tough as frequently to cause much difficulty in the attempt made for its removal or division with the needle.

3d. *Capsulo-lenticular Cataract.*—This, the third variety of cataract, is of very frequent occurrence, and consists, as its designation intimates, of an opacity involving both the capsule and lens. It is

remarkable for its volume, being usually much larger than any other form of the complaint. So large is it in some cases, that the iris is forced across the anterior chamber of the eye, and lodged against the cornea. In such the motions of the iris are *mechanically* impeded by the presence of the cataract, a fact which should be recollected in our diagnosis, for I have seen the loss of contractility dependent on this cause alone, confounded with paralysis. Its colour is for the most part *pearly white*, and often we can distinguish the opaque lens of a darker tint through the less opaque portions of the capsule. But there is great diversity of appearance, and it is of this peculiar form of cataract that such endless varieties are made. Beer, for example, makes six, and bases his classification upon the colour, form, consistence, &c., presented by the capsule or iris, upon which, or in which, deposits of lymph or other fluids are discovered. Thus we have the marbled, fenestrated, striated, stellated, &c., all of which belong to the *first* class of Beer. We have also the *encysted*, in which the lens seems to move in the capsule; the *pyramidal*, in which a dense pyramidal mass projects into the pupil; the *cataracta gypsea*, where the capsule is converted into a thin, brittle, cretaceous substance; the *barred*, in which a thick opaque bar passes across the pupil; and lastly, the *dry shelled cataract*, (*cataracta arida siliquata*,) in which the capsule is contracted and shriveled.

All ages are liable to this form of cataract, and it may result from a variety of causes; usually, however, it is the product of some inflammatory affection. Its consistence, as well as its colour, varies in different patients.

4th. *Morgagnian Cataract*.—The existence of such a variety, independent of any affection of the lens, is denied by Travers, Lawrence, and many of our best authorities; Beer declares it to be exceedingly rare. That an opacity or turbidity of the liquor Morgagni can exist for any length of time as a distinct affection, is of course impossible, for the lens must speedily become involved. The following case, reported by Dr. Hays, is probably the best example of the kind on record. “Drs. Neill and Kerr brought to me for examination, on the 30th of April, 1840, the eye of a woman who had died the day before, in the Philadelphia Hospital, Blockley. They had not been able to ascertain the history of the case. They had divided the eye by a perpendicular incision through the centre of the sclerotica; and being struck with the unusual appearance of the lens, they placed the eye in water and brought it to me. I found the lens covered with its capsule, which was more convex than usual; renitent, as if distended by a fluid; somewhat opaque and very firm. Whilst squeezing it to ascertain what pressure it would bear it broke, and some yellowish-white fluid, resembling thin pus, or milk and water, and equal in quantity to about one-fourth the bulk of the lens, was discharged. The lens was of

a light amber colour, somewhat smaller than natural, but perfectly transparent."—(*Hays's edition of Lawrence on the Eye*, p. 579.)

5th. *True Cataract*.—Although it must be obvious, from the definition given of cataract that the term can with strict propriety be applied to no other affection of the eye, yet, inasmuch as some of the best oculists, such, for example, as Beer, Allison and Morgagni, have divided cataracts into *true* and *false*, the distinction may be retained. Under the first head are included, of course, all opacities seated in the *capsule*, the *lens*, or the *liquor Morgagni*, and no other.

6th. *False Cataract*.—The term *false* has been applied to all opacities or obstructions to the passage of light through the pupil, and which involve parts in the immediate vicinity of the organs usually the seat of disease in cataract. Beer describes four varieties. The *first*, or *albuminous cataract*, is occasioned by the accidental development of a false membrane or layer of lymph immediately behind the iris; the *second*, or *purulent*, is the result of hypopion, and is nothing more than a collection of pus in the posterior chamber of the eye; the *third*, or *sanguinolent*, is produced by an hemorrhage from some cause or other, and a clot of blood occupying the posterior chamber effectually prevents the transmission of light; the *fourth*, or *dendritic*, is usually brought about by the reception of a severe injury, which detaches the pigment from the posterior surface of the iris, and at the same time forces particles of this colouring matter upon the anterior wall of the capsule, which, when thus stained, presents the peculiar arborescent arrangement of the *dendritic agate*, and from this resemblance, fancied or real, the complaint takes its name.

Callisen speaks of another variety, which he terms the *hyaloid*, (*cataracta hyaloidea*.)

7th. *Cataracts of different shapes*.—From what has been said it is readily understood that cataracts may present the greatest diversity of shape. It is in fact impossible to describe any one form as the type, and as it is a matter of little practical importance, at least so far as the operation is concerned, we need not occupy ourselves with a reference to the tedious descriptions met with in many of the systematic works on affections of the eye.

8th. *Cataracts of different consistencies*.—It is highly important to bear in mind the fact that cataracts are not all of the same consistence, for our mode of treatment is based upon this point. In what are termed *hard* cataracts the lens, as already stated, is tough and dense, and here we should, in every case where the operation is practicable, *extract*, rather than *couch* or attempt the ordinary *absorbent* operation with the needle. So slow is the process of absorption in such cases that months may elapse before the patient is cured. The *cataracta gypsea*, and the *osseous cataract*, are rarely met with, at least in eyes fit for an operation; but should such cases

present themselves, the only operation at all calculated to succeed is *extraction*. The consistence of *soft* cataracts varies as much as it does in the hard, and we meet with cases as fluid as milk, others in which the lens is reduced to the consistence of a thick jelly, while in others again it resembles soft cheese. The latter variety constitutes the *caseous* cataract of some authors.

9th. *Cataracts of different colours*.—While the ordinary colour of cataract is grayish or whitish, with now and then a shade of amber, the disease may present almost any shade. Thus we have the *brown*, the *yellowish*, the *chalky-white*, the *green*, (several cases of which are reported by Cunier, and some of them were treated for glaucoma,) and the *black*, the existence of which is denied by many, but without sufficient authority, for Morgagni, Wenzel, Pellier, Edwards, Béclard, and others report a number of examples. This last variety is readily confounded with amaurosis, but the catoptic examination is sufficient to establish the diagnosis at once. It is highly important to pay attention to the colour of the lens, for as already observed, its consistence may generally be determined in a great degree by this test. But in addition we find the colour indicates the condition of other and more important portions of the organ. If, for example, in a *young person* or *child*, we meet with a *yellowish* or *dark brown* lens, it almost invariably indicates some malignant disease of the eye. The same colour, however, in persons more advanced in years, has no such signification.

10th. *Congenital Cataract*.—The term congenital is applied to those cases which occur at birth, the child coming into the world with an opacity of the lens or its capsule. That this is by no means an uncommon circumstance, all acknowledge, and moreover that the disease appears to be decidedly hereditary, at least in many families. It would not be difficult to cite facts upon facts in support of this view, but it may be sufficient to refer to the excellent report of Maunoir, (*These sur la Cataracte*, Paris, 1833, No. 345,) and the cases of Lucas, Demours, Beer, Adams and Saunders.

11th. *Acquired Cataract*.—All cataracts occurring after birth, produced by any cause whatever, are called *acquired*.

12th. *Mature Cataract*.—Great stress has been laid upon this division by some excellent oculists, and with reason; for the period at which an operation should be performed is determined by the condition of the cataract. As the disease is often the result of some inflammatory affection of the eye, the progress of which is marked by the degree or extent of the opacity of the lens or its capsule, we should carefully avoid operating until a check is put to the growth of the cataract, or in other words, until it has become *mature*. Whenever we discover that alterations are going on either in the shape or size of the opacity, I repeat, it is unsafe to *operate*, and all our efforts must be limited to the administration of such

remedies as shall diminish or remove the inflammatory condition upon which the development of the cataract depends.

13th. *Immature Cataract*.—This term is applied to the cataract during its development, and it is in this stage that by some the disease is considered curable. Græfe, Benedict, Gondret, Himly, Loder, Lattier de Laroche, and others, all speak of cases relieved or cured by the employment of appropriate means. It must be confessed, however, such results are so rare that surgeons place but little confidence in the plans of treatment proposed. But this we should always bear in mind, never to *operate* until the cataract is *mature*!

14th. *Complicated Cataract*.—Cataract is for the most part a simple local affection, but occasionally we find it complicated with complaints of other portions of the eye, or it may be accompanied with various diseases of the general system. It is of the highest importance to determine the true state of the case before resorting to any plan of treatment, for the success of our measures depends chiefly upon the care with which we prepare our patient. The complications may be divided into the *local* and *general*, and under the first head we may include

- A. Amaurosis.
- B. Glaucoma.
- C. Adhesions of the pupil.
- D. Diseased condition of the lids or excretory ducts.

The existence of any one of these diseases would materially interfere with the success of our treatment.

Under the second head or general complication, we include affections, either acute or chronic, of other organs of the body, during the existence of which no attempt should be made to cure the cataract by operation.

15th. *Secondary Cataract*.—This term is applied to the opacity which sometimes takes place, after the operation for cataract has been performed. It usually consists of a portion of the capsule, either its anterior or posterior wall, most generally, according to Breschet, the latter, but it may be composed of a piece of the lens. When inflammation supervenes to an operation, effusion of lymph may take place, become organized, and constitute another form of secondary cataract. Some time since another variety of secondary cataract was alleged by a M. Cocteau to exist, as *the result of the formation of a new lens, which in its turn becomes opaque*. But the observations of others, particularly Demours, Béclard and Reveillé-Pariese, go to prove that no such form of cataract occurs, and that what M. Cocteau supposed to be a *new lens*, was in reality nothing but a portion of the old.

Causes.—It is exceedingly difficult to trace each case of cataract to some definite cause, indeed it is impossible; nor are we able to state any general condition of the system at large that in reality

predisposes to the development of the complaint. It is often stated that *old age* may be considered in itself a cause, but observation does not bear out this opinion entirely, for although cataract is often met with in old persons it is almost as common in adults, and children are frequently born with the complaint. Again, it is very unusual to meet with cataract in those who live to extreme old age, such persons frequently retaining their vision, or acquiring what is termed a "second sight!" That all inflammatory affections of the eye are causes of cataract is, I believe, generally acknowledged, and hence any agent, local or general, capable of producing congestion and inflammation of this organ may be considered a cause either direct or indirect. Exposing the eyes to strong light, long continued examination of minute objects, the use of powerful magnifying glasses, congestions of the brain, blows and injuries of various kinds, the suppression of habitual discharges, or eruptions, and specific inflammations of the eye, as those produced by syphilis, gout, rheumatism, and scrofula. All these and many others which produce a similar condition of the eye, are cited as the causes of cataract, but it must be confessed that in a vast majority of the cases mentioned, it is impossible to assign any sufficient reason for the development of the complaint. Delpech compared the condition of the lens to that of the bone in necrosis, and hence defined cataract to be *necrosis of the lens*, but although the comparison at first sight seems rational enough, yet it is not perfectly correct, for the lens is *not dead*, it is rather in a state approaching in its nature *gangrene*. At least such is its condition in the early stages; when *mature* there is probably no circulation in the part, and it is really in a state of *necrosis*.

Progress of Cataract.—Unless the result of severe active inflammation or intense congestion, the development of cataract is, for the most part, very gradual, some obstruction to vision existing for weeks or months before blindness makes its appearance. There are, however, examples of the sudden formation of cataracts, as in the case reported by Pravaz, occurring in the wife of a celebrated lawyer of Paris, and in that mentioned by Gleise and Laroche, where, in consequence of a person's having received a prolonged kiss upon the eyelids, the lips of the woman by whom it was given being so arranged as to produce more or less suction, a cataract was produced in a few minutes. But these, as well as others of a similar character met with in almost every work on the eyes, are exceptions to the general rule, and were all occasioned by sudden and severe congestion of the eye.

Symptoms.—When cataract is the result of some general cause, it usually affects both eyes, when occasioned by local injury, but one, at first, is attacked. There is great danger, however, of the second eye, in such cases, becoming involved, and hence we should carefully guard the patient against any cause calculated to excite the opacity.

The symptoms indicative of the affection are modified by circumstances, but generally the first thing that directs the attention of the patient to his malady is some slight imperfection in vision, but without pain; thinking that the eye is merely weaker than it should be, no attention is paid to the difficulty, until by and by we have added to the weakness a mote, or speck, or cloud or mist, more or less dense, which is constantly before the pupil, or it may occur only in bright lights. Up to this period there may exist no visible evidence of the opacity, or there may be a slight cloudiness behind the pupil, and it is only by the catoptic examination that we can discover the true character of the defect. In bright lights vision is much more imperfect, and when the flame of a candle is placed in the axis of vision it appears surrounded by a halo more or less distinct. As the disease advances there is a change in this respect, the patient seeing best when the object to be examined is placed in a strong light. These alterations in the power of vision are owing, in the first case, to the fact that the *centre* of the lens is usually the part first involved, the edges retaining their transparency. When the eye is exposed to a *bright light*, the pupil contracts and shuts out nearly all the rays, and those which penetrate are absorbed by the opacity. As the pupil dilates in feeble lights, the transparent portions of the lens are exposed, and vision is often quite useful. When the opacity involves the *entire* lens as it does in the advanced or mature cataract, nearly all the light is absorbed, and it is only when very strong that a few rays penetrate the mass and pass on to the retina. Although in these cases the patient is conscious of a change from darkness to light, there is yet, for the most part, no useful vision.

As the disease advances the mists and clouds become darker and darker, until at length the patient is unable to distinguish objects or walk without a guide. But even in the most mature cataracts the patient is generally able to distinguish day from night, (a circumstance that should be borne in mind in our diagnosis,) and many indeed possess useful vision when the opacity is not very dense.

When we examine an eye affected with cataract, we readily distinguish behind the pupil an opaque spot, the colour of the opacity, varying in different cases. The *iris* and *pupil*, in simple cataract, are not altered in shape, and the motions of the pupil are perfectly normal. When the cataract is very large, by pressing upon the iris it may produce not only change in form, but also loss of motion under light, a fact to which reference has already been made. Occasionally there exists a dark zone upon the surface of the capsule, produced by the shadow of the pupillary margin.

Diagnosis.—When cataract is once fully established and presents the usual colour, there is no difficulty whatever in the diagnosis. But in its stages of development, and when it is either greenish or

black it is by no means so easy a matter. Even the best surgeons are often at fault, and unless the catoptric examination is employed, no one can say positively what really constitutes the difficulty.

The diseases most frequently confounded with cataract are glaucoma, amaurosis, and weakness of vision consequent to senility.

Glaucoma may be known by the greenish hue of the pupil, the existence of a yellowish, luminous, almost metallic looking concave body, deep in the eye; dilated or sluggish iris; pain in the head usually though not invariably; dimness of vision; or loss of sight in one or both eyes. The catoptric test, however, will generally be required in order to enable us to arrive at a correct diagnosis. When cataract and glaucoma are combined, the glaucoma is the first to appear, and the history of the case will here be sufficient to enable us to avoid any error of opinion as to the success of our treatment in the case.

Amaurosis, when complete, is known by the existence of total blindness, at least in nearly every case; in cataract the individual is usually able to discern night from day. In amaurosis, when forming, there are generally muscæ, scintillations, or other luminous appearances; in cataract there is a mist or cloud before the eye. In amaurosis there is usually pain in the head; in cataract this symptom rarely exists. In amaurosis the pupil is, in nine cases out of ten, dilated or rigid; in cataract the pupil retains its natural activity. But if we dilate the pupil and examine the eye with a taper, we shall find the images in amaurosis those which exist in a healthy eye, while in cataract we have such a modification of these images as enables us at once to recognize the complaint.

Weak vision.—I have often been consulted by persons of sixty or seventy years of age, who laboured under impaired vision, and who fancied that cataract was forming in one or both eyes. Usually in such cases we find the eye *flatter* than natural, and presenting a *bluish* tinge behind the pupil. There is no pain, nor any indication of inflammation or disease. If examined by the catoptric test the three images are perfectly distinct, which is sufficient to establish the diagnosis between the defect and cataract. There is, of course, no remedy for the evil.

Prognosis.—It is highly important, especially for the young practitioner, to investigate thoroughly every point connected with his case before he ventures upon promising a speedy or even a tardy cure, when the operation for cataract is to be performed. If simple, occurring in an infant, or young person, fluid or soft, not resulting from any inflammatory affection, confined to the lens or capsule, with a healthy retina, an active iris, the constitution of the patient sound, and his habit of body spare, the prognosis is unquestionably favourable. It is particularly so in congenital cataracts, and in the firm lenticular variety of old persons.

Where, however, there exist adhesions of the pupil, rigidity or dilatations of the pupil, contracted pupil, glaucoma or amaurosis, a fluid state of the vitreous humour, hypertrophy or atrophy of the ball, pains in the head which had been accompanied with *muscæ volitantes* before vision was lost, congestion or inflammation about the eye, feeble general health, gout, or rheumatism, or syphilis, and the patient is advanced in years, there is nothing to be anticipated but failure, even when the operation is performed in the most skilful manner.

Operation in old persons.—In very old persons, too, who can distinguish light from darkness, it is best not to operate, but merely to apply every day a little belladonna or stramonium, which dilates the pupil, and affords in some cases useful vision. When this remedy fails, however, and blindness is complete, inasmuch as the patient cannot be injured, an attempt may be made to remove the cataract, provided the case is suitable.

Question of operating when but one eye is affected.—It has long been a question with surgeons whether we should operate or not in cases where but one eye is affected. The great majority are in favour, as a general rule, of waiting until the sound eye becomes diseased or is lost, inasmuch as the patient sees perfectly well with one eye; disease may never attack the sound one; and lastly, the operation itself may excite sympathetic inflammation and thus cause the loss of vision in an organ that might possibly have escaped. On the other hand it is alleged, that the removal of cataract in one eye may prevent its formation in the other.

The weight of authority is unquestionably in favour of *not operating*, and I do not hesitate to advise most patients who apply to me with but one eye affected, to submit patiently to the inconvenience. But in young persons, especially females, to whom personal appearance is a matter of much importance, a deviation from the general rule is allowable, and in such cases most surgeons perform the operation.

I have already mentioned that we should never operate until the cataract is mature, or until the patient is perfectly blind, but it occasionally happens that a cataract is mature in one eye and immature in the other. Here it is proper to remove the first, in order to give the patient use of that eye, while the cataract in the other is reaching maturity; this is a source of great comfort, and saves him the inconvenience of partial blindness for many months.

Treatment.—It is a well-ascertained fact that a cataract, especially that variety which results from the reception of a wound, is sometimes cured by a spontaneous effort. Ware, Pott, Callisen, Tenon, Delmas, Velpeau, Mackenzie, Rosas of Vienna, Sichel and others, all report well authenticated cases of this kind, and it appears that the destruction of the opaque lens is due to some laceration of the capsule, produced by the injury which gave rise to

the cataract. The aqueous humour having thus access to the lens, in time dissolves it, and vision is restored.

Boyer has reported a most singular case, in which a spontaneous cure was accomplished in another manner. The patient, while walking in the street, led by his guide, suddenly perceived that he could distinguish objects; on examination it was found that the lens had become detached at its upper margin, and falling over, assumed a *horizontal position, its margin being opposite the pupil*. This dislocation permitted the entrance of light, and vision was at once re-established.

Fischer has also reported a case in his *Clinique Ophthalmologique* of spontaneous cure produced by the *sinking down* or *subsidence* of the lens, so that light passed in above its superior margin.

But these examples are too rare for us to place any confidence in their occurrence in the cases which present themselves in our practice. Hence, no one thinks of telling his patient to wait, and possibly nature may accomplish his cure in time, but sets to work at once to do that which is required.

On reference to authorities we find that from the most ancient periods of our science down to the present day attempts have been made to cure cataract without an operation. Scientific men, as well as the most ignorant charlatans, have engaged in the attempt, and many cases are recorded in which, by medical treatment alone, either local or general, true cataract has been made to disappear. Thus we find Græfe and Benedict stating that with pulsatilla they had succeeded in curing cataract; Gondret recommends cauterization of the scalp; Laroche, alterative doses of calomel, with counter-irritation; others rely upon drastic cathartics; others employ blood-letting both topical and general; in short, almost every remedy in the materia medica has had its advocate. Among quacks the application of stramonium or belladonna is a favourite treatment, as it enables them to declare the patient cured as if by magic; and recently a Mr. Turnbull, of London, states that he removes a cataract by exposing the eye to the fumes of prussic acid; no confidence, however, is to be placed in his reports. Electricity and galvanism have likewise had their supporters, and it appears not without some foundation, at least in a few cases.

But while we acknowledge that medical treatment, properly directed, may, at least in the forming stage of cataract, be productive of benefit, or even accomplish a cure, we cannot for a moment suppose that it exerts the slightest influence after the disease has reached maturity. Our remedies, then, should be strictly confined to cases in the forming stage, and here occasionally the progress of development may be retarded or arrested; although it must be confessed that in the large majority of patients the opacity refuses to yield.

We have, in fact, but one means in which much confidence can be placed, and this is a surgical operation of some kind or other.

Several methods of operating are now in vogue, and we rarely find surgeons agreeing as to which is most to be preferred. In fact no one operation is applicable to every case, and we must be governed in the selection by circumstances. Probably the safest, as well as the method most suitable to the vast majority of patients, is the *absorbent*. We shall describe each plan, and state in what cases it is considered best to put it in practice.

I. EXTRACTION.

In this method the opaque lens is removed entire through an incision made in the cornea. The operation, practised by B. Bell, Earle, Lebel, Quadri, and others, in which the lens was removed by an incision through the *sclerotic* coat, has very justly been abandoned in consequence of the danger of inflammation, and loss of the vitreous humour. This method of operating through the cornea is often classed among the modern improvements in ophthalmic surgery, from the fact of its having been particularly described and recommended by Daviel, a French surgeon, who lived about the middle of the last century. But it appears that a similar practice was known to the ancients. Antyllus, for example, describes most accurately a process for the removal of cataract by section of the cornea, and Rhazes tells us that a Greek surgeon named Lathyrius adopted a similar practice. The Arabian surgeons were also familiar with this operation, and thus we find that like many other measures of great utility, the extraction of an opaque lens originated with surgeons of former days, and has only received modifications and improvements in modern. I need hardly mention the names of Wenzel, Richter, Beer, Ware, Roux, Velpeau, Lawrence, Mackenzie and Physick, as those to whom the profession is chiefly indebted for these improvements, for who that is at all familiar with ophthalmic surgery is not already aware of the fact?

For the performance of the operation the following instruments are required:—A *knife* for the section of the cornea, and it is not a matter of essential importance which of the various instruments of this kind met with in the shops we select. Some prefer one shape and some another, but those of Beer modified by Tyrrell, and of Wenzel or Ware, are generally employed. Tyrrell's knife is shorter and broader than the original instrument of Beer, which "enables us to make the section of the cornea by a single thrust, before the point of the knife reaches the nose; whereas in the knife of Beer, when the point has been carried as far as the nose will allow of, a considerable portion of the cornea still remains to

be divided beneath the edge of the instrument; and it is difficult to complete the division of this part."

Fig. 47.

Fig. 46.



(*Tyrrel's Lectures*, vol. ii. p. 392.) Fig. 46 exhibits the knife of Tyrrell, and fig. 47 that of Beer. We should always endeavour to have the sides of the blade a little *convex*, which will prevent an escape of the aqueous humour during the section of the cornea. As often met with, instead of this *convexity*, the knife presents an obvious *concavity* on each side.

The lancet-shaped knife of Wenzel is also an excellent instrument, especially when the operation of Wenzel by the "exterior and inferior section" is performed. Fig. 48 exhibits both the section and the instrument with which it is made.

Fig. 48.



tion and the instrument with which it is made.

It is also well to have at hand one or more delicate, narrow, *probe-pointed knives*, one with the cutting edge on the concavity, the other with it on the convexity, (fig. 49,) or a pair of *Daviel scissors*,

Fig. 49.



with which, in case of necessity, we enlarge the opening in the cornea.

As the capsule does not readily yield, it is necessary to divide it before the lens will escape, at least in most cases, and for this purpose a couching needle or the curette may be employed. The *curette* (fig. 50) is an instrument terminating in a sharp and slightly curved point, which being passed through the pupil, readily lacerates the capsule. To the other end of the handle the spoon or scoop of Daviel is attached, and with this we raise the flap of the cornea, or remove fragments of the lens.

Sometimes even after the laceration of the capsule the lens remains in situ and cannot be made to leave its position without considerable pressure upon the ball. To avoid

the hazard of this process, a *delicate hook*, or a pair of *sharp toothed forceps* may be used, and with either of these instruments the lens or its capsule may be readily removed.

Fig. 50.

Few surgeons who operate much for cataract employ, at the present day, any agent for lifting the lids other than the fingers of a careful assistant. Indeed, I have seen the most disastrous consequences result from pressure of the speculum upon the eye, and have long since abandoned its use in the majority of cases. But where the patient is restive, or an infant, we may occasionally find a *speculum* or elevator of some kind required.

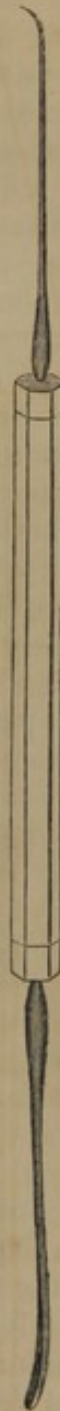
As it will be proper to shield the eye from light for several days after the operation, compresses of soft linen, attached to a piece of roller long enough to pass around the head, must be in readiness, and for the exigences of the operation, sponges, wine and water, towels, &c. &c., should likewise be prepared.

The operation of extraction may be performed in one of three different methods. 1st. By the *superior section*, in which the upper half of the cornea is divided. 2d. By the *inferior section*, the knife being made to pass through the inferior half; and 3d. By the *exterior and inferior*, or *oblique section* of Wenzel. The first method is much to be preferred to either of the others, inasmuch as the operator has "more complete control over the eye; the aqueous humour does not so readily escape, hence the risk of prolapsus iridis is much less; and finally, the pressure of the upper lid keeps the flap of the cornea in its right place."

The *inferior section* is the most objectionable, because there is great risk of an escape of the aqueous humour before the section is complete; as a consequence, prolapsus of the iris often occurs; and the margin of the lower lid pressing against the corneal flap may prevent its proper union.

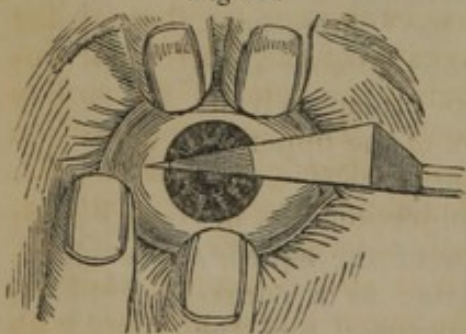
The oblique operation of Wenzel (fig. 48) is much less objectionable than the *inferior section*, and is even considered "equally eligible with the superior" by many. But there is obviously more hazard, for the direction of the wound favours the escape of the aqueous humour, and from this circumstance alone the eye may be lost or very much injured.

The operation is usually divided into *four* stages. 1st. The puncture and section of the cornea. 2d. The laceration of the capsule. 3d. The removal of the lens. 4th. The closure of the orifice and dressing the eye.



The patient, having previously had the pupil dilated with belladonna, being placed in the recumbent posture, with his head upon a pillow, and in such a position as to allow the light to fall a little obliquely upon the eye, the surgeon takes a place on one side, using the right hand to hold his knife when the left eye is to be operated upon, and his left when the right organ is affected. A careful assistant next elevates the upper lid, and avoids, as much as possible, making pressure upon the ball, while the surgeon with the index finger of his left hand, if the left eye is the one diseased, depresses the lower, and with his second finger placed upon the inner portion of the globe keeps the eye steady during the introduction of the knife. Without this precaution the eyeball is involuntarily turned towards the nose, and this occasions much difficulty and delay. All being prepared, the knife, held between the first two fingers and thumb, while the outer portion of the hand rests against the temple, is made to puncture the cornea on the temporal side of the eye, and as near its margin as possible. The object of making the section in the margin of the cornea, is to gain space for the ready escape of the lens, and at the same time place the cicatrix beyond the axis of vision. Sometimes the eye is very unsteady, rolling about in every direction: in such cases, before introducing the knife it is well to divert the attention of the patient by some question, or gently tap the globe near the

Fig. 51.



point of puncture with the flat surface of the knife. The ball becoming steady the operation is commenced, and the knife carried entirely across the chamber with a quick and steady motion of the hand. (Fig. 51 represents the superior section with the knife of Beer.) No attempt should be made to *cut upwards*, until the point of the knife emerges at the nasal side of the cornea; then if

necessary, a slight sawing motion may be made and the section of the flap completed. Great care should be taken, during this step of the operation, to keep the flat surface of the knife parallel to the iris, for if there is the slightest irregularity, or unsteadiness, the aqueous humour escapes, the iris falls over the edge of the knife, and the operation is arrested. Should this accident occur in spite of all our care, as soon as the iris is perceived upon the knife, we should suspend the operation, but hold the knife in its place. Then waiting a few moments, or dropping a few drops of the aqueous solution of belladonna into the eye, or simply rubbing the surface of the cornea gently, dilatation takes place, and the iris returns to its former position. But when these measures fail, we may with the

point of the finger *press the iris back*, as advised by Beer, and as the broad part of the knife enters the chamber it will prevent any further prolapsus.

It has been advised by high authority in case prolapsus iridis occurs *before* the puncture of the cornea on the nasal side, to withdraw the knife, close the wound, and after healing of the parts to perform the operation again. But I am convinced, from having witnessed the difficulty in several cases, that it is best to pursue the course recommended above.

The cornea having been divided, the eye is allowed to close, and a few moments rest given in order that spasm and pain may subside. We then reopen the lids, support them as before, and examine the incision. If large enough for the ready escape of the lens, the second step of the operation may be undertaken; if not sufficiently large it may be increased in size by means of a pair of delicate scissors, one blade of which is probe-pointed, or better still, with one of the small knives already described. The point of the knife is introduced into the anterior chamber, and its edge lodged in the base of the incision. As we withdraw the blade towards the temple, the cornea is still further divided.

The section of the cornea having thus been completed in a satisfactory manner, we are next to facilitate the escape of the lens by *lacerating the anterior wall of the capsule*. This is done with the *curette* (fig. 50) in the following manner. The lids being held open, as in the first step of the operation, the surgeon turns the flap down with the scoop, and then passes the curette through the pupil, being careful to keep the convexity of the instrument upwards. As soon as the capsule is reached the point of the curette is made to penetrate and lacerate it freely. This accomplished the lids are allowed to close and a moment or two given the patient. On reopening the eye the lens is often found engaged in the incision, or lodged under the lid, which is a fortunate circumstance, as it saves all further trouble. But if it still retain its position, gentle pressure with the scoop upon the upper lid, or pressure with the finger upon the lower portion of the globe, is generally sufficient to cause its expulsion.

If, however, adhesions exist, and the cataract is prevented from escaping even under the pressure, it is proper to break them up with either the curette or scissors; but this is a troublesome and hazardous matter. Not unfrequently, instead of adhesions, a portion of the lens or the capsule remains in the pupil and prevents perfect vision. It is best in such cases to remove the fragment, *if loose*, with the forceps or curette, but *if attached*, although some advise its removal even when it requires a good deal of force, no one who wishes to save the eye or values his reputation would undertake the operation. The fragments, if adherent, should be

let alone, and often they are absorbed in the course of a few days or weeks.

Occasionally the lens is retained in consequence of the contraction of the pupil, produced by the access of strong light; for such cases the eye must be shaded, and then the pupil dilating the lens readily escapes. Sometimes, however, this does not occur, the pupil being contracted; a few drops of the aqueous solution of belladonna or stramonium may then be dropped in the eye, and if this fail the margin of the pupil must be divided with the scissors, as recommended by Rosas, Sichel and others.

If in the extraction the lens should break to pieces, rather than run the risk of irritating the eye by our attempts in the removal of the fragments we should close the flap and trust to the dissolvent powers of the aqueous humour.

In examining the pupil after the expulsion of the cataract, we should avoid all unnecessary exposure of the eye, for fear, in the first place, of inflammation from the stimulus of light, and in the second, of an escape of the vitreous humour from spasm of the muscles. Great stress was at one time laid upon the escape of the vitreous humour; indeed it was supposed that the loss of the least portion would prevent the success of the operation. But although such an accident is by no means desirable, (unless, indeed, there is a sort of hernia of the hyaloid membrane, when the escape of a small quantity is a favourable circumstance,) experience proves, that a large quantity, even one-half of this humour may be lost, and yet the eye receive no injury whatever.

If by accident, during the section of the cornea, the iris has been wounded, we need be under no apprehension as to the result, at least so far as vision is concerned. For, if inflammation occurs, it is generally susceptible of relief, and any effusions of lymph that may take place are, for the most part, in time removed. Sometimes, however, the wound does not involve the margin of the iris, but makes an opening in its body; here, in order to avoid confusion of vision, which would result from the presence of two openings in the iris, the two should be laid into one by cutting across the little barrier by which they are separated.

Everything being accomplished, and the parts in as satisfactory a condition as possible, the flap should be carefully smoothed down with the curette, the lids closed, a light pledget of lint wet in cold water placed upon them, the patient put to bed, with his head and shoulders slightly elevated, and the room darkened. It is proper to bind up both eyes, for fear that the sympathetic movements of the other may cause too much motion in the one upon which the operation has been performed. This is particularly necessary when there is more or less vision in the eye not operated upon. The after treatment should be strictly antiphlogistic and administered for several days.

About the fifth or sixth day we may examine the parts, but with the greatest caution, merely opening the eye and closing it again directly. In about two weeks, if all things go on well, a little light may be admitted into the room, and by degrees the eye may be used. The patient will require convex glasses, and generally two pair, one for ordinary vision, and the other for reading, &c. But we should caution him against their constant, or even frequent use, for fear of weakening the retina. I have known blindness induced by this cause alone.

There are one or two accidents that sometimes occur after this operation, from which much mischief may arise unless a prompt and well-directed treatment be at once substituted.

One of them, and decidedly the most formidable, is *iritis*. The great danger here results from the effusion of coagulable lymph, which blocks up the pupil and destroys vision. As soon, therefore, as evidences of this inflammation are detected, the most active antiphlogistic course, followed by mercurials, must be employed.

Another accident results from a want of tone or vigour in the general system of the patient, which prevents the effusion of plasma and of course prevents the *union of the flap*. This condition is known by a feeble pulse, general depression, absence of much pain or redness in the eye, and great irritability of the nervous system; a tonic treatment is demanded here.

Another troublesome circumstance is the *prolapsus of the iris*, coming on a few days after, or at the time of the operation. If it occurs at the time it should be returned at once, either with a curette or by rubbing the eyelid. Should the accident return, and the eye seem full or swollen, the posterior wall of the capsule may be punctured, and a little of the vitreous humour evacuated. When it occurs a few days after in consequence of some sudden movement of the head, it often escapes detection until adhesions form between it and the opening in the cornea. Here all that can be done is to relieve the pain and tension by puncturing the protrusion with a needle, and instituting the most active antiphlogistic treatment; so treated we sometimes obtain a very good result. If discovered before adhesions have taken place, the prolapsus may be touched with nitrate of silver, after by a little puncture, its bulk has been diminished.

Inferior section of the cornea.—For reasons already given this method is considered much more hazardous than either the superior or oblique section. When performed in consequence of some peculiarity in the case the general directions laid down for our guidance in the operation just described, will answer. The same knife may be used and the section of the cornea made precisely as in the superior section, with this difference, that the edge of the knife is turned *downwards* instead of *upwards*, and the inferior half of the cornea is divided instead of the superior.

Operation of Wenzel.—In the operation of Wenzel, called also the *oblique* method, the cornea is divided in the manner exhibited in fig. 48. Several prefer this plan to any other from the fact that there is probably less risk of prolapsus of the iris; and should this occur, and the pupil become displaced, its position is generally such that the patient has very useful vision. The best knife for the operation is that of Wenzel or Ware, and the general directions are the same as in the other methods of operating.

Cases to which the operation of extraction is adapted.—All surgeons unite in opinion as to the propriety of restricting the operation by “extraction” to persons of middle age, or if more advanced in years, of sound constitution, whose eyes are not much flattened or sunken, and who have hard and small cataracts. In such the operation is vastly preferable to any other, as it restores vision in a much shorter period. It is, however, by far the most difficult of all the different modes of operating, and should not be attempted by a person unaccustomed to its performance. It is also liable to another objection, viz., should it fail it cannot be repeated, and the eye is totally lost.

Cases in which the operation should never be attempted.—In very old persons, whose feeble energies prevent the ready healing of the cornea; in very young persons whose cataracts are soft; in those whose eyes are sunken or small; in those whose cataracts are large and encroach upon the anterior chamber of the eye; in those in whom the palpebral fissure is small; in those whose eyes are very unsteady; in those in whom adhesions of the pupil, or habitual contraction of this opening, exist; in those affected with pulmonary affections giving rise to coughs or difficulty of breathing; some other method should always be preferred to extraction. Beer and others also caution us against operating by this plan in cases of large “arcus senilis,” for fear the wound will not heal. Lawrence, however, states that he has repeatedly cut through the arch and found the wound to unite without the slightest difficulty.

I have described the usual, and probably the best method of extracting a cataract, and shall dismiss the subject with a brief notice of one or two of those recently introduced into practice.

Mr. Scott, of London, whom I have seen operate by his peculiar method, declares that the chief difficulty in all cases arises from the force necessary for the complete section of the cornea, and has invented a knife calculated, according to him, to facilitate materially this step of the operation. The knife is very narrow, curved somewhat like a sabre, and sharp-pointed. In the operations witnessed by myself, which were all by the superior section, the introduction of the knife was certainly very easy, and the section of the cornea equally so. The patient was placed in the recumbent posture, and the surgeon stood behind, raising the upper lid himself, while an assistant depressed the lower. I am not prepared as

yet to give a positive opinion in reference to the advantages of this instrument, but must confess that although in the hands of Mr. Scott it may answer exceedingly well, I should prefer, possibly from habit alone, the knife of Beer or that of Wenzel.

Furnari, of Italy, has recently proposed a plan altogether novel, which consists in first making a lateral section of the cornea, with a convex-shaped knife, and then with a pair of forceps extracting the lens through the opening. The alleged advantages of this method are "the smooth incision in the cornea, obtained by puncture merely; the absence of all risk of an escape of the vitreous humour; the almost utter impossibility of prolapsus iridis; and lastly, the certainty of speedy union of the wound, inasmuch as there is no hazard of displacement of the flap from the action of the lids." Should experience prove the correctness of these views, the operation must unquestionably become popular; up to the present time, however, it has received but little consideration.

Sir William Adams, Travers, Mackenzie and others, have occasionally employed another operation in cases of *small, firm, or capsular cataract*, or when *the lens has by accident fallen into the anterior chamber*. Such high authority should cause us to receive the proposition with respect, and whatever may be our objections to the operation as a *general method*, every surgeon must have seen cases to which it was peculiarly applicable. It is performed in the following manner. The patient being placed in the horizontal position, and the pupil dilated with belladonna, a curved needle is passed through the sclerotica until it reaches the lens or capsule; with the point of the needle the capsule is ruptured and the opaque mass is thrust forward into the pupil, or if possible, into the anterior chamber; an incision, involving about *one-third of the circumference of the cornea*, is made then with the ordinary extraction knife, and through this a small hook or pair of forceps may be introduced and the cataract removed.

Sir Wm. Adams was in the habit of fixing the cataract with the needle, which he gave to an assistant until the section of the cornea was complete.

II. DEPRESSION OR COUCHING.

Another operation for the relief of cataract is one in which the opacity is removed by lodging the lens in the vitreous humour. This, at one time, was a favourite method, and is still preferred by some to any other, and it must be confessed that in many cases it is probably the best operation. It is performed with a needle, and to suit the fancy of the surgeon, a great variety of forms have been given the instrument. The two usually employed are those of Saunders and Scarpa. The needle of Saunders is straight, ground

flat at its extremity, and has a cutting edge of a line or two on each side, and is cylindrical in its shaft. (Fig. 52.) Scarpa's needle

Fig. 53.

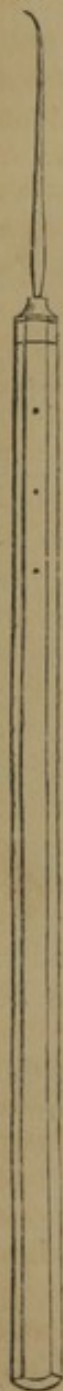
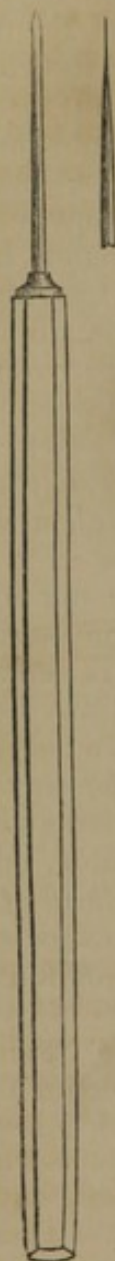


Fig. 52.



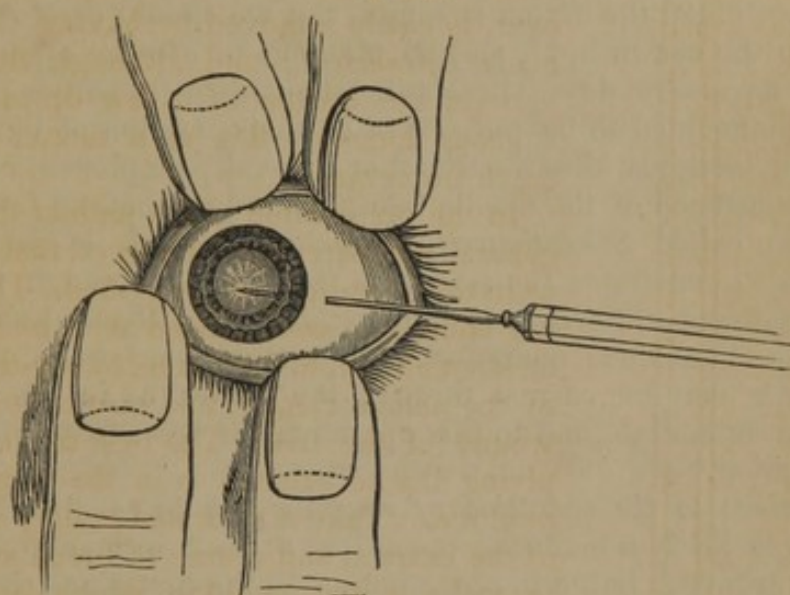
is curved at its extremity, has cutting edges, and instead of a cylindrical is furnished with a conical shaft to prevent the escape of the aqueous humour. (Fig. 53.) Most surgeons prefer this needle to any other, and it is probably the best calculated for those not accustomed to operate. The only objection to which it is liable is the shape of the shaft, which, being conical, blocks up the wound in the coats of the eye and prevents the free motion of the needle. This objection, however, is easily removed by having the shaft made *cylindrical*; and although this form permits the escape of a few drops of the aqueous humour, this is a matter of not much importance.

In the preparation of the patient the same general rules are to be observed that govern us in the operation just described. The pupil too should be well dilated with belladonna or stramonium, to enable us to see the point of the needle clearly, and also to prevent a wound of the iris. The best mode of applying the belladonna is in the shape of a poultice. Take a saturated watery solution of the extract, and crumb of bread sufficient to make a soft poultice, which being enclosed in a little bag of fine linen or cambric, is laid upon the closed lids about two hours before the operation. Another plan is to smear the margins of the orbit with the extract several hours before we expect to operate. Should we be pressed for time the dilatation may be accomplished in a few minutes by dropping a few drops of a filtered saturated solution of the extract in water between the lids. The eye not to be operated upon should be bandaged, and the patient placed in the recumbent position, as when extraction is to be performed. Some

prefer placing the patient on a low stool, with his head supported by an assistant, while the surgeon himself sits in front on a chair more elevated. For myself, I prefer the recumbent position. The upper lid must be elevated and fixed by two fingers of an assistant, while the lower is depressed by the surgeon. The patient is then

directed to look towards the nose, and if the eye is unsteady it will be proper to touch the cornea several times with the convexity of the needle, (if we use Scarpa's,) which step being altogether devoid of pain, gives confidence and calms the agitation of the patient, who dreads the suffering of the operation more than anything else. The surgeon next, holding the needle like a pen with its convexity upwards, and resting his little finger upon the temple or malar bone, which gives steadiness to the hand, introduces its point through the sclerotica, about a line and a half to two lines behind the margin of the cornea, and a trifle *above* the centre of the ball. (Fig. 54.) There is some difference of opinion among surgeons as

Fig. 54.



to the precise spot for introducing the needle, one preferring the centre of the ball, another a point below, and another a point above. The object of each is to avoid the long ciliary artery, but the distribution of this vessel is by no means the same in every subject, and hence it is impossible to indicate exactly the spot by passing through which we shall avoid its lesion. Many of the most successful operators select the position I have recommended, and for several years I have introduced the needle in no other. The needle having penetrated the sclerotica, it is carried along with a gentle motion, and as it progresses should be rotated between the fingers so as to cause the *convexity of the point* to present forward. A little spot or speck on the handle indicates the precise position of the convexity or concavity of the instrument; when this speck is in front the *convexity* is turned forwards, and *vice versa*. Assuring himself of the proper arrangement of his needle the surgeon next raises the handle, (which at first was inclined downwards,) to the horizontal position, and passes the needle, by a slow and steady motion of the

hand, onwards until its point is distinctly seen between the iris and the anterior surface of the cataract. The capsule is now lacerated by drawing the needle across it in various directions, and as soon as this is accomplished, the handle of the instrument is depressed so as to bring the *concavity* of its point upon the superior and front surface of the lens. All is now ready for couching, and accordingly, with a *slow* and *steady* pressure the lens is dislodged and carried below the pupil. For fear that it may lose its new position in the vitreous humour and again appear behind the pupil, it should be held down some thirty or forty seconds. The needle is next disengaged by a rotatory motion and withdrawn, its *concavity* now being made to present forwards.

As the pupil is freed from all obstruction, vision is at once restored, provided the retina is sound, but we should carefully avoid exposing the eye to light, and no attempts to use the organ can be allowed for several days. In fact the after treatment here is precisely that recommended to be pursued after the operation of extraction.

The method just described is that generally employed, and from the circumstance of the needle being made to penetrate the sclerotica it is called *Scleratomyxis*. Another method, in which the needle also penetrates the sclerotica, but passes through the hyaloid membrane and vitreous humour, is called *Hyalomyxis*. This is a more hazardous operation, and is rarely performed. Lastly, the needle may be carried through the cornea as in the anterior absorbent operation, and to this operation the term *Keratomyxis* has been applied.

Objections to the operation of couching.—I have already stated that this is justly a favourite operation, at least in many cases, but it is nevertheless liable to objections. In the first place, it is very frequently followed by intense inflammation in consequence of the injury inflicted upon nearly all the coats of the eye; in the second, the lens may be carried so far down as to press upon the retina, and thus cause amaurosis, and when the vitreous humour is softer than natural this accident might happen in the hands of the most skilful operator; and lastly, we have examples of the lens mounting up into the pupil, even after the lapse of several months or years. Lawrence, for example, (page 611,) mentions a case in which, after fourteen months had expired, the remains of the lens passed through the pupil, and lodging in the anterior chamber, gave rise to most intense inflammation, and required a section of the cornea for its removal.

Advantages of the operation.—The operation of couching is easy of execution, there is less risk of inflammation than after extraction, and it can always be repeated in cases of necessity. These are strong reasons for preferring it in many cases to extraction, and as it relieves the blindness in a very short time, it is sometimes preferable on this account to the absorbent operation.

Cases to which it is adapted.—The cataracts best treated by this method are the *hard* or *firm*, when from the circumstances of the case extraction cannot be performed. Soft cataracts, of course, could not be relieved by this process, inasmuch as the needle would pass *through them* instead of accomplishing their displacement.

Is the depressed lens absorbed?—Many, and among them the celebrated Prof. Beer, declare that the lens is *never absorbed*, but remains more or less altered in shape, size, and consistence, in the substance of the vitreous humour. But the reports of Scarpa, Sæmmering, Anel, Cloquet and others, set this question at rest by proving most conclusively that although the lens *may* not be absorbed or dissolved, yet in the vast majority of cases it entirely disappears.

Reproduction of the lens.—That the lens is frequently reproduced in the lower orders of animals, where the capsule is allowed to retain its natural connections, Leroy D'Etiolles, Cocteau and others, have clearly shown; but it remained for Sæmmering to discover a similar instance of reproduction in the human subject. Such an event is exceedingly rare, but the possibility of its occurrence is acknowledged by all.

III. RECLINATION.

It has been proposed to relieve cataract by a process in which the lens, instead of being passed down into the vitreous humour, is merely made to change its position, so as to bring its inferior margin opposite, and a little below the pupil, while its superior is lodged in the vitreous mass. This inclination of the lens upon its axis permits the transmission of light to the retina, and is sometimes sufficient for the establishment of useful vision.

It may be performed with the needle used in depression, and the introduction of the instrument is made in the same manner as when we intend to couch the lens. As soon as its point reaches the nasal margin of the pupil, it is to be turned so as to bring its concavity towards the lens, and then placed against this body near its superior margin. By a very slow and steady backward movement of the needle the cataract is detached from its connections, and made to assume the horizontal position, its anterior surface becoming superior, and its posterior lodged upon or rather in the vitreous humour. The needle is now disengaged by a rotatory movement, but not immediately removed, for it may be necessary to reapply pressure to the lens in order to keep it below the pupil, or to remove it from contact with the iris or ciliary processes. After a proper adjustment of the opaque body the instrument is withdrawn, and the after treatment, recommended in cases of couching, at once put into operation.

Weinhold's double needle, when at hand, may be employed, inasmuch as it facilitates the reclinatio*n*, but the ordinary needle answers very well.

The only advantage of this method consists in the slight injury inflicted upon the vitreous humour. There is, of course, less risk of inflammation and lesion of the retina than when the lens is couched; but so far, at least, notwithstanding all that has been alleged in its favour, the operation has failed to become a favourite, and few surgeons ever attempt its performance.

IV. ABSORBENT OPERATIONS.

By far the most simple, most easy of execution, and at the same time most useful in the majority of cases, is an operation intended to destroy cataract by exposing it to the action of the aqueous humour. To accomplish this end, the capsule is freely lacerated, the lens itself divided in several directions, and sometimes the fragments carried into the anterior chamber of the eye. It has long been a matter of dispute as to the manner in which the lens is removed. By some it is supposed to be *absorbed*; others contend that it is simply *dissolved* in the aqueous humour. But it is highly probable that an action in which both processes are combined is the cause of its destruction. We know perfectly well that fragments of the lens often remain for a length of time in the aqueous humour without causing turbidity of this fluid, or undergoing the ordinary process of solution. This would seem to prove that the lens should be in *contact* with living tissues in order to be absorbed; but on the other hand such fragments are often removed entirely, showing that contact with other tissues is not essential. That the aqueous humour has the property of destroying the lens in some way or other, and by a process much more rapid than that which takes place when the lens is exposed to the action of the vitreous humour, is acknowledged by all, and upon this fact the "*absorbent operation*" is based.

There are two modes of performing the operation, one through the *cornea* (Keratonyxis), first practised by Conradi, and hence frequently called the "operation of Conradi," and another through the *sclerotica* (Scleratomyxis).

Anterior operation.—In the *first*, the instrument used is a delicate curved needle, with a shank sufficiently large to fill accurately the wound made with its point. This prevents the escape of the aqueous humour, and of course diminishes the risk of prolapsus iridis, or a wound of the iris. Jacobs, of Dublin, uses a small sewing needle, No. 7, curved at its point, and ground flat on each side. Most surgeons prefer a small Scarpa's needle which cuts on the sides, while others use the straight needle of Saunders. I prefer,

myself, a Scarpa's needle, somewhat smaller than that usually met with in the shops.

The pupil being well dilated with belladonna, the patient placed in the horizontal or sitting posture, and the upper lid supported by an assistant, while the surgeon depresses the lower, the needle, held as when we are about to couch, is introduced, with its concavity in front, through the cornea, about a line in advance of its junction with the sclerotica. As soon as the puncture is completed, the instrument is passed on until it reaches the cataract, turned so as to bring its point against the capsule, and then by gentle movements across or from above downwards, the membrane, as well as the cataract, is freely divided. When the cataract is fluid it escapes as soon as the puncture of the capsule is made, renders the aqueous humour turbid, and conceals the point of the instrument. When solid or gelatinous we are obliged to pass the needle several times through the mass, and bring the fragments forward with its point.

After the rupture of the capsule, which is sufficient in fluid cataract, or the division of the lens in the other varieties, the needle is withdrawn *with its concavity in front*, the eye closed, and the usual antiphlogistic treatment instituted. It is after this operation particularly, that we find dropping a few drops of the aqueous solution of belladonna into the eye, or smearing the brow and temples with the ointment, so useful. Not only does it prevent adhesions of the pupil, but by dilating the orifice, it allows the aqueous humour free access to the lens, and thus materially shortens the process of destruction.

Although most surgeons introduce the needle through the *circumference* of the cornea, others follow the practice of Saunders and carry it directly through the *centre*. There is risk, however, when this course is pursued, should inflammation supervene, of corneal speck *in the axis of vision*, a difficulty not easily corrected and often incurable.

The operation of Conradi is very simple, and in congenital cataracts often answers a very good purpose; but it is liable to several objections. For example, it is often followed by an escape of the aqueous humour, and consequent prolapsus iridis; by protrusion against the needle, at the moment of operating, of both iris and lens, which may give rise to serious inflammation; and by corneal speck. The motions of the needle, too, are by no means free, which will prove a source of difficulty, and may cause the failure of the operation.

These objections have caused the method to be nearly abandoned by most surgeons. It is still the favourite method of a few.

Posterior operation.—In the posterior operation the same needle is employed, and its introduction is effected in the same manner, and at the same spot selected for the operation by depression. When the lens is reached we carefully avoid its displacement, and

limit our efforts to the laceration of the anterior capsule, the division of the mass, and the occasional pushing forwards into the anterior chamber, of one or more small pieces of the cataract, at least where this is solid. The preparation of the patient, and the after treatment, is the same as when the anterior operation is performed.

In the execution of either process it is well to recollect that an attempt to complete the operation at once is often followed by the most serious consequences. We should therefore be content with doing a little at a time, and after the lapse of a few weeks, when the lens is softened by the aqueous humour, the operation may be repeated. In this way we avoid the risk of inflammation, and although the process is tedious, accomplish our object in the end. We should also guard against bringing the entire lens, or a large piece of it, into the anterior chamber, inasmuch as its presence in this cavity is often productive of intense suffering and inflammation. A displacement of the lens forwards so that it presses against the iris is also a troublesome circumstance, and must be carefully avoided during the attempt made to effect its division or that of the capsule.

Cases to which the operation is best adapted.—Soft, caseous, or fluid cataracts, and those occurring in young persons, are most easily cured by the absorbent operations. Hard cataracts, from the length of time required for their removal, should not be subjected to this method, extraction or couching being far preferable.

Objections to the operation.—The only objection that can be urged against this mode of removing cataract is the time required for the complete distribution of the lens. Unless fluid or very soft, several weeks often elapse before vision is perfect, and this delay, accompanied as it frequently is, by pain and inflammation, is exceedingly onerous to the patient.

Advantages of the operation.—No mode of operating is so easy of execution, gives so little pain, or excites so little inflammation if properly performed. It is also the method which admits of repeated repetitions. These advantages render the operation a favourite with most surgeons.

V. OPERATION OF DRILLING.

A most serious obstacle to the success of any of the usual operations for cataract is the existence of adhesions between the pupil and capsule. In such cases an ingenious method of bringing the aqueous humour in contact with the opaque lens, has been introduced into practice by the late Mr. Tyrrell, one of the best oculists this age has produced. It consists in making a number of punctures through the capsule with a very fine and straight needle, the

lens being undisturbed. Through these openings the aqueous fluid passes and gradually destroys the opacity. The needle is introduced through the temporal margin of the cornea, and passed into the lens about the sixteenth of an inch. After its introduction the handle is rotated between the finger and thumb, "so as to cause its point to act as a drill," and in consequence of this the operation has received the appellation of the "method by drilling!" After accomplishing our object, we withdraw the needle and order a moderate antiphlogistic treatment. These punctures give rise to little or no pain, are followed by scarcely any inflammation, and often succeed in relieving the defect. The operation may be repeated every three or four weeks until the lens is absorbed.

As the lens is absorbed it occasionally happens that the capsule remains, and being firmly attached to the pupil prevents vision. In such cases an artificial pupil must be established, or the operation for secondary cataract performed.

CONGENITAL CATARACT.

This term has been applied to the defect when met with in children immediately after birth. At one time it was supposed not to be strictly congenital, but a number of cases, especially those of Von Ammon, prove that the disease does in reality exist in many cases previous to birth.

Causes.—Its causes are too obscure for us to attempt their enumeration. That the defect is often hereditary, occurring sometimes in whole families, is acknowledged by all.

Varieties.—The variety most usually encountered is the *capsulolenticular*; but the capsule alone, or the lens, may, as in the adult, be the only seat of disease. The consistence also varies; usually it is *soft* or *fluid*, and rarely, if ever, *hard*. Occasionally, however, in consequence of the absorption of the lens, the anterior and posterior layers of the capsule coalesce, and form a dense, tough, membrane.—(*Cataracta arida Siliquata*.)

Symptoms.—The symptoms of congenital cataract are nearly those of cataract occurring in the adult; but there is probably greater variety in the degree of vision, some children seeing tolerably well, while others are stone blind. There is also a peculiar and almost constant rolling of the eye.

Treatment.—Nothing short of an operation will answer here, and for obvious reasons that which promises most is the *absorbent*. *Extraction* should never be attempted, and the usual softness of the lens, and the small size of the vitreous cavity, contra-indicate the performance of *depression*.

The needle used should be smaller than that employed in adult cases; but with this exception, the operation is precisely the same

in both. Probably the anterior operation is more frequently demanded here, in consequence of the unsteadiness of the eye, the small size of the posterior chamber, and the difficulty of keeping the head steady while the operation is going on.

The best position for the child is the horizontal. It should be placed upon a narrow table, and its limbs secured by bandages or by having a pillow case passed over the feet and tied around the neck. Three assistants are generally required, one to hold the head, another the arms, and a third the feet. A speculum too is often required in consequence of the difficulty experienced in keeping the eye open by the fingers alone.

When we have an opaque capsule, or the *cataracta arida siliquata* to contend with, several methods of operating have been devised; but the best, at least I have found it to be so, is that in which we make a straight incision with a needle through the centre of the opaque membrane, leaving its connections at the circumference untouched. The margins of the wound contract and leave an opening sufficiently large for the transmission of light. The after treatment is that employed in adult cases, but there is less risk of inflammation here.

Age most proper for the operation.—There has existed some diversity of opinion among surgeons on this point, some operating early, others waiting for several years. For myself I have always followed the advice of Lawrence and several other excellent oculists, and operated as early as the *sixth* or *eighth* week, in order to prevent weakness of the retina from want of use, to remove the rolling of the eye, which is frightful, and to facilitate the early education of the child.]

T. D. M.

FOREIGN BODIES IN THE NOSTRILS.

Foreign bodies are sometimes lodged in the nostrils. It is seldom that an adult puts anything into his nostril which he cannot get out again; but children are apt to introduce seeds, peas, and so on, into their nostrils, their ears, and sometimes into other passages, which neither they nor their parents can remove. The child is then, perhaps, taken to a practitioner, who makes other and further attempts, and the foreign body at last gets impacted in the fissure betwixt the anterior and posterior nares. In some cases it remains there a considerable time, causing discharge, obstruction of the nostril, &c.

These foreign bodies are easily removed if one only knows how to set about it. People generally rush into the case; they get hold of a pair of forceps of some kind, and try to seize the foreign body, but the more they try thus, the further it is pushed in. There is

no possibility of separating the blades of forceps so as to encompass the substance. Sometimes they succeed contrary to their expectations, and in a different way from what they had contemplated; for a time the substance recedes, and at last it is fairly pushed into the throat, and so is got rid of. The way to remove a foreign body, whether lodged in the ear or the nostril, is to get a small scoop, bent down at the point, place the patient in a good light, pass the scoop behind the substance to be removed, and with a peculiar and quick motion of the hand, turn it out of its place.

Fig. 55.



With this instrument, similar in shape, only immeasurably smaller than the vectis used by obstetricians, you will almost uniformly succeed even when various attempts have before failed, and where the foreign body, if a seed, has, from its long retention, perhaps swollen out, and begun to germinate. You must be sure that there is a foreign body present, and take care that you do not break down the bones, or in the case of the ear, break up the membrane of the tympanum, as has happened. For want of due caution all sorts of mischief has been inflicted, the bones have been denuded, and patients have been supposed to have foreign bodies in the passages when they have really escaped. By placing the patient opposite a strong light, or by using a speculum, you can generally see the foreign body if it be present.

The speculum I here show you is intended for the nostrils, and

Fig. 56.



is useful not only in such cases as we have been considering, but also in cases of disease of the part, tumour, ulcer, &c. A somewhat similar instrument is advantageously employed in affections of the meatus auditorius.

NASAL POLYPI.

Obstruction of the nasal passages is often occasioned by polypi. They are of two kinds; the most common is the soft mucous polypus. It is very seldom that these growths occur singly. They are

generally found in the fissure between the anterior and posterior nares, hanging from the superior turbinated bones, and from the sides of the nostril. They generally exist in great numbers, and occupy both cavities. What gives rise to them I cannot tell. Some have attributed their origin to the school-boy practice of picking the nose with the fingers, but the disease would, I fear, be more commonly met with than it is were this the cause. The disease is met with seldom before the age of puberty, and presents the appearance of the comparatively benign mucous polypus. It very frequently occurs in weak leucophlegmatic habits, in females equally as in males, but I never saw it in a very young subject. The nostrils become obstructed, and the patient begins to suspect that there is something wrong. He feels as if he were labouring under a cold, and his head is, what is said to be, always stuffed. He experiences pain and weight about the forehead. These symptoms are always increased in damp weather, and, in fact, the tumours are then seen to swell and to project more than usual. As the disease advances the patient cannot perceive savoury odours, he loses his taste, and of this he very much complains. You can easily understand how that is—taste and smell are associated with each other, and if the sense of smell becomes deteriorated and deficient from any cause, as by the practice of snuff-taking, the taste becomes also deteriorated, and is, in a great measure, lost. You have seen the trick of putting a cover over the eyes, holding the nose, and giving a person different kinds of solids and liquids to taste. He is unable to distinguish between different wines and spirits of the most dissimilar flavour. A patient with a polypus of the nose suffers a great deal of annoyance. The nasal duct becomes obstructed from pressure upon its lower aperture, the bones of the nose become expanded, and the appearance of the patient is often as much disfigured from the growth of the soft mucous polypi as from malignant diseases, though not quite so rapidly.

These tumours, I have said, are often found in great numbers. In this jar (presenting it) there are from a dozen to twenty. These tumours were all taken from the nostrils of one individual, at two or three sittings. These, and tumours generally, adhere by narrow necks, have a smooth, moist surface, and I found, some years ago, that they were covered by ciliated epithelium. On placing a small shred, from the surface of a polypus, under the microscope, soon after it is extracted, you observe the cilia in active motion, driving about the fluid which surrounds it, stirring the globules of blood about so as to make them present all their aspects. It is the only opportunity, I believe, you have of seeing the ciliated epithelium in action in the human subject. The substance of the tumour is soft, possibly a hypertrophy of the basement membrane, or of the submucous filamentous tissue. A few vessels will be observed ramifying through it. Some of these polypous tumours, covered,

as described, contain fluid. There is a quantity of serosity in all tumours, even the most solid, which exudes when the surface is broken, or when they are punctured. But many such tumours are made up of cells containing serum. Sometimes the tumour consists of one large bag, or it is intersected, or several exist. The cysts are sometimes extracted unbroken, very often the fluid escapes during the operation, and the empty bag only remains to be taken away.

In cases of polypus, there is always a profuse discharge of mucus; the patient is constantly trying to use his handkerchief, but he cannot blow any air through the nostrils, or only imperfectly. The disease is attended with inconvenience, but it is not usually followed by any bad consequences. The disease, in other words, does not degenerate, and if you can take it away altogether, which is no easy matter, it is not, I believe, reproduced.

But there are other tumours met with here, which are of a very different nature, tumours which spring from the Schneiderian membrane, and fill up the nostrils very rapidly. They are attached by broad bases, and fill up the anterior and posterior cavities. Even if the disease is noticed from the earliest period of its commencement, you can do next to nothing to counteract it. You find, after a time, a large tumour projecting into the throat, and threatening to suffocate the patient. These tumours furnish a profusion of bloody sanious matter, and often a great quantity of blood. The disease is rapid in its progress, and may destroy the patient in a few months. Many of these tumours begin from the various sinuses connected with the nostril. They spring from the sphenoid and the frontal bones, and sometimes grow from the surface of the nostrils themselves.

You find, now and then, a tumour projecting from the back of the nostrils, growing from the posterior nares, and hanging down the throat; some of the soft mucous polypi are found, though rarely, in that situation, and when the velum is raised up, they can be seen behind it. But, again, you find a fibrous tumour, very broadly attached, hanging down in this situation, and that tumour is not of a malignant kind. If you can succeed in removing the whole of it, it may not be reproduced.

Malignant tumours, I have said, are not to be interfered with; fortunately they are not of common occurrence, but the more you meddle with them the more rapidly the disease will be found to proceed. The soft mucous polypi are to be got rid of by the employment of the forceps—by evulsion. There is no use in trying to clip them off, for you will find it impossible to do more than to take away small portions of these swellings. There is no use in trying to tie them. I have seen that done over and over again, and when the polypus begins to shrink, the ligature comes away without bringing off the tumour. Besides, it would be endless

work to apply ligatures to tumours when in such numbers, as I have shown you is almost uniformly the case. Suppose that you could push the ligature up to the neck of the tumour, and tie it accurately, some days must elapse before it could come off, and you have to repeat this operation over and over again. Very few would be found patient enough to submit to such treatment, even could a successful issue be promised, which could not by such means. The simple plan is to twist the tumours from off the Schneiderian membrane. For that purpose you would not use the clumsy tools that you find in cases of instruments intended for that purpose, or in the shops of the cutlers. You will find the forceps which I now show you answer the purpose; they are much better,

Fig. 57.



small and delicate, yet sufficiently strong for the intended purpose. Could you possibly seize the tumour, near its neck, by the old large forceps, to bring it out with such instruments as I now exhibit must give dreadful pain. You will perceive that there is a pin passing from one blade and turned into a hole in the other, so as to prevent their passing each other in the twisting process.

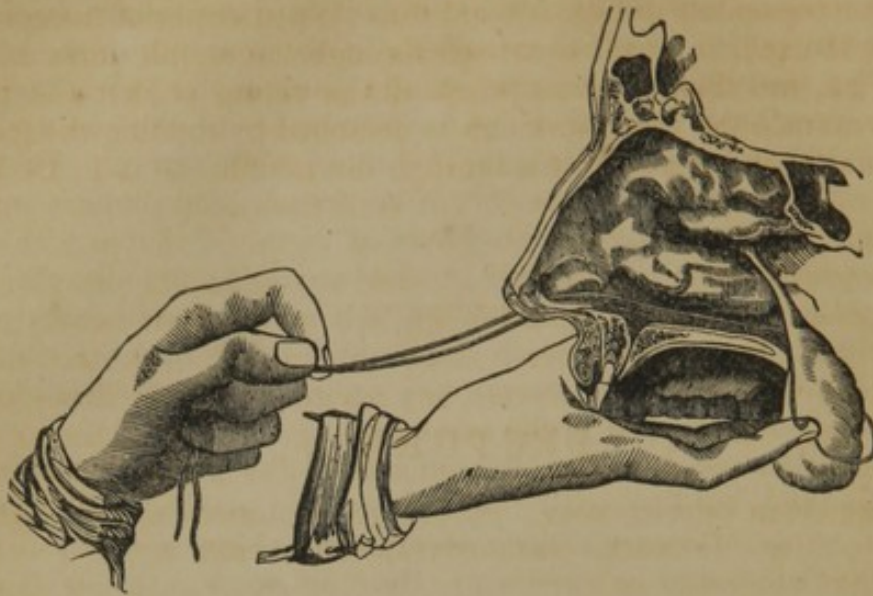
You set the patient, then, opposite to a strong light, take hold of the tumour, which gives no pain, and pull it gently downwards. Having hold of the tumour with one pair of small forceps, you put another pair close over these, and carry them up to the neck. By holding the forceps firmly, and turning them round, you do not pull the polypus forcibly, but you twist it gradually till the attachment gives way. By proceeding in this manner you run no risk of tearing the membrane or destroying or injuring the bones. You have got hold of the tumour, then, close to the root; you press the instrument, first of all, downwards and backwards, and you feel whether the attachment has given way or not. If you find that you have only removed part of the tumour, you introduce the forceps again and bring away the rest, either by the manœuvre I have described or by gentle twisting. You take hold of a second tumour before you are interfered with by the flow of blood, and you may thus, in a few seconds, succeed in removing three or four from the nostril. You must warn the patient that it will be impossible to cure him at one sitting, but you take away so many that he can breathe quite comfortably, and clear the emunctory, in other words, blow his nose. When there is a good deal of bleeding you cannot tell where other tumours are situated, or indeed whether there are any more. The patient will breathe freely for several days; per-

haps there is some swelling, that goes down, and then the nostril appears clear, but within eight or ten days he comes back probably obstructed as much as ever. This does not arise from re-growth, but from the cavity of the nostril not being emptied. Some have been wedged in the anfractuositities of the cavity; these fall down and occupy the place of those taken away. You must deal with these in the same way as the former, and perhaps in three sittings you may remove the whole of them. I have seen many cases which have been cured in this way. As the disease is not malignant there is no reproduction, but as the same causes are in operation which give rise to them in the first instance, tumours, after the lapse of some years, may again present themselves, and these may be removed in the same way.

When the tumours are situated behind the posterior nares they may be laid hold of with the forceps, and pushed back into the throat, so as to separate their attachment,—they are thus dropped into the fauces and hawked up. Here are some instruments which belonged to John Bell, strange things to push off or pull out tumours with. Here are, also, knives to cut off the tumours from their attachment.

If you find a patient with a considerable tumour hanging down at the back of the throat, and it causes a great deal of annoyance; if you have reason to think that the attachment is pretty broad, and you have failed with the forceps, you must then attack it by ligature, and this is rather a difficult matter. There are upon the table several polypi as large as hens' eggs which have been taken off in this way. In Mr. Bell's "Principles of Surgery" there is a sketch of a polypus hanging from the posterior nares, and he gives a very lively account of the dangers and difficulties attending the operation. He tells you about the necessity of being determined in your proceeding; how to pass a wire through the nostrils, to bring it out behind the palate, and expand the loop, and then, notwithstanding the patient's struggles and his sense of impending suffocation, you are to get it fairly over the body of the tumour, and then with the other hand bring the loop up to its neck. He gives a very good account of the proceeding, and if you had occasion to witness the operation, or still more, have to attempt it on the living body, you will be prepared to acknowledge the truth of his description. Having the loop of the wire fairly upon the neck of the tumour, you then take a bit of a catheter, or a double canula with rings, put that on the wire, fix one end, and pull the other tightly. But I have seen the wire give way, a very annoying and puzzling circumstance, and you are, indeed, obliged then to re-apply it. It is an operation not very pleasant to the patient who has to submit to it, neither is it a very agreeable or simple piece of business for the surgeon. I believe it is better to pass the wire first, and then by means of it a piece of small and good whipcord.

Fig. 58.



This is tightened through a ring upon a stalk. The noosing of polypi was recommended, it appears, by Glanderpius, followed by Heister, and fully treated of by Levret. The method is not applicable to any other polypi of the nose than those growing from the posterior cavities, and hanging into the fauces. But it is employed advantageously in pendulous and pediculated tumours in other mucous canals.

[When the tumours are situated far back, and overhang the

Fig. 59.

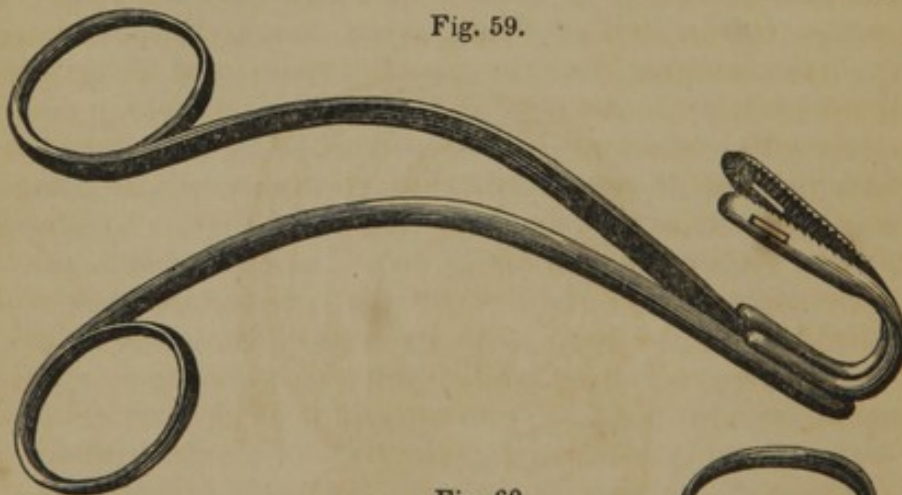
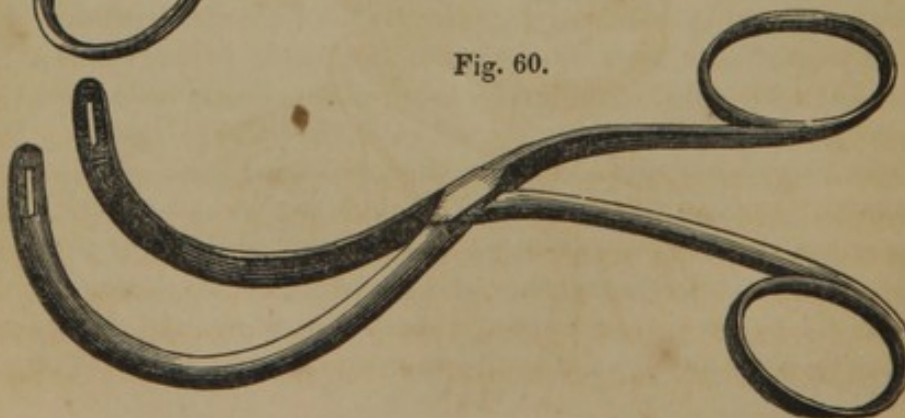


Fig. 60.



fauces, I have employed, with great advantage, forceps of the shape represented in figs. 59 and 60. When either of these instruments is used, it must be carried through the mouth down into the pharynx, and then drawn up behind the velum so that the blades may embrace the tumour, which is detached by rotating the forceps, and may then be withdrawn through the mouth. T. D. M.]

LECTURE V.

ULCERATION OF THE NOSE.—RUPIA.—LUPUS.—RESTORATION OF THE NOSE.—TALIAÇOTIAN OPERATION.

IN the last lecture I spoke to you about expansion of the nostrils from the presence of polypi. Not only are the wings of the nostrils expanded, but the bones even are pushed far out of their places, and in many cases they even increase in thickness, become hypertrophied, so that the features are considerably deformed. This is often apparent in patients who have suffered long from benign polypi. Malignant polypi may soon make the patient present an awkward appearance. Here is the cast of an old man, who was a

Fig. 61.



patient in the hospital, in whom the disease had increased with great rapidity. The nostril was filled up, and it being quite impossible to give any permanent benefit by treatment, the patient was merely kept in the house till the model was made.

FRACTURES OF THE NASAL BONES.

Mr. Cooper, I doubt not, has told you of the mode of remedying deformities caused by injury of the bones giving support to this important feature. The bones may be broken down and displaced, and some of them dislocated and turned right about. You may have a simple or a compound fracture to deal with. Sometimes there is no wound of the integuments, but there is almost uniformly laceration of the lining membrane of the nostrils; and the case is frequently complicated still further by an external wound, and a breaking up of the parts within. It is of no use to apply splints or anything of that kind here. All you have to do is to reduce the fracture and to take care that the patient does not rub his nose against anything, of which he will be tolerably cautious so as to redisplace the bones. The reduction is in general easily accomplished if you are called in immediately after the accident; but if there be much delay in the matter you will find it difficult to put the parts in their proper position, and there will be much pain caused in making the attempt. In order to put the bones straight you use only a strong probe, a director, or a pair of dressing-forceps. If you cannot get anything better, a goose-quill will answer the purpose perfectly. The instrument held with the right hand, must be introduced into the nostril to a sufficient depth, according to the extent of the fracture; you raise the bone, and at the same time, restore the nose to a proper shape by moulding it outside with the fingers of the left hand. If the nose be a shabby one you may even improve it and make it a little more handsome than it was before. The external wound must be treated according to the ordinary rules of surgery; you bring the edges together, that it may heal kindly and rapidly, and thus prevent deformity as far as possible.

WOUNDS AND ABSCESS OF THE NOSE.

I have seen cases in which the nose was almost cut entirely off with great comminution of the bone. When I was a student of surgery, I mean to say when I was attending lectures and hospitals, (for a surgeon must never cease to study his profession diligently,) a friend of mine met with a severe accident of this kind, on some rejoicing day, king's birth-day it might be, for these were held after

a different fashion in those days from what they are now ; a boy thrust a squib into the back of his neck ; he was determined to be avenged in some way, and followed him with all his might and main. It was dusk. The boy ducked under a railing, one of those low railings round commons with a triangular rail at top. My friend in trying the same dodge struck his nose with great violence against the rail, and cut it right across the bridge, almost from the junction of the ala with the cheek to the other. You would have thought that it was a sabre wound ; it got well, leaving, as you can well understand, a very conspicuous scar for life. I saw a lady not long since who had fallen against the keys of a piano-forte, and inflicted a very similar wound, all but cut her nose clean off. It was hanging down on her face. She was going quickly into the drawing-room, stumbled over a mat at the door, made an effort or two to save herself, and fell with her face into the piano-forte, which was open and opposite the entrance. The nose was replaced, the edges of the wound being put together with sutures ; the bones were set right, and the wound healed rapidly and kindly with but slight scar or deformity. If the nose is large it is a good deal in the way. A person receives a blow on the front of the nose, violent inflammation takes place, and sometimes very serious consequences result from it. The septum of the nose is shaken, great infiltration takes place under the lining membrane covering the bones, and inflammation and abscess are very often the consequence. A patient presents himself, say with the nostrils closed up by a large swelling occupying both of them, and the breathing is obstructed. I have more than once known this swelling mistaken for a polypus ; I have seen a practitioner take hold of such a swelling with forceps, give it a twist, and out has come a gush of purulent matter. But you ought to know better ; you should look to the history of the case, examine the character of the swelling, feel it carefully, and perhaps you will be able to make the fluid pass from the swelling in one nostril to that in the other. Instead of taking a blunt instrument and pulling it, you should introduce a keen-cutting bistoury, make a good free opening in one or both nostrils, and allow the matter to escape. If this be done at a sufficiently early period the probability is that the patient will soon get well ; but if not you may find the septum destroyed, and the two nostrils so far thrown into one ; ozæna will follow, accompanied with great fetor, and the patient may only recover with the total or partial falling down of the prominent part of the organ. I have seen cases in which even the columna nasi has been destroyed after an accident of this kind. A young gentleman was many years ago brought to me for advice in this predicament ; he had been playing at ball some months previously ; one of his companions in trying to strike it missed it, swung round, and struck him violently on the nose. Great swelling took place very soon after in the nostrils, with great pain ; and a collection of

matter formed. The case was neglected, the discharge continued some years, and he at last recovered, but with the point of his nose depressed upon his lip, and with the loss of a great portion of the septum and the columna nasi. We had a patient in the hospital lately who was saved from a deformity of this kind. He was a young man, a sailor, who had come from a long voyage. He had applied for advice, and was told that he had a polypus, and was advised to go and have it extracted. On looking into the nostrils the nature of the case was at one glance ascertained. He had, it appears, in a gale of wind, been struck with great violence by the end of a bow-line, a thickish rope, across the face, and the most prominent part, the bridge of the nose, suffered most severely. A great deal of pain, inflammation, and swelling took place. There was in this case a large collection of matter under the membrane covering the septum narium. This was instantly, on his application, evacuated. He recovered very well without deformity, and even without any permanent communication betwixt the nostrils. These are cases which you ought to understand. I do not think you will find any account of abscess of the septum in many of the surgical books in common use. Some lecturers are exceedingly fond of saying that you will not find this and that subject, of which they are about to treat, described in books; the majority of diseases are very well described, and it would be strange indeed if at this period they were not well indicated; but there are some few subjects, however, which you will not find so fully noticed as, from their importance, and from the consequences which follow upon their mismanagement, they deserve.

ULCERS OF THE NOSE.

The interior of the nose is sometimes destroyed by ulcerations induced by various causes, and it is exceedingly difficult to get rid of these ulcers and of the discharge accompanying them. As long as any dead bone remains the discharge will be continued, and it may last a long period, causing great annoyance not only to the patient, but to every person that comes in immediate contact with him. The fœtor of *ozæna* is most offensive; sometimes you cannot come within a yard of the patient, within reach of the air expired through his nostrils; it carries the fœtor with it, and is insupportable. Till the bones are discharged you cannot expect to bring about a cure of the ulcer. Whilst that is open there must be more or less discharge and contamination of atmosphere around the individual so affected; but a great deal may be done by putting the patient in good condition, and some relief may be afforded by injecting astringents and aromatics. A weak solution of zinc may be employed with lavender or rose-water. From a solution containing creasote

advantage is obtained, or a weak solution of chloride of soda may be used, though the latter, I think, is almost as offensive as the discharge from the nostril; if it destroys fetor it is by causing nearly as bad a one.

[I have derived the greatest advantage in ozæna from the following inhalation, provided no active inflammation exists, in which case leeches, emollient applications, and the antiphlogistic treatment should be preferred.

Take cinnabar one scruple; white sugar two scruples. Mix intimately and divide into twenty powders—one of them is to be used three times a-day in the following manner:

Prepare a half-pound weight or bit of iron and heat it, *but not to redness*; place this upon a shovel, and then pour one of the powders upon the weight. As soon as combustion takes place, a small *glass funnel* must be inverted over the weight so as to collect the fumes, and then its pipe is to be introduced into the nostril. So directed the fumes are carried to every nook and corner of the nasal cavity; and I have seen this remedy alone produce the most beneficial results. The decoction of Zittman, the iodide of potassium, and Donovan's solution, are all capital alteratives in this disease, and may be used alternately.—T. D. M.]

The interior of the nose may in this way be destroyed without external deformity; but you meet with ulcers that destroy greater or smaller portions of the organ. The ulcer may commence within or externally, as upon one of the alæ. It may begin in the form of a small wart, followed by ulceration; this extends and goes on destroying the parts until there is some active interference with the disease, and the ulceration is checked. But it may have extended so far as to have destroyed one side of the organ, one of the alæ, or the apex, or all the cartilaginous part, and sometimes even the bones are destroyed.

I have, every now and then, seen the nose very considerably deformed by the occurrence of rupia. A patient labours under some form of venereal disease, generally the phagedenic, and, as a consequence perhaps of improper treatment, he gets into bad health, he has a pustular eruption, and this is followed by prominent crusts; and these crusts increasing you find the patient with great horns on his forehead. Sometimes they form at the apex of the nose, or on the alæ, and the ulceration may, before the falling off of the crusts, have proceeded so far as to destroy the tissue completely. A gentleman was under my care some years ago with nearly the half of his nose carried away; thus he was in a very awkward predicament. He was in the army, and though he had some sort of an enamel or metallic nose, yet his brother officers could not sit with him at mess. There was great fetor, and he looked anything but handsome. He exchanged into another regiment in India, obtained leave of absence for a certain time, and if he had not got something

of a better nose he would have been obliged to give up the profession entirely. He applied under these circumstances to have the deformity removed; he had large full cheeks, and a good piece was borrowed from one of them, and joined to the nose. He subsequently entered another regiment, and now, I suppose, fills his place as well as any one.

[In this form of rupia, the iodide of potassium is almost a specific. I have also derived great advantage from sulphur vapour baths, and the preparations of mercury, particularly the bichloride, with sarsaparilla.—T. D. M.]

RHINOPLASTIC OPERATIONS.

By a little management you can supply not only portions of the nose, but the greater part of it; and notwithstanding all that has been said about this operation—this piece of decorative surgery—a nose made of real skin is more comfortable to wear, I should think, than any artificial one made of pasteboard, or metal, or putty, or anything of that description. The instrument-makers contrive a thing attached to a spectacle-frame, a sort of paper nose, but this is always very awkward. You cannot, to be sure, make a nose quite so handsome as nature does, but you may so supply the deficiency that a man will not be much noticed on the street. He may not be able to take snuff very well, but that objection equally applies to a paper nose.

You are aware that this operation has been practised for a long period of time. It was described by Italian surgeons many centuries ago, but the operation practised by Taliacotius, Branco, and others, was very different from that now resorted to in this country. I believe that some of the German surgeons have actually taken parts of the skin from the upper arm as recommended by the "learned Taliacotius," and applied them to the nose. The part of the arm which is to be removed must be previously prepared; the flap must be raised and detached from the subjacent parts after an incision is made on each side. A foreign body, such as a plate of metal or ivory, is put under the skin and allowed to remain for some time. The tissue by this becomes more vascular, and is prepared to adhere to the part better than it would do in the first instance. It is shaped out like a bit of cheese, cut in a proper form, and the surface of the face being made raw, the arm is tied up to it, and secured for three or four days, or as long as is necessary, till adhesion takes place. The adhesion having become complete, the attachment to the arm is cut away, and the nose gradually curved and made of a proper form. Here is a copy of Taliacotius' plate. But the operation now generally practised is, as I have said, of a very different character. It is an imitation of an operation that has

been very well known in India for a long period. The first account given of it was by a surgeon who had been in India, and a plate representing it was published a good many years ago. I think that Mr. Carpue was the first to imitate the proceeding in this country. He made some attempts to put on a nose, which, I believe, were not very successful. It appears that there is a caste in India, the Potters, who are in the habit of practising this operation, doing it very dexterously, and at one time it was much required. As a punishment the nose used to be cut off by the native rulers, and the natives were, it appears, in the habit after a time of picking up the detached part, and clapping it on again, and it often stuck. Even in colder climes, and in less favourable subjects, adhesion will sometimes take place in parts that are completely separated from the body. In this country many fingers have been cut off and put on again. There is a story told to the following effect by Garingeot, which may be familiar to some amongst you:—In a quarrel a man bit off the nose of his antagonist. The man picked up his nose and threw it into an apothecary's shop, and having beaten his opponent soundly, he returned to the apothecary, who put it on, and there it grew. In India the executioners, finding out the plan adopted by the natives, put the nose in a fire, lighted for the purpose, and then they were obliged to exert their ingenuity to supply the loss by other means. The method adopted was very clever. The edges are denuded, the cicatrix is taken off, the parts are cut very deeply, and then a flap is brought down from the forehead. The flap must be proportioned to the size of the features. You must not put a large nose on a small featured person, nor *vice versa*. You must look at the person's countenance, consider what sort of a nose will suit him, and then cut a piece of leather or pasteboard as a pattern which will fit.

But before cutting off the nose of the subject before us, I would rather show you the operation for making the *columna nasi*. The removal of the *columna nasi* causes deformity enough; a person looks very awkward without it, and it is desirable to supply even that deficiency. I have done this in many cases. While in the north, I had patients coming from all quarters with deformities of this kind. The first case in which I proposed it, was one in which deformity arose from a blow on the organ, followed by abscess; the case I have already detailed to you. At first the patient declined the operation, but two or three years afterwards he came and underwent it. It is now about twenty years since the occurrence took place, and I believe that that was the first time it was ever thought of.

How are you to supply this deficiency? It may be done very simply, and very beautifully, from the upper lip. You raise up the point of the nose, and make a raw place within its apex, in order to attach your flap to; that is the first step of the proceeding. You

then pass the knife a little to one side of the median line of the lip, through it, and carry it downwards to the free edge of it. You then pass the knife again a little on the other side of the median line, and carry it down also in the same manner. You thus detach a flap of sufficient breadth, raise the portion up a little, and cut the frœnulum of the lip so as to allow it to come up freely. There is no occasion for making any twist of the flap. You take off a little of the prolabium, and having made it raw, put it up inside of the nostril, leaving the lining membrane of the mouth undermost. You are aware that when that has been exposed for some time, it will change its character, and resemble the skin. You then put in a pin, make a point of twisted suture, carry your needle through the apex of the nose, and get the suture through the flap which you have formed. You thus have a perfect enough column. But now you must put the edges of the lip together, and this you also do by two points of twisted suture. You put one needle through the lip, close to the prolabium, and so place it that there shall be no notch. In this way the lip is brought together. In a patient who has lost the columna nasi, the lip is generally full, and hangs down, and by taking a bit out of it, you improve his appearance materially; here

Fig. 62.



you make good use of the part removed. You make one point of twisted suture here, and having done that, you put another pin through a little higher, and thus finish the proceeding. The flap may swell a little, and the nostril be obstructed a short time, but

by and by the swelling goes down, the edges cicatrize, and all is right. This is really a very nice little operation, though it is a conundrum of my own, as Mr. Abernethy would have said. This which I have shown you is by far the neatest way of making a twisted suture, and one that is to be applied in various operations and injuries about the face more particularly. It used long ago to be an awkward proceeding enough; the needles were very large and clumsy, such as represented in the diagram before you. They were made of silver, with movable points, and served the purpose over and over again. The points were taken out, and the pins left, and these, after a certain time (four or five days) were also removed, and made use of again when occasion required. They were a great deal too thick; they left scars, and were apt to cause ulceration. They did not pass so easily as those I have now used. You may employ the pins which I have had made on purpose, formed of wire, and steel pointed; or you may, on an emergency, have recourse to common sewing-needles, with a bit of sealing-wax on the head of them. If you use the latter, you must break away the points, leaving the wax-ends, but the others are much better. After having passed them through, they are fastened with twisted suture, and you have then nothing more to do than, with a pair of farrier's scissors, to clip off the ends, so as to prevent them becoming entangled with portions of the patient's dress. Some nicety is required in introducing the pins. Care must be taken to lay the edges accurately together, and the pins must be passed almost two-thirds through the thickness of the lip, so that the surfaces may be brought accurately together at every point. They must not be deeper at one part than another; there must be no irregularity of the prolabium, no notch left, the edge must be quite even and smooth. This is very necessary in performing the operation for hare-lip. The thread must be drawn tight enough to prevent the blood oozing between the edges, which would interfere with the adhesive process, and so that the large vessels cannot pour their blood into the mouth. You will not think of putting any dressing over this suture, though that used to be the common proceeding, and may be yet, for what I know, in some old-fashioned establishments, after operation for cancer of the lip, and for hare-lip; you merely leave the blood to dry on the incision, among the threads. One of the pins may be removed two days after the operation, and on the following day you may remove another. If union take place, it will occur within forty-eight hours; yet keep the other pin in to steady the parts, and you leave the thread still attached to it; that is to remain for four or five days, and then, as a matter of security, you put isinglass plaster over from one cheek to the other. This is all that is required. In removing the pin, you take care that the end is cleared of any clotted blood, and, with a pair of bell-hanger's or watch-

maker's small pliers, you seize the pin, turn it on its own axis, and loosen it, and steadying the thread with the finger, pull it out.

It has been proposed to put on all sorts of bandages to keep the parts together after the operation,—to put on plasters with threads to tie over them. It has been proposed, even by some of the French surgeons, writers in the “Memoirs of the Academy of Surgery,” to attempt the union without a stitch at all, by means of plasters and bandages. If you expect to effect this you will be miserably disappointed. Sometimes instead of the twisted, the interrupted suture is used; Sir Astley Cooper employed it; but you cannot by this means bring the edges so fairly, firmly and neatly in apposition, and thereby prevent the oozing of blood. Depend upon it the twisted suture is the best to insure union by the first intention.

We will suppose that only the cartilaginous part of the nose is lost. The patient comes in this predicament, and wishes to have the deformity removed by operation. You ought to do it; there is no danger; and it is generally a very satisfactory proceeding. Having looked at the case, and determined on the size of the flap, you pare the edges, make a deep incision all round, then with the hooked forceps take up the portion and detach it, thus forming a deep sulcus, into which to insert the edges of the flap. You may make the flap of the form here represented—the one which the Indians recommend, and which was adopted by Mr. Carpue; or you may make the point of the nose first, and after that has adhered make the column. This is the mode which I have latterly followed. You make a pattern, say of soft white leather, and with Indian ink

Fig. 63.



draw a mark around on the skin, to show the shape and size of the flap. You bring the pattern well down to the root of the nose, and then make an incision at once down to the pericranium: there is no use in scratching the parts bit by bit. You take down the flap composed of skin and the occipito-frontalis, leaving it at its temporary attachment betwixt the superciliary edges as thick as you possibly can, and cutting a little lower down on one side than on the other, to allow it to be turned round cleverly. The bleeding at this part and also of the flap having ceased, you turn the flap round, and stitch it by two or three points of interrupted suture on each side. It now looks, anyhow, very awkward indeed. The flap is soft and movable, it is puffed up by the expirations of the patient, and it has been asked, How is this to be supported? It has been proposed to put in an artificial bridge, and the late Mr. Tyrrell, I think, had one made of platinum. It was an absurd unsurgical notion, but it was attempted to be done. The fact is the under surface is quite raw,—that must granulate, and the parts thus become condensed. The granulations continue growing till they obtain support underneath. To support the nose for a time you may introduce a dossil of lint. When the nose is sufficiently vascular you cut away the attachment that is left betwixt the eyebrows, and when you have made it of a right shape you cut a groove, and lay it into it smoothly, and then it soon adheres. A good deal of paring is sometimes necessary to make the nose quite handsome. What are you to do with the wound in the forehead? It is at first a dreadful and frightful-looking deformity, but it is wonderful to see how soon it is filled up. You put in a stitch at the lower part and pull the eyebrows together; the part goes on cicatrizing with immense rapidity, and in a short time the cicatrization is complete, and this cicatrix diminishes in size very speedily. Here are paintings of a patient both before and after he had lost his nose from lupus, and in whom the operation was performed. I produce them to show the small size of the cicatrix. The last painting of him was made not more than two months after the performance of the operation. Some patients who have had the operation performed come to the hospital now and then to show themselves. Here is a picture of a man who had his nose supplied in India. This was the first notice that was taken of the proceeding in this country, and which turned the attention of surgeons to the operation. The following statement is annexed to the picture:—

“Comasjee, a Mahratta, of the caste of husbandmen. He was a bullock driver with the English army in the war of 1792, and was made a prisoner by Tippoo, who cut off his nose and one of his hands. In this state he joined the Bombay army, near Seringapatam, and is now a pensioner of the Hon. East India Company. For above twelve months he remained without a nose, when he had a new one put on by a Mahratta surgeon, a Kumar, near Poona.

This operation is not uncommon in India, and has been practised from time immemorial. Two of the medical gentlemen, Mr. Thomas Cruso, and Mr. James Findlay, of the Bombay presidency, have seen it performed as follows:—A thin plate of wax is fitted to the stump of the nose, so as to make a nose of good appearance; it is then flattened and laid on the forehead; a line is drawn round the wax, which is then of no further use; and the operator then dissects off as much skin as it covered, leaving undivided a small slip between the eyes. The slip preserves the circulation till an union has taken place between the new and old parts. The cicatrice of the stump of the nose is next pared off, and immediately behind this raw part an incision is made through the skin, which passes round both alæ, and goes along the upper lip. The skin is now brought down from the forehead, and being twisted half round its edge, is inserted into this incision, so that a nose is formed with a double hold above, and with its alæ and septum below fixed in the incision. A little terra japonica is softened with water, and being spread on slips of cloth, five or six of these are placed over each other to secure the joining. No other dressing but this cement is used for four days. It is then removed, and cloths dipped in ghee (a kind of butter) are applied. The connecting slip of skin is divided about the twenty-fifth day, when a little more dissection is necessary to improve the appearance of the new nose. For five or six days after the operation the patient is made to lie on his back, and on the tenth day bits of soft cloth are put into the nostrils to keep them sufficiently open. This operation is always successful. The artificial nose is secure, and looks nearly as well as the natural one, nor is the scar on the forehead very observable after a length of time. The picture from which this engraving is made was painted in January, 1794, ten months after the operation.”

The alæ of the nose have to be supplied from the cheek. The flap taken out must be proportioned to the part deficient, and may frequently be put on without any twisting of the slip by which it is attached. The flap is cut out and turned over, and thus the deficiency can be uncommonly well supplied. I have performed this operation over and over again, and it has been done in the hospital here in two or three cases. One occurred in a man part of whose nose had been bitten away by a horse, and another occurred in an oldish woman, who had been suffering under lupus. The chloride of zinc was applied by one of the dressers, and that rather freely; a good portion of the nose was taken away, the disease was put a stop to, and the parts healed firmly. We put on a bit to beautify her before she left the house. When the flap is left attached to the cheek the circulation goes on well through it. It is wonderful how well the nose is supplied with blood; the part which you have added becomes in a short time so firm that you may detach it from

the connection with its original site, and leave it to be supplied by the anastomosing vessels only.

[The following cases, taken from another publication of my own, will serve to illustrate two novel operations, designed for the entire or partial restoration of the alæ. T. D. M.]

CASE I.—About the 1st of October, 1837, I was requested by Professor Jackson to visit, in consultation, a gentleman from the South, who had had the misfortune to lose a considerable portion of the right half of his nose.

Without entering into a history of the case, which would have but little bearing upon the operation to be described, I shall proceed at once to state the character of the deformity, and the means employed to accomplish its cure.

The whole of the right ala, as well as the adjacent soft parts, as high up as the os nasum of the same side, were wanting. As a consequence of this loss, an opening half an inch in its *perpendicular* diameter, and about three-quarters of an inch in its *transverse*, at the widest part, was established. The margins of this opening were thin and callous, while the neighbouring tissues, to the distance of two or three lines, were much paler and firmer than natural, owing to the deposit of lymph during the period of inflammation to which they had recently been subjected.

The septum nasi, the os nasi, and the Schneiderian membrane were perfectly sound. The face was rather full, and its integuments healthy, with here and there a small cicatrix, the result of previous local inflammation.

As the deformity was striking, and as the deficiency of nostril on one side modified the voice, so as to render it rather disagreeable, the patient determined to submit to any operation that promised success. His general health, though delicate for some years past, is at the present moment excellent; while his age (28) and temperament (sanguine) rendered our prognosis, respecting the results of an operation, very favourable.

Upon an attentive examination of the deformity, it was determined to attempt its relief by an operation differing essentially from those proposed by the surgeons who have devoted their attention particularly to the autoplasmic department of surgery. The details of this operation I shall now present. It was performed on the 6th of October, at 12 o'clock, in the presence of Drs. Jackson, T. Harris, J. Randolph, J. R. Barton, P. B. Goddard, and Langley.

The patient was seated with the organ to be operated upon exposed to a good light, while his head was slightly thrown back and supported by Dr. Randolph. Seating myself in front, I commenced the operation by making, with a small sized convex edged bistoury, an incision extending from a few lines above the *superior* border of the orifice, to a short distance *below* its inferior, and directed *downwards* and *outwards*. It did not penetrate to the bone, but was

sufficiently profound to allow a flap about *three* lines in thickness to be readily detached. This incision was completely on the *outside* of the cicatrix, a portion of which was subsequently removed in order to prevent its hardened edges from irritating the raw surface of the flap, which was to be placed immediately upon it.

One or two small arteries were cut across, but the hemorrhage from them was arrested by pressure, until the *second* incision was made. This commenced at the *terminal* extremity of the first, and *extended horizontally outwards about an inch*. A *triangular* flap was thus marked out, and immediately detached from the subjacent bone, by dissecting with the edge of the knife held nearly parallel to the surface of the cheek. In the execution of this part of the operation two or three arteries of some size were necessarily cut across, and required the application of the ligature.

The *third* incision, which extended from the *initial* extremity of the *first* to the point of the nose, was made with a pair of strong straight scissors, these being preferred to the scalpel, in consequence of this margin of the orifice being, to a certain extent, loose and unsupported. The triangular piece of cicatrice included between the superior extremities of the first and third incisions, was then removed with the scalpel and forceps; and the sharp margin of the inferior portion of the opening also pared off, for reasons already stated.

The hemorrhage having been arrested, and the parts properly sponged, the next step of the operation was undertaken. This consisted in the approximation of the first and third incisions, and the application of such measures as were calculated to retain the flap in its proper position. From the free dissection, and the yielding character of the subcutaneous cellular tissue of the cheek, no difficulty was experienced in placing the edges in contact; and in order to insure their perfect and close approximation, *four* stitches of the *interrupted* suture made with saddler's silk, waxed and doubled, were passed. In addition, two or three small adhesive strips were applied to the spaces between the sutures.

Finally, in order to prevent adhesion between the *flap* and raw surface beneath it, and to give a better shape to the former, a small roll of soft lint, well oiled, was introduced into the *new nostril*.

The patient bore the operation, which was necessarily tedious and painful, with remarkable firmness. He was ordered tinct. opii gtt. xxx: to be kept perfectly quiet, and to lie with his *head elevated*. The temperature of the room to be 50° Fahrenheit.

October 6th, afternoon. Four hours after the operation we paid our patient a visit, and found, with much satisfaction, that he had passed a very comfortable time. The temperature of the flap was a little *above* that of the rest of the body, but this increase of temperature was not accompanied by *pain*. The pulse was a little excited, but the reaction could scarcely be considered *febrile*.

Strict injunctions were left with the assistants relative to the *position* of the patient during the night.

7th. Passed a good night; complains of a little *stiffness* and *soreness* in the parts. The flap was still somewhat *warmer* than natural, though its *colour* was not deepened. Slight oozing of a bloody serum from the lower part of the wound; pulse natural; tongue coated with *white*; bowels costive; slight thirst and anorexia; ordered ol. ricini ʒj., to be followed, if necessary, by a laxative injection: diet, iced lemonade, barley water, or tea and toast; room to be kept *quiet* and *cool*, and in case of fever occurring, spts. ether. nit. ʒj., to be given in a little cool sweetened water.

8th. Slept well; flap more painful, and slightly erysipelatous; discharge of bloody serum more copious; pulse *natural*; tongue cleaner; appetite better, and less thirst; medicine had operated freely; ordered the flap to be bathed with tepid mucilage of medul. sassafras; diet, &c., the same as yesterday.

9th. Pretty much as yesterday; flap still slightly erysipelatous, but *less painful*; continue same treatment.

10th. At 12 to-day, in the presence of the consulting surgeons, the dressings were removed; *union by the first intention* has taken place throughout, and is sufficiently firm to bear the removal of the sutures; granulations have sprouted from the lower margin of the flap, and extend some lines below the tip of the nose. Healthy pus was discharged in considerable quantity upon the removal of the plug from the nostril; flap appears much as it did at the previous visit; tongue clean; bowels open; no thirst; pulse natural; reapplied adhesive strips and plug; ordered poultice of cort. ulm. americ. to the nose; diet, &c., as before.

11th. Slept well; flap wears a much more healthy aspect, slight inflammation, however, still remains; discharge of pus from beneath the dressings; no *pain* or *stiffness* in the parts; pulse natural; secretions normal, &c.: continue same treatment. The antiphlogistic system was pursued for the period of two weeks, the treatment varying only in some minor points from day to day. During this period the ligatures of the arteries were discharged, one of them ulcerating through the flap, but it occasioned no inconvenience of any kind. About the commencement of the *third* week, it was determined to remove the granulations from the lower margin of the flap, and at the same time give it a proper curve. This was accordingly done, by means of a pair of strong curved scissors.

In consequence of the contraction of the flap, the septum nasi was caused to incline to one side, which deformity was made very evident by the removal of the granulations.

In order to remedy this, the *line of union between the base of the flap and the cheek* was divided, cutting from within with a small scalpel held parallel to the surface of the cheek, to the extent of three or four lines.

The plug was then increased in size, and introduced into the nostril, while a wide adhesive strip was carried from the tip of the nose across the cheek on the sound side, and attached just in front of the ear, in order to incline the septum in this direction as much as possible.

No bad consequences resulted from this operation, and the antiphlogistic system, to a certain extent, was still pursued for a couple of weeks longer. The patient's diet, however, had been somewhat improved, and he had also been allowed to move about the house. The use of the strap across the cheek was discontinued, in consequence of its invariably producing irritation of the skin. It moreover exerted but little influence in straightening the septum. The plug, during this period, had been gradually increased in size, with the view of *distending* the nostril, as well as to give it a proper "*set*," and the granulations within, which were very luxuriant, touched twice a day with a weak solution of the nit. argent. or creasote, and occasionally with solid caustic; at the end of the sixth week from the day of the first operation, it was determined to execute the "third step" in the treatment. This consisted in the division of the skin and cellular tissue at the base of the flap in a *semi-circular* direction, the convexity of the curve looking outwards. The object of this incision was to give the peculiar rounded margin of an original ala; to diminish the fullness of the cheek where the natural depression should exist, which depression had of necessity been destroyed by the tension of the flap, and to permit a return to the perpendicular position of the deviated septum nasi. The incision was made with a small scalpel, and extended to the bone. In order to prevent union of its margins, a small roll of oiled lint was introduced into the cut, and a strip of adhesive plaster applied to the tip of the nose, and fastened on the cheek of the sound side. The patient was ordered to confine himself to his room, and to reduce his diet.

On the third day the dressings were removed, and it was found that the margins of the incision were nearly cicatrized and beautifully rounded off.

The same dressing was reapplied, and the plug intended for both incision and nostril increased in diameter. No change of importance was made in the dressing, or in the subsequent general treatment, except that the patient was allowed to return to a more generous diet, and to take exercise in the open air. At the expiration of the eighth week the nose presented an excellent appearance. The contraction of the granulations had caused the margin of the flap to be rounded off, and the cicatrice resulting from the union of the first and third incisions, which was originally located nearly upon the dorsum nasi, to descend nearly to the cheek. This latter change was a very favourable circumstance, as it produced a depression in the exact spot at which it was required, in order to give

a proper expression to the face. Had it not taken place, there would have remained *a sort of inclined plane* from the bridge of the nose to the outer portion of the cheek. At the expiration of the ninth week my patient returned home with scarcely a vestige of his deformity remaining. There existed a slight deviation of the septum, but this was perceptible only on close examination, and in all probability will gradually diminish as the tissues of the cheek regain their original elasticity. There was also a slight discharge of mucus and pus from the nostril, owing to a few of the granulations being still uncicatrized.

The nostril itself is perfectly open, and its orifice nearly of the shape of its fellow.

The flap presents the usual colour of the skin of the face, and is so firm that the patient unhesitatingly made use of it in the ordinary operation of cleansing the emunctory. In short, as was remarked by one of the attendants, "so perfect is the cure, that no one would ever imagine that an operation had been performed upon the organ. The voice is also rendered natural."

Remarks.—By those familiar with the divisions of modern "*Autoplasty*," the operation just detailed will readily be recognized as belonging to that in which the loss of original tissue is supplied by *sliding a portion of neighbouring integuments over the deformity, (operation par glissement du lambeau.)* For the *principle*, the profession is indebted to Celsus.

In cases similar to that of my patient, there cannot be a doubt of the vast superiority of this operation over all others hitherto performed, and the wonder is, that it has never, so far as I am able to learn, been earlier resorted to. Dieffenbach, Græfe, Labat, Dupuytren, Blandin, Liston, and every other authority, ancient as well as modern, that I have consulted, make no mention of such an operation for *such a case*. The *principle*, it is true, has been applied to other cases of deformity; for example, a fistula of the male urethra was cured by Alliott, by "*sliding a portion of sound skin over the opening, and then uniting it by sutures to the surrounding parts.*" Chopart, Roux, Roux de Saint Maximin, Lisfranc, Velpeau, Blandin and others, have also made use of it in a variety of cases, but more especially in ulcers of the *cheek* or *lips*.

The mode of relieving the deformity created by the loss of one ala nasi, has heretofore consisted in the section of a flap from the cheek, the *pedicle* of which rests on the *margin* of the wound. *Torsion* is resorted to, and the *flap* attached to the septum, &c., by suture or strap. Another plan, practised especially by Liston, and the English generally, has recently been published. This consists in the section of a flap, of a suitable shape and size, from the cheek, and is altogether a better operation than the one usually performed. There is here no *twisting* of the pedicle; "The co-

aptation of the flap is consequently more exact, the supply of blood more free, and the vitality of the part less endangered."

Another operation for this deformity, where the cheek is *spare* and *shrunk*, has been successfully performed by Liston. The flap is taken from the forehead.

"This is done," observes Mr. Liston, "in the same way as for restoration of the whole nose; but a variation is expedient when the organ is of unusual length. Then the long and narrow connecting slip, if treated in the ordinary way, would be so indifferently nourished, and so ill supported, that the vitality of the transplanted part would be endangered. To obviate this, a deep incision is made along the ridge of the nose, continuous with the wound in the forehead, at that side to which the twist is to be made. This longitudinal incision is, by a little dissection with the point of the knife, widened sufficiently to contain the connecting slip from the forehead; and, into the groove so formed, the slip is laid and retained, until firm union of the whole flap has taken place. When this has occurred, which may not be until after a week or two, the slip is again raised by incision, and cut off close to the adherent flap. The wound in the ridge of the nose is then united by suture."—*Practical Surgery*, p. 233. London: 1837.

It is evident that in all these plans, a wound of greater or less extent must be made in the *cheek* or *forehead*, the cicatrice of which gives rise to considerable deformity. But in addition to the inevitable occurrence of deformity, another objection of much moment presents itself against the *first* and *last*.

Every one familiar with operations is aware, that when a part is *twisted*, or caused to deviate from its *natural* direction, to such an extent as to occasion an *impediment* to a *free circulation* of blood through it, *gangrene* is *very often*, though *not invariably*, the result. Hence the great difficulty in the rhinoplastic operations, where a flap is taken from the forehead or cheek, and *torsion* resorted to.

In the operation I have performed, both of these difficulties are done away with. There is no *scar* on the face, or at most one scarcely perceptible, and no *torsion* of the flap being required, union by the *first intention* is almost "a thing of certainty." The free supply of blood to the flap is also another circumstance in its favour.

Such is the laxity of the cellular tissue of the cheek, that no difficulty whatever is experienced in the approximation of the parts. The only *objection* to this operation is, that unless the *incisions* are carried *outwards* sufficiently far, the subsequent *contraction* of the flap may cause a deviation of the septum nasi; but this can scarcely be termed an *objection*, inasmuch as it is always subject to remedy.

The objection to taking a flap from the *cheek*, as advised by Mr. Liston, is the production of a *scar* of some magnitude.

One or two interesting physiological points connected with auto-

plastic operations in general, and which are still "matters of dispute," deserve a passing notice.

It is stated by Lisfranc, Blandin, and others, that in all cases of "autoplasty," there exists, for some weeks after the operation, a *perversion of sensibility* in the flap; or, in other words, that an impression made upon the flap (such as the prick of a pin, for example), is not referred by the patient to the point of its reception, but to the part from which the flap has been removed. Dieffenbach contends that this is altogether a mistake, and remarks that, "in all his experience (which has been most ample), nothing of the kind has ever been met with." Liston and others state, that "perversion of sensibility is not by any means so common an occurrence as many assert," though it may occasionally happen. In the case just recorded, there certainly did exist, for a few days only, however, something like it; for example, a fly resting upon the *nose*, caused the patient to brush his cheek, &c. But here the nervous communication between the parts was so *direct* and *extensive*, that we are at no loss to account for the phenomenon.

Another statement made by most writers upon the subject is, that when the flap has been taken from a part naturally covered with hair, the hair-bulbs in the transplanted parts, either dry up, or secrete a very *fine, silky, and light-coloured down*, altogether different from the original hair. *Jobert* denies this assertion, and says that the hair, though somewhat lighter in colour, nevertheless continues to grow as luxuriantly as before.

In my case, the flap extended into the bearded portion of the upper lip, and *two months* after the operation, this beard *continued to grow*; whether or not it has since disappeared I am unable to say.

In all cases of successful rhinoplasty, the granulating surface of the flap becomes in time converted into *mucous membrane*, and enjoys to a certain extent the function of this membrane in an original organ; the *sensibility* is not, however, as acute; in my case, this change has been fully accomplished. Within the last few days I have received a most gratifying letter from my patient, a brief extract from which I introduce; it bears date four months after the operation.

"Dear Sir,—After a very pleasant trip in fine weather, and some intentional delay on the road, I arrived home in safety about a fortnight since. I suffered no injury from traveling. Since my arrival, I am pleased to say to you, that the wound on my face has *entirely* healed, both *inside* and outside the new formed ala. The new skin, internally, is *entirely sound and healthy*, and all swelling has subsided. The scar on the face is hardly observable, and the adjacent parts have accommodated themselves, as well as I could expect, under all the circumstances, to the altered condition of the nose and cheek. The nostril appears natural, but not quite large enough;

and there seems to be a disposition in the part still farther to contract, though I hope it may eventually be overcome."

"N. B. My general health is very good, and I am as actively engaged in business as ever."

I have no doubt whatever, but that in course of a few months, all "*tendency to contraction*" will be overcome.

CASE II.—George Desher, aged 19, in a fight with a person much stronger than himself, had a large portion of the right ala of the nose bitten out. The parts healed kindly, but there remained the de-

Fig. 64.



Fig. 65.



formity exhibited in fig. 64. On a careful examination of the parts, I determined to perform an operation essentially different from those usually employed in similar cases. Accordingly, on the 3d of April he was brought before my class, and the following method of operating put into execution:—Being properly seated, and the head supported by an assistant, I passed, flatwise, a long, thin, narrow, and sharp-pointed bistoury between the integuments and the subjacent cartilage in the direction of the dotted line *a b*, in fig. 64. When the point of the instrument reached the spot indicated by the letter *b*, I turned the blade upon its *edge*, and divided the cartilage and muscle freely from without, *inwards*. Then disengaging the knife, I passed it, in the same manner, in the direction of the line *d c*, and separated the cartilage from its attachment. These two incisions enabled me to pull the flap, included between them, *downwards* and *forwards*, so as to occupy the space originally occupied

by the ala nasi. I next freshened the edge of the flap, and also that along the bridge of the nose, and brought them together by four stitches of the interrupted suture, as is seen in fig. 65. A strip or two of isinglass plaster was placed over the parts; a small pledget of lint introduced into the lower edge of the wound, to prevent union between the edges, and the patient ordered to be kept quiet, and in a cool room; and in the event of the flap being too warm, the assistant was requested to irrigate it with mucilage of the medul. sassafras. Union by the first intention took place; and in two weeks my patient was entirely cured.

Remarks.—This operation is unquestionably the best that can possibly be proposed in all cases of *partial* loss of the ala; inasmuch as by it we avoid a scar upon the cheek, an extensive dissection, and, above all, secure a round and perfect margin for the nostril. There is only a line along the bridge of the nose to indicate that an operation had been performed, and the deformity is entirely relieved. —T. D. M.]

LECTURE VI.

THE NOSE.—ENLARGEMENT OF THE FOLLICLES.—ENCYSTED TUMOUR OF THE ALÆ.—EPISTAXIS.—CONGENITAL DEFORMITIES OF THE FACE.—HARE-LIP.—FISSURE OF THE PALATE.

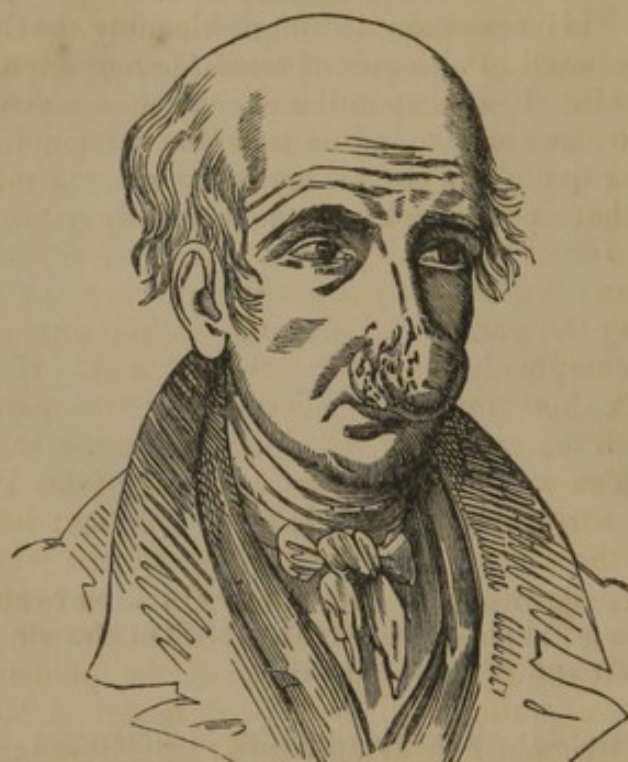
I SPOKE yesterday of supplying the deficiencies of the nose. Making an entire nose is not, perhaps, so difficult a matter as putting in small bits. Even when the ossa nasi have been destroyed, a sufficient flap may be made to supply the deficiency; but when the nose is almost entirely destroyed it is often best to take away what remains and make an entirely new one; by this means a better and more creditable job can be made of it. This union by the first intention was much ridiculed at various times, by Butler, for instance, in his admirable "*Hudibras*." He represents noses as made from a part of some other individual which could well be spared, and that when the party died from whom it was borrowed the nose dropped off. Long before this Rabelais gives a capital stroke at union by the first intention. He describes an engagement in which Episthemon, one of the friends of the young prince, lost his head. The way in which the loss was remedied was this: it was found betwixt his legs all bleeding, was wiped and bathed in wine, and was held by Panurge against his codpiece, to keep it warm; it was forthwith applied, vein against vein, and spondyle against spondyle;

it was then stitched all around, and a famous job was made of it; only the neck was a little twisted for some time after.

HYPERTROPHY OF THE NOSE.

Sometimes patients have a great deal too much nose, as represented in the drawings before you. This, I stated some time ago,

Fig. 66.



is a sort of hypertrophy of the skin. There is a great enlargement of the follicles; some of them are so large that on opening them you can insert the point of the finger; in fact, they may often be described as a series of small encysted tumours, containing a quantity of sebaceous matter, and of different sizes.

Where these tumours only involve a portion of the skin they can be easily removed; and even where they are of a large size the whole may be taken away. Surgeons used to be afraid of interfering with disease of this kind, and this arose from the notion that it was of a malignant character. In the "Memoirs of the French Academy of Surgery" two cases are described as cancerous, and the surgeons hesitated to interfere. If I am not mistaken, the late Sir W. Blizard lost a patient in the London Hospital in attempting to remove one of these tumours. The patient was there for an ulcerated leg; Sir William thought he might as well remedy this deformity whilst the patient was necessarily confined. The tumour

was dissected off, but the man died, I have heard, from the effects of hemorrhage. The tumour is of the simplest possible character, and if you take it away entirely there will be no reproduction of it, and if this is properly gone about there is no risk from bleeding, or from any other cause. If the tumour is extensive, involves the apex and both alæ, an incision must be made right down the median line of the nose, through the whole thickness of the diseased skin; your assistant puts his finger in the nostril, and with a pair of hooked forceps and a knife you dissect the tumour from one side, and make the nose as like as possible, in size and shape, as it was before. There is often a good deal of bleeding, but you need not stop on that account. Having completed the operation on one side, you proceed with the other, and make the two sides as nearly as you can of the same shape. This may occupy some few minutes. In this peculiar tissue you cannot expect to pull the vessels out and tie them, so that if they continue to bleed very profusely, small sewing-needles must be put through the bleeding points and threads tied round them; the ends of the needles are then cut short off. In general, stuffing the nostril with lint and putting on a compress and bandage will completely arrest the flow of blood. Here is a drawing of a man a short time after the operation was performed; you see how smooth the surface is, and how handsome and shapely the nose looks. You would expect that a wound of this kind, presenting so large a surface, would be long in healing; but that is not the case. At the end of a fortnight, although the whole nose has, as it were, been skinned and made raw, it will be healed over, and there will be a good and firm cicatrix. This drawing is really no exaggeration; it shows the appearance of the patient a very few weeks after the operation had been performed. A mighty change has thus been wrought rapidly and safely, all these lumps, some as large as oranges, having been permanently got rid of. This is one of a great many cases in which I have had occasion to perform the operation.

[I have operated on several of these cases, one only a few days since (Oct. 20th, 1845) before my class, and in no instance have had the least difficulty. At one time the disease was looked upon as very formidable, on account of the bleeding, but I agree with Mr. Liston in the opinion that there is no risk from this cause provided we are careful. The cold water dressing has been the only application made in any of my cases, and under it, the process of healing was rapidly performed, the cicatrix being smooth and flexible.—T. D. M.]

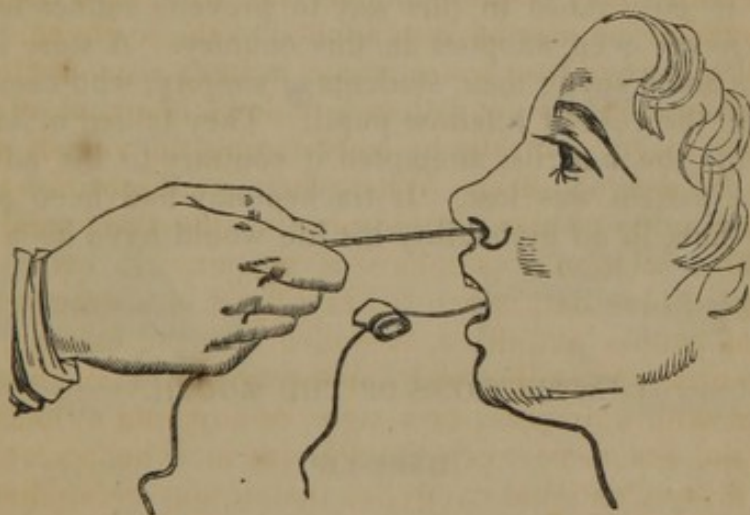
EPISTAXIS.

You are often called to arrest bleeding from the nostrils,—to treat what is called epistaxis. Boys very often have bloody noses from

injury, but sometimes blood will spring out from one or both cavities without any cause, perhaps from stooping, in those of full habit, but that is soon arrested. Occasionally, however, in persons beyond puberty, bleeding takes place from the nostrils, and it goes on, perhaps, to an alarming extent. The patient falls down in a fainting fit, the bleeding then stops, but it may recur again and again, and then, in fact, the patient is in a very precarious state. He labours, perhaps, under a hemorrhagic diathesis. The blood runs out very fast and becomes very thin; it contains little fibrin or colouring matter, and the flow is stopped with much difficulty, and if arrested for a time it is apt to run away again on the slightest excitement. A gentleman came to me, too late for dinner, two evenings ago, who had been to see a lady attacked in this way, and she was in such a condition that he feared she would not live many hours. She had been lying for some time with slow breathing, tossing about her arms, and was becoming convulsed in her features. The bleeding had been stopped for a time by the injection of astringents into the nostrils, but this will not always answer the purpose, nor can it be depended upon. If you are called to a case where the bleeding is very alarming,—has, perhaps, stopped of itself, or been checked by the application of cold externally, or the use of astringents, and then come on again furiously,—you must take some effectual means to arrest it. In many cases the application of cold will be sufficient. Very cold water may be dashed over the face, or a bladder containing pounded ice may be kept applied to the forehead. Bathing the genital organs in iced water is said to have a good effect. Old women will sometimes put a door-key down the back of children whose noses bleed, and this, by constringing the vessels generally, may have the desired effect. Where there is a disposition to hemorrhage you may try to arrest it by injecting the compound solution of alum, or a solution of sulphate of copper. In some hospitals what is called blue lint, which is lint dipped in a strong solution of sulphate of copper and dried, is stuffed into the external nostrils. It is a favourite proceeding with some surgeons to take a long piece of lint, and with a director, or bougie, or anything at hand, push it right into the fissure between the anterior and the posterior nares, and then fill the external cavity, so that it may be applied to that part of the mucous membrane which is furnishing the blood. But sometimes this does not answer; the blood does not flow from the anterior nares, but goes back to the throat, and you must stop it there also. You must, as it is called, *plug* the nostrils effectually. For this purpose a ligature must be passed through the nostril which is bleeding, and sometimes through both, as where the septum is imperfect. To carry the ligature a piece of wire must be introduced along the floor of the cavity to the back of the throat. You see it behind the velum, take hold of it with your finger or with a blunt hook, and bring the loop of the ligature forward into the mouth.

You cannot always carry about with you instruments for this purpose, although such instruments have been contrived. Here is one intended for that end. A piano-forte wire, however, the wire of a catheter, an elastic gum-catheter, or anything of that kind, will answer the purpose. When you have brought the loop forward you attach to it another, consisting of stay-silk or whip-cord. In the middle of the ligature which passes from the nostril to the mouth you fix a plug sufficient to fill up the posterior cavity of the nostril. That is put into the mouth and drawn back; you guide it with the finger to behind the soft palate, and drawing the ligature in the nostril, lodge it fairly in the cavity. Nothing now remains to be done but to plug up the anterior cavity; the blood then accumulates, coagulates, and the hemorrhage stops. The plugs must be retained two or three days; you then withdraw the anterior plug, a fetid coagulum of blood is discharged, and there is no further hemorrhage. If half a day elapses and there is no further bleeding, you dislodge the posterior plug also; for that purpose, you draw the piece of lint into the throat and out of the mouth by means of the ligature that was left. The plug had better consist of lint than of sponge; sponge sometimes swells, gets entangled with the bones, and is dislodged with difficulty.

Fig. 67.



Speaking of foreign bodies in the nostril, I should have mentioned that some time since a lady came to me with what she called a discharge from the head, and labouring under an impression that some foreign body was impacted in the nostril. She had a faint recollection of a piece of sponge having been thrust up to arrest an alarming flow of blood. I examined the nostril with great care, using a speculum, of course, but could discover no foreign substance. The discharge went on, and rendered her very miserable, and at last a piece of sponge which had been lodged there came

out of itself. It got back into the throat, and was coughed up in a hard state, together with a great quantity of fetid matter, and then the discharge ceased. She had worn this sponge for several years, suffering constantly from violent headache, and profuse offensive discharge.

At the same time that you perform the operation of stopping up the passages from the nose effectually, you will take means to get rid of the hemorrhagic disposition. You will not be contented with this mechanical measure of arresting the bleeding, but will take the opportunity of improving the patient's health, altering the state of the blood as much as possible. There are remedies which, given internally, have some effect in rectifying this hemorrhagic diathesis, such as alum, the acetate of lead, &c., but perhaps the best of all is gallic acid. You may give Ruspini's styptic in a large dose, the active ingredient of which is believed to be gallic acid, or, what is more certain and satisfactory, you exhibit this acid in solution, in doses repeated according to circumstances, and thus arrest the blood not only temporarily but permanently. In some cases of obstinate hemorrhage from the nostrils, dependent evidently upon a plethoric condition of the system, a good bleeding from the arm has often been practised with advantage.

It has been proposed to pass instruments through the nostrils for other purposes. Dessault, in cases of affections of the windpipe, proposed to pass tubes in this way to prevent suffocation. This plan has never been adopted in this country. A story is told by Pelletan of some young men, students of surgery, who came to consult him on the case of a fellow pupil. They talked of inserting a tube through the nostrils, attempted it contrary to his advice, and failed—the patient was lost. If tracheotomy had been performed in proper time, in all probability his life would have been saved.

AFFECTIONS OF THE MOUTH.

HARE-LIP.

You may sometimes be called upon to repair congenital deformities of the face, and these are of many and various kinds. Here is a very good sketch of four children labouring under different kinds of hare-lip.

What gives rise to this deformity I cannot pretend to say. If you talk to a woman about it who has brought forth a deformed child she will find some excuse for it, and perhaps tell you that she was frightened by seeing some horrid object, some individual perhaps labouring under a very bad and disgusting deformity of the kind. You, of course, will not give credit to idle fables of this

kind. I have often been told of instances where women had brought forth many children well formed, but, by some chance, a family had come into the country, one of the children of which had a deformity, and then all the women began to have children similarly affected. The four children sketched here belonged to one family. You not unfrequently find two children thus affected in the same family, for a woman, after getting into the bad habit of bringing deformed children into the world, often goes on with it. This woman had a sister who came to live with her when she was newly married, and she entertained a leveret as a pet. The neighbours and gossips told her that if she remained there her children would be born like hares, with their lips split, and so they were, one after another. There was one intermediate child perfect, which died, but the four boys lived—John, Charles, James, and Toby—and they were sent to the Edinburgh Hospital. I was in the hospital after all the pupils had left, and I met the family coming straggling down stairs. I went back and gave them into the charge of the nurse, without saying a word to any one, surgeons, or dressers, or pupils. There were some capital operations to be performed the next day, and having performed one we had in a case of hare-lip; that again was followed by a capital operation, and then another case of hare-lip, till the pupils thought they were never to be exhausted. I have

Fig. 68.



Fig. 70.



Fig. 69.



Fig. 71.



brought this drawing to show how much the cases varied. The youngest child has a simple slit of the lip; in another there is a double hare-lip, with a very short flap; one not quite so bad, and one where the fissure was very great, passing back through the hard and soft palates.

It is desirable to remedy this deformity for the patient's own sake, and in some instances it may be done with great facility. Sometimes there is a mere simple split on one side of the mesial line—perhaps there is a trifling notch—but the edges are rolled away, the teeth are exposed, and this gives the patient a very awkward appearance. The operation must be modified according to the extent of the fissure and the space between the parts of the lip. In the first place you are to consider at what period the operation is to be performed; some persons say it cannot be performed too early, and many parents are very anxious to have it performed immediately after birth. Some of the obstetric practitioners in this metropolis do perform it upon infants, but they often make sad bungling jobs. I advise you to defer the operation till the first set of teeth have come in, and I have seen good reason for adhering to this rule. When the operation is undertaken at an early period there is often great difficulty; sometimes union does not take place, the parts turn out again, and the patient is rendered more deformed than in the first instance. When the features are enlarged somewhat you have more ground to work upon, you can put the parts then neatly together, and you can almost answer positively for the union taking place. I operated on a child the other day in whom the operation had been performed twelve months ago. The parents were anxious to have it performed, but I then refused; it was done, however, but the moment the pins were removed the lip turned out as before. You continually see patients sent back at the hospital till the proper period has arrived.

Supposing that the fissure is simple, and everything is right and proper as it regards health, the operation may be performed by a very easy process. The instruments employed are, or ought to be, exceedingly simple. Here are all sorts of complicated instruments made for holding the lip, but, depend upon it, the fingers are the best forceps. With the fingers and a knife, such as the one I show you, you make the incision, whatever the nature of the hare-lip may be. Here is a drawing of two children who were brought to have the operation performed. What mischief might be done by operating on such objects as these! They often do not live, and it is, therefore, better to let them go on as they are for a time. You do not put them in a better condition to live, even though the operation succeeds, and this is by no means a certainty, as I have said, in mere infants. If they die the operation is saved, but if they live you can then do something to remedy the deformity by uniting the fissures. If you have a simple fissure on which to operate, you

wrap the patient well round with a table-cloth, or jack-towel, so that he cannot move. You have him held on the nurse's knee, place yourself in a good light, and fix the child's head betwixt your own knees, with his head towards you. Then laying hold of the edge of the lip with the fingers, you enter the knife above the angle of the fissure, and carrying it downwards, free from the continuation of the prolabium, you take care to remove all that portion of the lip. You pare off a considerable thickness of the parts, so as to get a broad surface to oppose to the opposite side. You enter the knife again, carry it down on the other side, and bring it out where I have done. The operation is now so far completed. You have some little bleeding, which you can arrest by the fingers, but you do not care for its instant cessation. You immediately put in the needles for the twisted suture in the way I described yesterday, and these are also of the simplest kind. I have here various sorts of forceps which are used to lay hold of the lip; and then there is an instrument for introducing the pins which used to be called a *porte-aiguille*. Five and twenty years ago no surgeon would have thought himself prepared to encounter a common and single case of hare-lip unless fortified by this armamentarium. Having introduced the needle you make two points of suture, secure them by a thick twisted thread, and cut off the ends of the pins.

If there is a double hare-lip, the operation must be regulated altogether by the size of the intermediate flap. In many old books, those of Heister, Benjamin, Bell, &c., and even in Mr. Cooper's "First Lines," it is recommended that the operation should be performed on one side, and that one fissure being united, and the cure consolidated, many weeks or months afterwards the other should be operated upon. But there is no occasion for anything of the kind; if there are two fissures, you complete the operation at once. Sometimes it is necessary to take away a portion of bone which projects forward, and pushes the flap out of its place. Before you can get the soft parts together you must detach the flap, and with a pair of cutting pliers clip away the bone, perhaps with a couple of the incisors. There are many specimens in the museum of portions so removed. In cases of bad double hare-lip, however, there is generally a deficiency of the bones, and that you cannot very well remedy. There is no mode of filling up the space. Sometimes the fissure of the palate runs quite forward to the fissure of the lip, and there is a great void into which you can pass the little finger between the bones of the palate. With the palate, however, I have nothing to do at present. Your object is to put the external parts neatly together; if the flap is in its proper place, good and well; if not, you take away a portion of the bone. If the flap is sufficiently large, you will make the incision thus:—you begin above the fissure and carry it down to the free margin of the lip; you make another incision, and carry that down also, and then you

do the same on the other side. Sometimes you make the incision in the median line, bring it to a point, approximate the edges, and merely thrust a pin through the upper portion. Sometimes you can get a portion of the prolabium to come down to a level with the lip, and if you can do this, so much the better. Having effected your incisions, you push the pins right across, and unite the two fissures at once, by the same twisted sutures. This answers better than doing the thing by halves; you make the parts smoother. The great object is to have the prolabium straight, and all the incisions are made with that view. Both the incisions must be made of the same length to prevent puckering. You must take away the rounded portions; for if you do not, you leave an awkward-looking notch. Many patients have been operated upon for hare-lip in early life that had better have been left alone. I operate two or three times every year, sometimes much oftener, where the operation has been performed before. In these cases you must cut through the lip, remove the cicatrix, and put the parts handsomely together, guarding against any notch being left at the free edge of the lip. I had a young lady under my care, in the neighbourhood of the hospital, two or three years ago, who had a split palate, and who had been operated upon for hare-lip very soon after birth. I advised her strongly to have the cicatrix cut out, and the parts again put together. She consented, and such was the change produced in her appearance, that, some days after the operation, on stirring the fire, and rising suddenly before a mirror, she started back, not knowing herself. I advise you, when you put in your first pin, to twist your ligature upon it; do not take away the ends, but give them to an assistant to hold, and then put in the other pin. It is not often that these are required.

CLEFT PALATE.

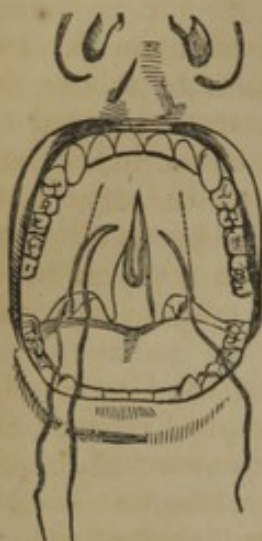
Having spoken of the deficiency of the palate, I may as well finish that subject. The union of the separated edges is often attempted; it now and then is successful, often not. It is not often that you find a case so favourable as the one represented here. The fissure generally passes forward in the bones, and when that is the case there is but little to be done; the speech is not improved by uniting the soft parts; the patient does not swallow better than before, and fluids come forward into the nostrils just as they did formerly. All that can be done in these cases is to have some clever mechanical dentist to put in a proper plate, which may be attached to the teeth, or sometimes it may be fixed independently of the teeth. But where you meet with a favourable case, where the soft palate only is split, and not far separated, and you find, on examination, that you can pull the edges together without a great

strain, it is worth while to attempt the union of the parts. You cannot perform this operation till the patient is getting towards years of discretion, when he is anxious to have something done, and will forward your views in every possible way by abstaining from putting the parts in motion, and from taking food for some time. When I say abstain from taking food, I am not to be understood to say that the patient is to be kept without nourishment entirely, without the means of sustaining the vital actions for days, or even for many succeeding hours. The operation itself is attended with some difficulty, and a surgeon must be well assisted by the patient or he cannot succeed. It is of great moment to diminish the excitability of the parts previously to the operation; they ought to be taken hold of and pulled about. The patient ought to be instructed to put his fingers in his mouth, and about the palate, so as to accustom the parts to contact with foreign bodies. The surgeon should, from time to time, take hold of the parts with the forceps and pull them together. If he finds that it is possible to retain them so without great strain on the ligature, if the case is favourable, and the parts are well prepared, you may set about performing the operation with confidence, and it is similar in every respect, in principle, at least, to that for single hare-lip. In the first place, then, you set the patient opposite to a good light; having opened his mouth, and well exposed the fissure, you hold down the tongue with one finger, and inserting a small narrow knife, above the angle of the fissure, carry it down with a slight sawing motion, till you bring it to the point of the cleft uvula, detaching a part of the fissure. You repeat that on the opposite side. You operate on the right side with the left hand, and *vice versa*. You seize hold of the parts that you have detached by a pair of long forceps, with fine hooked points, and with a little trouble you will be able to remove them completely. You are then prepared to put in your sutures. You allow the patient to clear his throat of blood; you wait till the bleeding has nearly ceased from the edges of the wound, and then you must take some efficient mode of putting the parts together.

In order to complete this operation a great variety of instruments have been employed, all sorts of complicated machinery, a great many things very ingenious, but very useless. Here is a machine for carrying a ligature through, but it is not of any use in practice. Here is another instrument, which a good friend of mine, an American surgeon, brought me over from Paris the other day. It is intended for approximating the edges of the fissure, and carrying a ligature through them, but it is quite inapplicable. I have no patience with these fine contrivances. The ligature can be passed very well with those simple needles, in handles, that we are in the habit of using on other occasions. There is no difficulty in passing a needle in this way with the point towards the incision. You

lay hold of the loop of the ligature with a small blunt hook, and bring out the double ligature to the angle of the mouth. You have another needle, armed with a small ligature, and you pass that from the other side also towards the incision. You detach these liga-

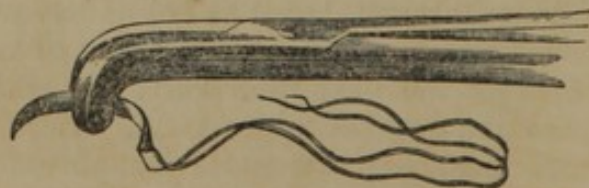
Fig. 72.



tures altogether from the needle, and draw the needle out, keeping in only a single ligature. You bring this out of the mouth, and put this single ligature through the loop of the other. You have thus a double ligature, of sufficient thickness, carried through both sides, and you accomplish the object more effectually than you can in any other way. You pass another ligature in the same manner, and that is quite enough at first. You secure the ligatures by drawing them together and fastening them with a common reef-knot. You can run it up quite well with the points of your fingers. My excellent friend, Sir Philip Crampton, has succeeded, in one or two cases, in passing ligatures by means of very much bent needles, from the incised edge outwards, taking it

back, and then passing it through on the other side. He has also employed a most ingenious method of drawing together the edges, viz., by passing both parts of the ligature through a little metal bead, such as ladies use in making netted purses, and pushing this up to the incision upon the threads. But the way that I first described answers perfectly well. Having put the parts together it is well to allow the patient to rest for a considerable time, several hours, to allow the wound to get dry, and then you put in two or three additional points of suture, which you can do easily by means of a small bent needle, carried in such forceps as these. You pull the parts together, and keep them in apposition by the two or three sutures first introduced, and then, when the favourable time for union occurs, we put the edges of the wound still more closely together by means of this needle, carried in these forceps. You

Fig. 73.



push it through, shift your hand, and bring the forceps back. You can thus turn your needle at once through both sides of the soft palate, from one side over to the other, and in that way you carry

two or three ligatures to secure the edges more accurately together. Thus you accomplish this *veli synthesis*, which is the fine name for the operation, but you must not be too sanguine about its success. I have succeeded in a good many cases, but it is liable to failure. In the last case operated on in the hospital, everything promised well, but after the ligatures had been taken away two or three days the parts tore open again.

[I have performed, in all, twenty-one operations upon the soft and hard palate, and out of this number have failed to relieve the patient but in two cases. In one, the ligatures were removed on the second day, by the coughing and restiveness of the individual, and the operation has not been repeated, although the case is as susceptible of remedy as before. In the other, the voice, although *improved*, is still indistinct, and the relief is not as apparent as in the other cases. I have met with no dangerous symptoms in any case.

In a *résumé* of M. Roux's cases, to be found in the *Gazette Médicale*, for August, 1842, it is stated that "in simple fissure of the velum he cured *two* out of *three*. When complicated with fissure in the hard palate, the proportion of successful cases was but *one* in *three*!" Dr. Warren, of Boston, has relieved thirteen out of fourteen cases.

In order to exhibit my method of operating, and also to indicate several points of interest connected with the subject, I introduce the following report, published some time since in the *American Journal of Medical Sciences*.

CASE I.—In the spring of 1840, I was requested to attend Mr. Nathaniel L. Dickey, of Philadelphia, who was desirous of having an operation performed for a congenital division of the velum palati and posterior third of the palatine processes of the palate bones. The appearance presented by the parts involved in the deformity is shown in the annexed cut, fig. 74.

Fig. 74.

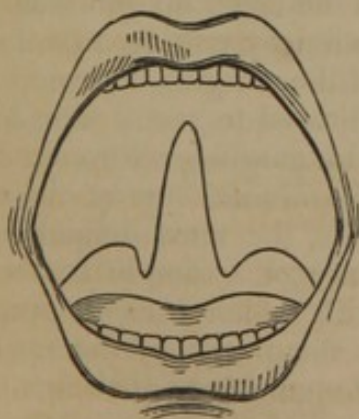
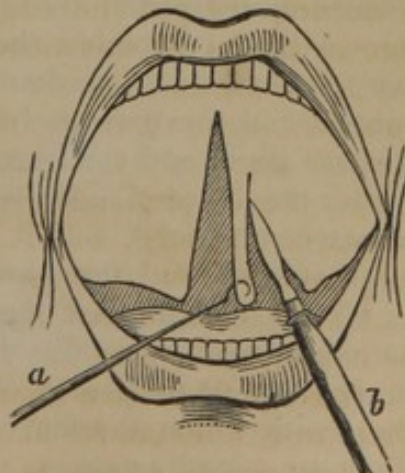


Fig. 75.



The age of the patient, 25 years, his excellent general health, the favourable season of the year, his intelligence, and above all, his anxiety to be relieved of the distressing accompaniments of the defect, determined me to perform the operation of velosynthesis or staphyloraphy at once. He was accordingly placed upon a preparatory treatment, (that is, so far as accustoming the parts by frequent touching to the presence of foreign bodies,) and after this end was accomplished, which required some days, a mild purgative was administered, and the next morning the operation performed in the presence, and with the assistance of Drs. J. Randolph, Norris and Anderson, and several of my private pupils. The patient was placed in a chair of the ordinary height, and his head firmly supported against the chest of an assistant. The upper portion of the trunk was also enveloped in a sheet by which his arms were secured, and his dress protected from the hemorrhage.

Placing myself in front, a little to one side of the patient, so as to offer as little obstruction to the entrance of light into the mouth as possible, and the head being thrown back to favour the same object, he was requested to open his mouth and keep it in this position as long as he was able.

The first step in the operation was then commenced by Dr. Randolph (who stood on my left) inserting a sharp hook (see fig. 75, *a*) into the most dependent angle of the left margin of the cleft, by means of which, with a slight tractive effort, he was enabled to make the whole line of margin tense. I then inserted the point of a *thin double-edged knife*, (see fig. 75, *b*,) (the blade of which was one inch, and the handle six inches in length,) in the most dependent part of the margin, about a line from its free edge, and cut rapidly from *below, upwards*, inclining the knife so as to reach the apex of the cleft. When the apex was reached, the knife was changed from the right hand to the left, and Dr. Randolph passing the hand which held the hook, across and a little above the face of the patient, made pretty firm traction upon the slip of mucous membrane previously separated by the first cut, and which still remained transfixed by the hook; by this means the right margin was made tense. I then completed the denudation by cutting rapidly from above downwards. The denudation of the margins occupied about a minute, and the patient was then allowed to rest. The hemorrhage was slight and easily controlled by gargling with cold water, and after the lapse of a few minutes the second step of the operation was commenced, and it was in this, the most difficult of the three, that we found the vast superiority of a simple contrivance over all the complicated "*portes*" with which I came prepared. Great convenience was also derived at this period of the operation from having small pieces of fine sponge firmly tied upon long probes, with which the fauces were readily reached, and the clotting blood mopped away.

The head being placed and firmly supported as before, and the mouth held open by the volition only of the patient, I passed a small curved needle, armed with a well waxed double silk ligature, and firmly held in the grasp of Physick's forceps, through the most dependent part of the left margin of the cleft, carrying the needle from before backwards, and inclining my hand to the left of the mouth, so as to throw the point of the needle, after it had trans-fixed the tissues, into the middle of the cleft, (see fig. 76, *a*.) As soon as it was visible Dr. Randolph seized it with a pair of long forceps, (see fig. 76, *b*,) and the clamp of the porte being at the same time relaxed, by which the grasp upon the needle was kept up, the latter was loosened and at once withdrawn from the mouth. The same needle was immediately replaced in the porte, and the latter being held in the right hand, instead of the left, I introduced the needle on the right margin of the fissure, at a point as nearly opposite as possible the little wound in the left, passing it from behind forward, (see fig. 77, *a*.) As soon as its point was visible, it was seized and drawn through, and thus the first ligature was

Fig. 76.

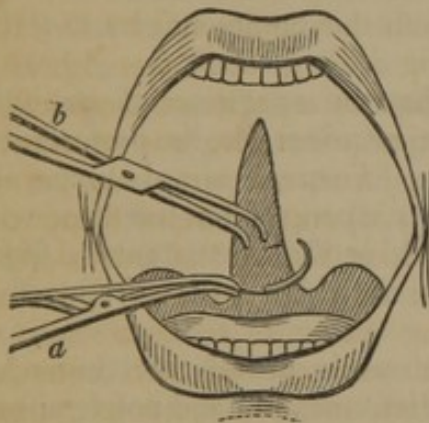
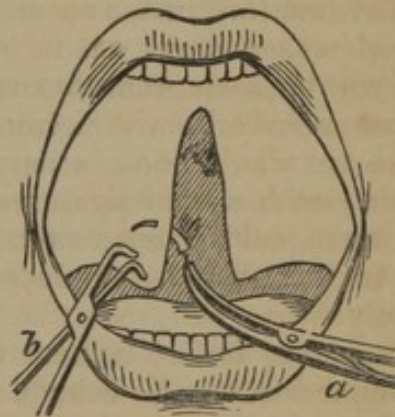


Fig. 77.



passed. The patient was then allowed to rest for a few minutes, and then the second ligature was passed in the same manner; a third and a fourth were also required, and between the introduction of each there was a respite of a few minutes allowed, during which the patient gargled with cold water, took a little wine and water, and had the blood mopped away. The whole were passed in about fifteen minutes, and as the needles were detached from each, their extremities were carried out at each corner of the mouth, and held separate by assistants.

The needles were all introduced from two to three lines from the margins. (See fig. 78.) The third and last step was then undertaken, and we commenced it by tying the ligature first introduced, or that nearest the uvula. The first knot was easily made by crossing the ends of the ligature, wrapping them around the ends of the forefingers of each hand, and then passing the fingers as far back

Fig. 78.

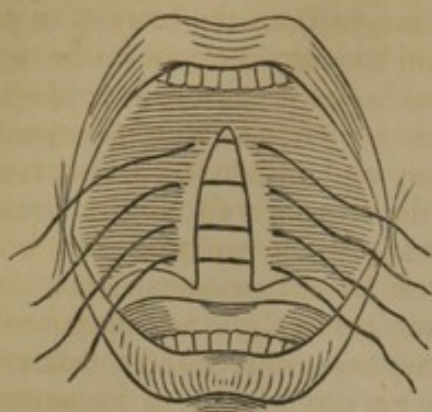
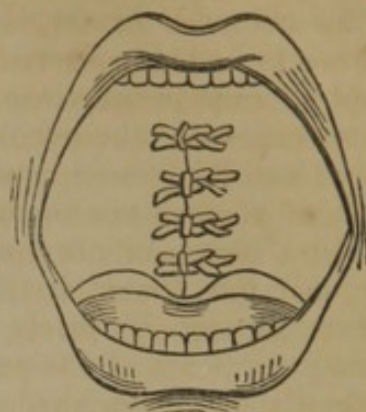


Fig. 79.



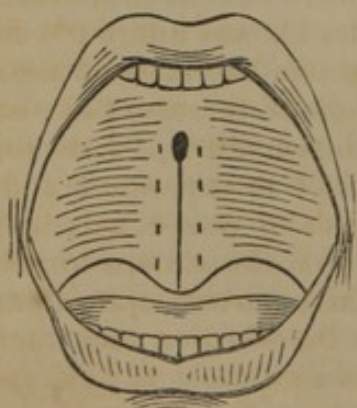
as possible. The edges came together beautifully, and with but little strain, by slowly carrying the fingers outward, and then the second knot was made. While the ends were crossing for this knot, Dr. Randolph grasped the first with a pair of forceps, and held it until the second was completed. Lastly, the ends of the ligatures were cut off close, and the patient allowed to rest for a few minutes. (See fig. 79.) The others were knotted in the same manner, and in thirty-five minutes from the commencement of the operation the patient was in bed.

It will be seen from this report, that the operation of staphylo-raphy, under ordinary circumstances, requires for its performance merely a knife, a hook, a pair of long forceps, a simple porte and needles, with waxed ligatures, scissors, sponges on handles, wine and water, cold water, towels, and two or three assistants. Other aids are occasionally employed, some of which will be referred to directly.

The subsequent treatment was such as is usually recommended in similar cases. For example the patient was ordered not to speak, cough, sneeze, &c., and to take no nourishment except a little whey

or barley water, a few drops at a time. On the fourth morning it was found that one of the ligatures had given way, and that there was some disposition to slough. This was arrested by touching the part with solutions of argent. nit. grs. ij; aq. font. $\bar{3}$ j; of chloridi calcis $\bar{3}$ j; aq. font. $\bar{3}$ iv; and of creasote gtt. vi; aq. font. $\bar{3}$ j. The other ligatures were taken away on the 5th, 6th and 7th days, and in three weeks' time the cure was complete, with the exception of a small opening at the upper part of the wound, caused by the sepa-

Fig. 80.



ration of the ligature, but this opening, from the use of argent. nit., and the efforts of nature, is now not larger than the head of a pin.

Remarks.—The operation of staphyloraphy, velosynthesis, kyonoraphy, uraniskoraphy, (for all these terms have been applied to the operation in question,) has been so frequently performed in Europe and this country, (with varying success, it is true,) that the report of another successful case will be received by the profession as a matter of not much interest. When we recollect, however, that the operation is considered by all as one of the most delicate in surgery, rarely succeeding perfectly, and occasionally causing the death of the patient, everything calculated to simplify its details or ensure success should be considered of importance and arrest the attention of the operative surgeon. Nothing proves more conclusively the delicacy and difficulty of the operation than the immense variety of instruments invented for its performance. Ever since the period when the dentist Le Monnier first essayed to close a "congenital deficiency of the palate from the veil to the incisors," surgeons have been occupied in devising methods by which the operation might be performed with ease to the surgeon and with comparative ease to the patient, and yet it must be confessed that up to the present moment no one plan of operating can be said to accomplish these ends much better than another; and obviously because nearly every one requires for its performance instruments exceedingly complicated, and often but ill adapted to the purpose for which they were invented. We will not waste time in enumerating, much less in describing the various instruments, and refer all who wish information upon the subject to the works of Velpeau and Froriep, and the American Journal of the Medical Sciences, in which nearly all of importance are described or figured. It appears to me that the first thing to be done in our attempts to simplify the operation is to show by positive results that it may be performed with more rapidity and a greater prospect of success by instruments such as I have described, which are always at hand, or even by others more simple, than with the assistance of all the special and complicated ones that have ever been invented. As a case in point I may remark that Mr. D. was but thirty-five minutes in the operating chair, and at least one-half of this time he was resting, which proves that all the steps of the operation may be completed in from fifteen to twenty minutes. Now, I have seen the best operators from one hour and a half to two hours and a half in effecting the same thing, and the delay was chiefly to be attributed to the instruments employed. All the clamps to seize and hold the edges of the fissure, the crooked scissors to pare away the edges, the complicated "portes" for the needles, and "serre nœuds" for tightening the knots of the ligatures, corks to hold open the mouth, &c. &c., may, in most cases at least, be dispensed with, and not only this, but dispensed with to advantage.

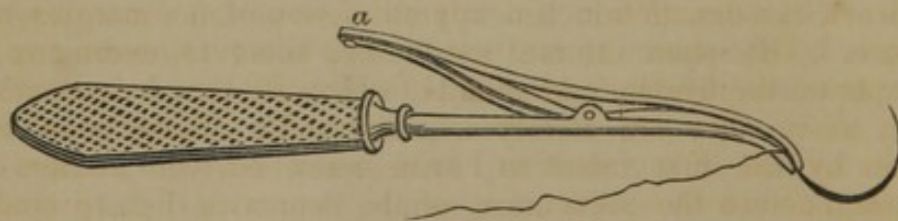
Dr. N. R. Smith, of Baltimore, has performed this operation with a long lance-shaped needle, furnished with a notch for the reception of the ligature, a common bistoury, and a pair of forceps. The only objections to the needle in question are, first, its being mounted on a straight handle, which renders it more difficult to introduce its point at the proper places; and secondly, the difficulty of disengaging the thread, which may be drawn back along with the needle in the attempts of the surgeon to disengage the latter from the margin of the palate. Notwithstanding these objections, however, it served an excellent purpose in the hands of the skilful surgeon by whom it was invented.

In using the forceps and needle of Dr. Physick, I would suggest an alteration in the shape of the needle generally employed, which is not sufficiently curved for the operation of staphyloraphy, and presenting sharp edges is apt to turn in the forceps used to disengage it from the pair in which it is held.

The needle I now use is more curved, half an inch in length, and mounted on a cylindrical neck, a portion of which is held in the grasp of the porte, and the other part made rough is intended to be grasped by the forceps of the assistant. The cutting edge of the needle being wider than the diameter of its neck, will make an opening large enough for the easy transmission of the ligature.

The forceps too may be improved by causing them to close with a spring instead of a catch, such as they are usually furnished with. The "porte" of Schwerdt, of which the accompanying cut conveys a very good idea, and which is figured in the large work of Fro-

Fig. 81.



riep, answers a better purpose than Physick's forceps, (to which it bears a strong resemblance in principle at least,) in consequence of the facility with which the needle may be disengaged. By simply depressing the branch *a*, the blades open, and the needle falls out. The spring should be strong, so that some force will be required to depress it. If too weak, the needle is held so loosely that it will be almost impossible to make it pass promptly through the yielding edges of the velum.* The forceps to be used by the assistants

* When the porte of Schwerdt is not at hand, Physick's forceps, or the porte of Roux, may be employed. If I am not mistaken, Dr. Wells, of Columbia, S. C., a most excellent surgeon, was the first to employ Physick's forceps in an operation upon the palate. In his case the opening was made by a reed being

should be made with a curve, and have their blades narrow, so that the needle may be grasped by its neck with facility.

Dieffenbach, who certainly deserves more credit than any other surgeon for his success in this operation, not even excepting Græfe and Roux, its accredited originators, prefers lead to silk ligatures, and assigns some very plausible reasons for the preference; but the difficulty of obtaining good ones, the irritation which their sharp extremities keep up upon the tongue, thus exciting cough, and the success which has attended the use of the silk, all lead me to prefer the latter. Most surgeons, and all who know much about the operation in question, have laid down a series of rules, by which we are to be governed in its performance. As reports of rare and successful cases are intended more for the benefit and instruction of the very young, than for the information of the older surgeons, we will conclude this section with a *résumé* of the rules referred to.

First. The operation should be divided into three stages—

1. The denudation of the edges of the fissure.
2. The introduction of the ligatures.
3. The approximation of the edges and tying the ligatures.

With reference to the first of these stages, I may remark, that some prefer introducing the ligatures before the incisions are made, as the blood prevents to a certain degree, our ascertaining precisely the spot at which the needle enters, but in all the cases which I have seen, the slight hemorrhage which follows the section of the edges, is readily checked by causing the patient to gargle with a little cold water. Mr. Alcock attributes the partial failure in one of his cases, to the denudation of the edges before the passage of the ligatures, in consequence of which some moments elapsed between the denudation and approximation of the margins of the fissure. This short interval could not, however, exert any influence upon the tendency to reunite, which all denuded tissues possess, when they are closely approximated. Many examples of union by the first intention, even when several minutes have elapsed before the adjustment of the separated tissues could be accomplished, might be cited, were it necessary to prove the assertion just made.

When the ligatures are introduced before the edges are denuded, there is always danger of cutting them while this is being done, and should this occur, the operation will of course be rendered more tedious, and necessarily more painful.

Again, when the edges are previously denuded, the sutures may be inserted more readily at the proper distances from the margins, and thus the liability to “cut out” be much diminished.

In freshening the edges we should always commence at the most thrust forcibly through the roof of the mouth. The edges of the wound were brought together immediately after the reception of the injury, and reunion by the first intention readily took place.

dependent point. By making the section from below upwards, the blood will not obscure the parts, and we are thus enabled to see the tissue through which the knife has to pass, in its natural state.

In the introduction of the sutures we must always, for obvious reasons, commence at the inferior portion of the wound, and be very careful to cause the points of entrance on one side, and exit on the other, to correspond as nearly as possible. Attention to this will prevent a puckering of the wound, and, as a consequence, its irregular union. All the sutures must be passed before we attempt to close the fissure; and in tying them it is unnecessary to use any instrument for tightening the knots; the surgeon's fingers being all that is required. After the first knot is made, the surgeon passes his forefingers out towards the cheeks, and this tightens the ligature previously wrapped around each; the assistant then may seize the knot in a pair of common straight forceps, and hold it firmly until the second be tied. Both ends of the ligature are then cut off close, so as to prevent their irritating the fauces, and causing cough. Caution must be observed in this part of the operation, not to tie them too tightly, lest they produce ulceration, or "cut out."

Age.—Surgeons, with but few exceptions, have come to the conclusion that the operation should never be attempted until the individual is old enough to appreciate its difficulties and dangers, as well as the benefits likely to ensue from it when success attends our efforts. It is hardly safe to undertake it before the sixteenth or eighteenth year.

Health.—The state of the general health should always be taken into account before the operation is decided upon. If the patient be feverish or too much debilitated, troubled with a cough or sore throat, or enlarged tonsils, or suffering from derangement of any of the important chylopoietic viscera, nothing should be attempted until these difficulties are removed. It is supposed by some that fluor albus, chronic ulcers and strumous inflammations, from their debilitating influence, by which the adhesive process is materially interfered with, particularly contraindicate the performance of an operation, the success of which so essentially depends upon the speedy union of the surfaces in apposition.

Season.—Although the operation may be performed at any season of the year, yet, when we have it in our power to select the period we should always decide upon that least liable to atmospheric vicissitudes. *Mid-winter* or *late spring* probably answers best. When the weather is very warm the patient bears confinement badly, and there is of course more risk of inflammation. In early spring or autumn the changes are so rapid, and occasionally so severe, as to cause colds and cough, the occurrence of which in the patient would effectually prevent the success of the operation.

Preparation of the Patient.—Some surgeons lay much stress upon

the preparation by medicine, diet, &c., of the patient, but unless there exist some positive indications for the employment of such measures, they are for the most part useless. If he be in good health, the administration of a purge the day before the operation is to be performed will be all that is required. Much benefit, however, will result from frequent introduction into the fauces and between the edges of the cleft—the instrument to be used, or the finger of the surgeon or of the patient himself, by which the parts become, as it were, *familiarized* to the presence of foreign bodies. Unless this be attended to, much difficulty will be experienced during the operation, from the efforts of the patient at retching, or even vomiting occasioned by the irritation of the fauces. When the parts have been daily accustomed to some similar impressions, they soon become so insensible as to bear being touched without much inconvenience.

Difficulties.—The difficulties accompanying the performance of this operation have been, as I have already hinted, vastly magnified. But under the most favourable circumstances and with the most simple instruments, it is one not to be entered upon lightly, as presenting *no difficulty*, and requiring but little skill for its successful performance. Not the least annoying circumstance connected with its performance, is the constant disposition on the part of the patient to *close his mouth*. To obviate this, some surgeons employ bits of *wood* or *cork*, grooved above and below, so as to admit the upper and lower teeth and hold them steadily. These are placed between the last molars, and when the patient is restive, serve a very good purpose; but it seems to me that, like most of the “*apparatus major*” with which the operation is burthened, they, in most cases at least, may be dispensed with, and as they occupy a considerable space where room is much wanted, it will be well, whenever the patient is trustworthy, to discard them entirely.

Motion of the Tongue.—Another difficulty is the motion of the tongue. As it is impossible to perform the different steps of the operation unless the cleft is readily reached, and as the constant motion of the tongue, uncontrollable in some cases, by any voluntary effort of the patient, effectually prevents this, surgeons have contrived a variety of instruments for keeping it out of the way. An oval plate mounted on a handle, so curved as to avoid pressure upon the teeth, has been used by Professor Gibson, and serves a very good purpose when such a thing is required. But when the patient has been accustomed by repeated trials to keep the tongue quiet while the mouth is held open, this difficulty may be considerably diminished. In the operations upon the palate now reported, it was unnecessary to use anything to fix the tongue, the patients having been previously prepared by the efforts to which reference has been made.

Breaking of Needles.—When the needles employed are badly

tempered, it may happen that the pressure of the forceps will cause them to snap. This happened to a distinguished surgeon who recently attempted the operation upon a very unruly patient. The needles in consequence of the fracture were swallowed, and some difficulty occurred in their removal from the œsophagus, although this was ultimately accomplished.

Hæmorrhage.—Some have expressed much dread of the hæmorrhage occasioned by the freshening of the edges of the cleft, and many dwell upon the annoyance experienced during the introduction of the ligatures, from the blood covering the parts and thus preventing, to a certain degree, the proper location of the needles. So far as I have been able to judge from my own cases, and from those of some of my friends, this difficulty is one of minor importance, and the oozing of the blood may be readily checked by cold and astringent gargles.

Difficulties after the Operation.—In order that reunion by the first intention may be accomplished, it is absolutely necessary that the edges of the wound be kept in a state of rest. This can only be effected by cautioning the patient against speaking, coughing, sneezing, clearing the throat and swallowing too frequently, but notwithstanding every precaution it sometimes happens that our efforts are frustrated by wilfulness on the part of the individual, or by accident.

For example, in the case of Mr. D——, who in every way was a most excellent patient, talking during sleep caused the detachment of one of the ligatures on the second night after the operation was performed. From the irritation of the fauces, patients are very apt to “clear the throat,” and by this effort the ligatures may be detached, and the same cause may occasion uncontrollable cough. In either case, injections of laudanum repeated until the system is fully under the influence of the anodyne, answer a better purpose than any other remedy.

Thirst.—Thirst is a very troublesome circumstance, against the indulgence of which all the philosophy of the patient must be brought to bear. Great relief, however, will be experienced from wetting the roof of the mouth with some demulcent liquid. A small piece of sponge attached to a quill or stick will be found useful for the application of the liquid employed. The patient, on no account, should be allowed to swallow a large mouthful of water or anything else; a teaspoonful of water may be allowed occasionally to trickle down the throat.

Hunger.—Some patients are very restive under the rigid abstinence from food to which for some days they must be subjected. The best article of nourishment is thin calf’s-foot jelly, or what is known as “cold custard” or “slip.” Either of these articles may be given after the second day, but it is best to prohibit anything until after the third.

Gripping.—From the quantity of blood usually swallowed during the operation, patients are often severely griped. For this symptom the best remedy is an enema, repeated every hour until the blood is brought away. Should it continue for any length of time or be exceedingly severe, an anodyne injection must be employed.

Inflammation of the Fauces.—It not unfrequently happens that inflammation follows the performance of this operation, and may be so severe as to cause great pain, or extending down into the lungs occasion the death of the patient, as was the case with the daughter of Lord Lyndhurst, operated upon by M. Roux in 1836. Should this unfortunate complication make its appearance, it must be controlled by the most active antiphlogistic means, such as venesection, leeches to the throat, blisters to the same part, and purgative enemata.

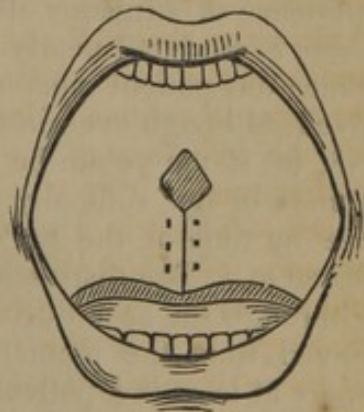
It would not of course be proper to administer cathartics; should cough accompany the inflammation, it must be kept down by opiates.

Sloughing.—When the inflammation runs high, sloughing is almost sure to take place, the ligatures cut out, and the operation almost to a certainty fails, either entirely or in part. As soon as the slough is perceived it should be vigorously attacked by all the remedies calculated to arrest this action. I know of no better agents, however, than a solution of argent. nit. grs. ij; aq. font. \bar{z} i; or a mixture of creasote gtt. vi; aq. font. \bar{z} ij, applied by a camel's-hair pencil three or four times a day.

Failing to Unite throughout.—From sloughing, cutting out of ligatures, or want of proper action in the edges, the fissure may be but partially closed, as is seen in the accompanying figure. When such a termination of the operation occurs, our work is but half finished, and the holes must be patched or healed by processes hereafter to be described.

Parts too Tight.—It occasionally happens that the union may be perfect, but in consequence of the tissue in the vicinity being more firm than usual, and consequently less yielding, or owing to the large size of the fissure, which requires for its occlusion more membrane than the adjacent parts could well supply, the new velum is so rigid and tense as scarcely to possess motion, and hence hardly participates in the various attempts of the patient at swallowing or speech. When such is the case the operation is but partially successful, and before our patient is relieved we must make an incision on each side parallel to the teeth, and half way between the latter and the cleft, by which the tension of the palate is removed, and it is ren-

Fig. 82.



dered subservient to the influence of the muscles in its vicinity. These incisions have sometimes to be made at the time the operation is performed, in order to take off the strain from the ligatures.

Dieffenbach was the first to propose this, although the credit of the suggestion is claimed by several.

Too much praise cannot be given to this modification of staphyloplasty. I have resorted to it on several occasions with the most satisfactory results, and I find that Professor Pancoast, in a case recently reported by him in the American Journal of Medical Sciences, for July, 1843, also derived great advantage from its employment.

Dangers.—This operation has been repeatedly performed by surgeons both in Europe and in this country, and so far at least the number of deaths resulting from its performance has been comparatively small.* Some, however, have certainly lost their lives, and as it is nearly always an "operation of choice," no surgeon would be justified in performing it until he had stated fully to the patient and his friends the possibility of a fatal result.

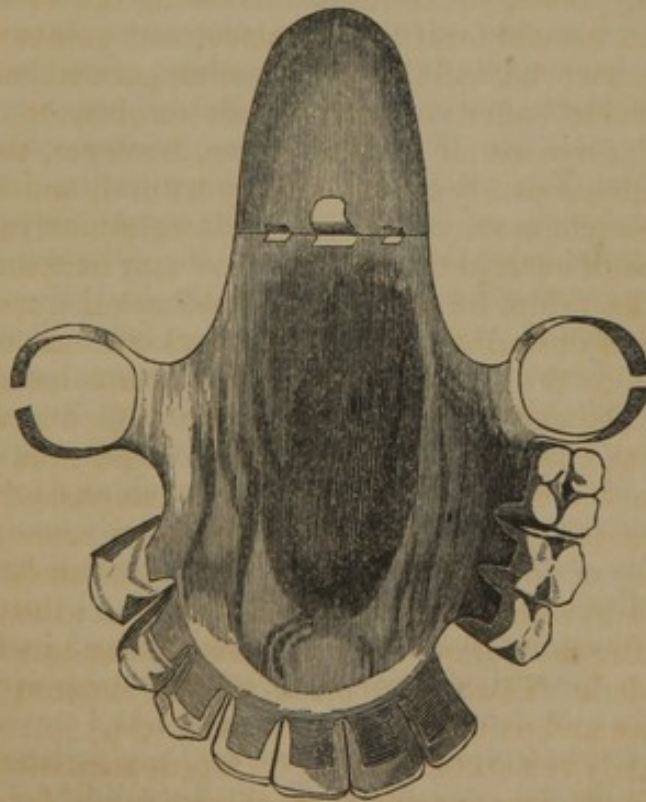
Results of the Operation.—Those not familiar with the operation and its results are very apt to promise a too speedy relief of the defects for which it was performed. For instance, it is often stated that if the adhesions are perfect, the voice will be *immediately rendered natural*. Now, so far from this being the case, it requires weeks or even months for it to take place, and unless the patient is aware of the fact he will be greatly disappointed when he first "essays his voice" after it becomes safe for him to do so. The experience of surgeons all goes to prove, however, that the voice *in time* is rendered nearly if not entirely natural, and with this assurance our patient must rest satisfied. Deglutition is at once improved, although even in this respect there may be some disappointment, for if the velum be tight, as is sometimes the case, there will be more or less difficulty in swallowing, which can only be overcome by time or the performance of the lateral incisions already referred to. The distressing inconvenience of food and drink passing through the nose during the attempts at deglutition is, however, relieved from the moment adhesion is accomplished, and in this respect at least the patient is at once rendered more comfortable. The *durability* of the adhesions has also been made a question; but as far as I have been able to learn, there is no instance of their giving way after the period when inflammation and its results are to be apprehended. The velum made by the surgeon is in every sense as strong and as useful as the natural one.

I have already remarked that the velum is sometimes so rigid as to occasion much inconvenience in deglutition. In such cases I have found a division of the anterior half arches, and sometimes of

* But 3 in 105 cases.—*Gaz. Méd. de Paris.*

the inferior margin of the posterior, afford decided relief. Again I have seen the velum apparently paralyzed, and the margins of the arches hanging so low down as almost to block up the entrance into the fauces. The voice when this defect exists is always imperfect. In a recent case of this kind, Mr. Neal, an intelligent dentist of this city, constructed a very ingenious and exceedingly useful instrument. As the patient had an enormous cleft of the hard palate, it was found necessary after obtaining union of the velum to employ a gold obturator extending from the incisor teeth to the posterior margin of the palate bones. To this plate Mr. Neal appended another, much smaller, however, and of the shape represented in fig. 83. The hinges connecting the two plates were made very loose, so that in deglutition, the lesser yielding before the alimentary mass, offers no obstruction. As soon as the food passes into the fauces, the plate falls into its place and is prevented from subsiding too far by a little rest or spring, attached, as is shown in the figure, to the larger plate about the centre of its posterior margin. This instrument, by supporting the velum and at the same time closing the cleft in the hard palate, enables the patient to articulate with great clearness, and does not interfere in the slightest degree with deglutition.

Fig. 83.



When the adhesions are imperfect and holes of different shapes and sizes are left, it may be requisite to repeat the operation, in part,

or to resort to other measures for their closure. When not very large I have succeeded in some cases with the aid of the argent. nit. repeatedly applied to the edges of the opening, and a well made obturator either of gold, silver or ivory. The shape of the obturator as well as its size must of course depend upon the nature of the opening, and may be held in its place by wires passed around the teeth, or by a sponge, or it may be made to resemble a common shirt stud, one plate of which rests upon the floor of the nostril, while the other forms a part of the roof of the mouth.

From the imperfect mastication and insalivation of the food, persons labouring under the cleft palate are very apt to suffer from dyspeptic symptoms. These are of course relieved as soon as the causes producing them are removed.

CASE II.—In the month of June, 1840, I was requested to attend Mr. J. W. Richards, who had suffered for a long time from chronic syphilitic disease, and who in consequence of this affection had lost a considerable portion of his palate. When I saw him the ulcerative process had ceased, although there existed chronic inflammation of the mucous membrane of the mouth and fauces. In addition to this there was an oval opening, three-fourths of an inch in length, by nearly half an inch in breadth, on the right side of the roof of the mouth, through which the finger might be readily passed into the nostril of the same side. The velum palati was barely involved in this opening, the ulceration having been confined almost exclusively to the hard palate. The margins of the opening were sharp and rigid, while the adjacent mucous membrane, in consequence of the previous inflammation, was more closely attached than usual to the osseous portions of the palate. His speech as well as deglutition was much impaired, and he experienced great mental distress from the observations of those by whom these defects were noticed. He had already consulted several gentlemen of the profession, one of whom had applied an obturator, from the employment of which instrument slight relief was derived. Caustics had also been employed and every effort made to cause the margin of the wound to granulate, but without the slightest benefit. His general health was such as to contraindicate any immediate attempt by surgical means to remedy the defect, and I therefore put him at once on a treatment for the syphilitic disease, promising that as soon as this was cured, to do something for the deformity, for the relief of which I had been consulted. The remedies prescribed were those usually employed in similar cases, and after the lapse of twelve weeks I had the satisfaction of finding the disease entirely eradicated, and my patient in an excellent condition for the operation. From the rigidity of the margins of the wound it was obvious that an attempt to cause them to approximate by the ordinary operation of staphyloraphy would prove utterly useless, and it became necessary for me to devise some other

plan of procedure. The size of the opening induced me to abandon the attempt to close it by "two flaps detached from the adjacent soft parts, inverted upon themselves, and united to each other in the centre of the wound," as recommended by Krimer; and also deterred me from resorting to the plan of Velpeau and others, in which one or more flaps are made by dissecting up the mucous membrane on each side and then sliding it over the opening, uniting the flaps either at the median line, or carrying (when but one is made) the free margin entirely across and stitching it to the adjacent membrane, first made *fresh* by scarification.* The operation of "sliding the flap," modified so as to embrace the operation by "granulation" of Mettauer, was finally decided upon and performed in the following manner:—Placing my patient in a good light, and having the head firmly supported against the chest of an assistant, he was requested to hold his mouth open as long as possible, all artificial means for accomplishing this object being dispensed with. I then with a small thin convex-edged bistoury made a crescentic incision through the mucous membrane, and down in fact to the bone, commencing the incision nearly opposite the superior extremity of the opening, and continuing it until it reached a point nearly opposite its inferior. A strip of mucous membrane, about three lines and a half in breadth, was thus separated, except at its extremities, from the adjacent parts. A similar incision was then made on the opposite side, (see dotted lines fig. 84.) The lips of the little wound were next detached from the subjacent bone to the extent of one line on each side, and then folded, as it were, upon themselves, thus leaving a gutter, into which I inserted a small cylinder of soft buckskin. Making the incisions, detaching the lips of the wound, and introducing the buckskin, occupied but a minute or two, giving the patient little or no pain, and causing no hemorrhage worth mentioning. The first step of the operation was thus completed, and the patient ordered to keep perfectly silent. Fearing that the motion of the tongue might displace the buckskin, I had prepared a sort of flat obturator, mounted upon a piece of elastic wire, the end of which I intended to wrap round a tooth, and by this means keep the plate firmly applied over the wound, and thus prevent the escape of the buckskin cylinder; but I found this instrument unnecessary, inasmuch as the swelling of the wound was sufficient to accomplish the object in view. Inflammation, followed by suppuration, speedily supervened, and on the removal of the cylinder seventy-two hours after its introduction, a fine crop of

* Dr. J. M. Warren, of Boston, to whom the profession is indebted for many valuable improvements in operative surgery, and whose success in the autoplasmic operations has been very great, recently succeeded in closing a deficiency in the upper part of a palatine cleft, or that portion which extended into the hard palate, by detaching the mucous membrane and sliding it from each side to the median line, uniting the flaps by two or three sutures.

healthy granulations was discovered at the bottom of the wound; these rapidly increased in size and soon filled up the space between the lips of the incisions, rendering the introduction of any foreign body for the accomplishment of this object needless.

In six days after the first operation, and when the granulations were in full vigour, I performed the second series of incisions, which were carried between the extremities of the other two, and treated in precisely the same manner. (See fig. 84.) In six days

Fig. 84.

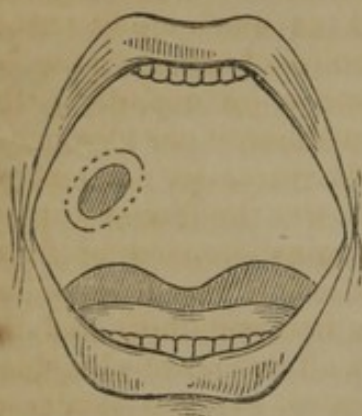
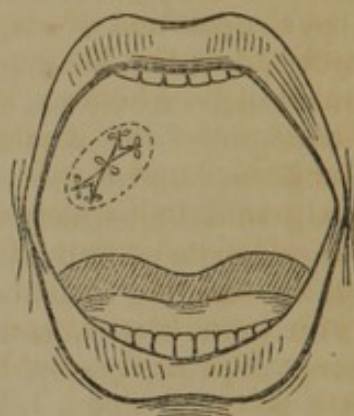


Fig. 85.



from the execution of this second operation I found the opening in the palate surrounded by a strip of granulations, and in a proper condition for the last, and by far the most difficult step in the whole attempt, the detachment and approximation of the flaps. Having provided myself with two scalpels, half an inch in length by two lines in breadth, cutting on both sides and slightly curved near the points, several very small and nearly crescentic needles, a delicate pair of Physick's forceps, two or three delicate hooks, small dressing forceps, and well waxed ligatures of silk, of one thread, with sponges, &c. &c., I proceeded to the performance of the operation. The head being properly placed I commenced by detaching the mucous membrane all around, dissecting from the margins out to the granulations, which being very yielding, allowed me without difficulty to bring the flaps together, at or near the centre of the opening. To accomplish this, a pair of small forceps was employed, and while the flap was held tense by an assistant, I passed the ligature first through the flap on the left side, at its centre and about a line from its edge, and then allowing that to escape from the forceps, the opposite one was made tense and the ligature passed through it at a point directly opposite the little wound in the other; the ligature was then tied, and the flap above, or that next the anterior portion of the mouth brought into the concavity formed by the approximation of the two lateral flaps, and attached by a ligature on each side. The lower was next brought to its

proper position and there held by similar stitches. The opening in the palate was thus completely "covered in," and presented the appearance seen in fig. 85.

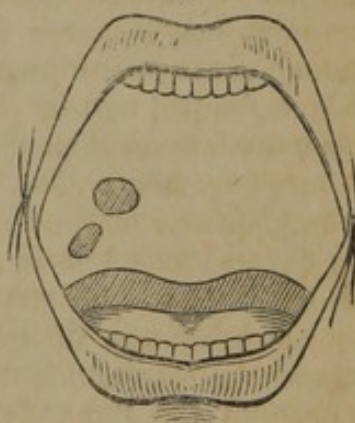
The usual after-treatment was pursued, and in three weeks from the date of the last operation my patient was perfectly relieved of every vestige of his deformity. The ligatures were cut away in the fourth, fifth and sixth day, and nothing of consequence occurred during the period of confinement.

This operation, though tedious, is nevertheless a very useful modification of staphyloplasty, and may be resorted to in almost all those cases in which the wound fails to unite throughout, after the usual operation of staphyloraphy; and too much credit cannot be ascribed to Dr. Mettauer for the suggestion of the operation by granulation.* I believe, however, that the case just reported is the first example of the combination of the operation "*par glissement du lambeau*," and that by granulation. My reason for not making all the granulating wounds at one operation was the fear of cutting off an adequate supply of blood to the margins intended for flaps. By postponing the second operation until the first wound was filled up with granulations, and the circulation between them and the adjacent flaps firmly established, I avoided all danger of sloughing from a want of blood. Time, in such cases, being a matter of minor consideration, I did not think myself warranted in running any risk of failing in the operation by an attempt to economize it.

CASE III.—James Williams, a young man 18 years of age, applied to me in December, 1840, for the purpose of having an operation performed for the closure of two openings, (the result of previous inflammation and sloughing,) one of which was situated entirely within the velum, and the other just above it, but located in the hard palate. Both openings were on the right side and separated from each other by a narrow strip of mucous membrane and bone, and presented each one a callous margin. That in the velum readily admitted the extremity of the forefinger and was ovoid in shape, the other was larger and nearly round. The usual accompaniments of such defects were present, and for the relief of these an operation was desired.

The common operation by interrupted suture was practised on the opening in the soft palate, which united perfectly in about two weeks, and as soon as this was accomplished and the patient had

Fig. 86.



* Amer. Jour. Med. Sci., Feb. 1838, p. 335.

rallied from the effects of the operation I commenced the treatment of the other, the method employed being that described in the report of the case of Mr. Richards. The result was most fortunate and fully justified the confidence placed in this novel operation.

The cases reported all belong to but two varieties of the defects usually met with about the palatine plates and velum, but it is not unfrequently the case that other malformations present themselves and occasion much difficulty to the surgeon. Malgaigne declares that congenital fissures of the palate may all be referred to three heads:—1st. Those in which the division is confined to the soft palate, the osseous plates remaining perfectly sound. Here there is no loss of substance, and the cleft may involve the entire soft palate, or be confined to the uvula. 2d. Those in which the separation between the halves of the soft palate is extended into the ossa palati, and possibly into the maxillary bones. 3d. Those in which the separation of the palatine vault is complete, and in which there usually exists either simple or double hare-lip, with division of the alveolar processes. In this classification one form of the defect, very rarely met with it is true, is omitted, viz.: that in which along with double hare-lip there exist *two fissures* in the palatine plates. In these cases the central portion is entirely separated from the lateral halves of the palatine vault, and in all the cases I have seen, the anterior extremity of the central piece projects so far forwards as to offer a material difficulty in the execution of an operation. Instead of *three* groups, therefore, we have evidently *four*, and each one will require a treatment peculiar to itself. A fifth group may be made of the cases *not congenital*, but depending on some cause operating subsequent to birth.

From the fact that the operations required to relieve these defects vary materially in their character, surgeons have introduced different terms by which they are characterized. For instance: where a simple fissure of the soft palate is closed, the operation is generally called *staphyloraphy*; when the fissure is very wide, or extends into the bony palate, and it becomes necessary to detach the adjacent soft parts and draw them forcibly across, the operation is designated as *staphyloplasty*; and lastly, when there is really a loss of substance in the palate, and it becomes necessary to detach a larger flap from the parts in the vicinity, in order to fill up the deficiency, the term *uranoplasty* is applied to the operation.

In case No. 1, the operation of *staphyloraphy* was fully explained. In Nos. 2 and 3, *staphyloplasty*, in combination with the operation by *granulation*, was resorted to. I have also performed the operation of Krimer, or *uranoplasty*, in which a flap is taken from the roof of the mouth, twisted on its pedicle, and then accurately fitted to the opening, (the edges of which were previously made raw,) and attached by suture. The case resulted very well, but I vastly

prefer the method resorted to in cases Nos. 2 and 3; or the more simple staphyloplastic operation of Dieffenbach.

I have also succeeded in two cases, where the cleft extended into the hard palate to within an inch of the incisor teeth, by resorting to the staphyloplastic operation performed by Dr. J. M. Warren, of Boston. It consists in first detaching the mucous membrane from the bones by means of a small bistoury curved on its flat side, and we must recollect to detach it as freely as possible. This step accomplished, we next seize the flap on one side, with a pair of forceps, stretch it forcibly, and then with a pair of curved scissors detach its base from all connection with the tonsil and anterior half arch. The anterior half arch being thus cut through, the flap expands, as it were, and is readily brought into a proper position. After completing the separation on one side, the same operation must be performed on the other. The edges of the flaps are next to be made raw, and the ligatures passed, as in the ordinary operation of staphyloraphy. The after treatment is also the same.

The management of the cases that come under the third and fourth heads of my classification, depends very much upon the *age* of the patient.

If called a few days after birth, and the child is healthy, I operate for the hare-lip as soon as possible, believing as I do that the earlier the operation is performed the better. Much needless dread of convulsions, sloughings, fevers, &c., exists in the minds of some, when they refer to operations of this kind upon very young children, but I have over and over again succeeded without the occurrence of an untoward symptom, in infants of three, four, and five days old. The advantages of an early operation are manifest. We gain, in the first place, *time*, union taking place usually in from forty-eight to seventy-two hours, and the child is thus ready to take its proper nourishment almost as soon as the mother is prepared to furnish it; and secondly, the influence exerted by the pressure of the cheeks and lips upon the maxillary bones is sometimes sufficient of itself to cause an entire closure of the fissure in the hard palate. We have thus, when the patient grows up, only the cleft of the *soft palate* to contend with. When the maxillary bone projects forward so much as to prevent the ready adjustment of the lip over it, as is often the case when the cleft is double, it may be necessary to apply pressure with an instrument constructed on the principles of a truss—the pad resting upon the bone and the spring passing around the head, and so arranged as to retain its proper position without the risk of slipping. In the course of a few days in some cases, but generally three or four weeks are required, the swelling has either partially or entirely subsided, and now the lip may be formed—the operation being modified by circumstances.

After the lip has entirely healed, I have derived much advantage from causing the nurse to introduce her finger and thumb as far as

possible into the mouth between the cheeks and alveolar processes, and make lateral pressure upon the latter several times a day. I have also resorted in very bad cases to a small silver clamp, composed of two flat blades and a regulating screw. The blades being properly adjusted, one upon each side, the screw is gently turned so as to produce the requisite degree of pressure.

If called to a child a few *years* old, affected with hare-lip and cleft palate, we have no time to lose, and should operate upon the lip at once. Even in these cases I have seen quite a wide cleft closed by the action of the cheeks, aided by the silver clamp.

Should the maxillary bone project, it will be almost impossible to cause its disappearance by pressure, unless it be continued for several months, and even then the measure generally fails of accomplishing the end for which it was applied. In consequence of this circumstance, I usually endeavour in these cases to close the lip, if possible, even although there exists a considerable prominence of the bone, and where there is much difficulty do not hesitate to detach the flaps freely from the adjacent parts. In one very dreadful case, I was obliged to make an almost entire lip by taking flaps from the cheeks. We sometimes gain a good deal by extracting any teeth that may be contained in the bone; and whenever they are irregular, or present their edges, even although the projection may not be very great, it will be well to remove them, as they irritate the lip, and may prevent its union. The usual operation of taking away with the cutting forceps, the entire piece of projecting bone, should never be resorted to unless it is impossible to accomplish the cure without it. When it is so large as obviously to forbid all attempts at reduction, it may be removed, and its place subsequently supplied by an artificial process and teeth. In one case of this deformity, Gensoul succeeded in bringing the projection into its natural position, by seizing it with a pair of strong forceps, and by main force breaking up its attachments to the adjacent bones. The boy, a lad thirteen years of age, recovered without difficulty. Although the measure is harsh, it may nevertheless prove of utility in many cases.

It is highly improper in these, as well as in all other cases of the defect in young children, to use an *obturator fastened by means of a sponge*, as the foreign body effectually prevents the closure of the opening. An artificial palate, fastened to the teeth or gums, by preventing the passage of food into the nostril, will, on the other hand, prove exceedingly useful, as well as a source of decided comfort to the patient. The edges of the cleft may also be touched occasionally with the argent. nit.

When a person of adult age consults us, very little can be expected from the pressure of the lips and cheeks upon the alveolar process, although some benefit may unquestionably result, and the cleft or clefts will be reduced in size. We are first of all, therefore,

to make the lip in the usual way, and if necessary, remove by the cutting forceps any projection of bone that interferes. It will be useless here to apply pressure to the projection, or expect to reduce it by Gensoul's method; and besides, the objection to the operation in young persons will not obtain in the cases of adults, inasmuch as the artificial process and teeth may be adjusted as soon as the parts heal. In young persons, from the fact that the parts are constantly increasing in size, it is both difficult and very expensive to remedy the loss of substance by artificial means. The operation upon the lip being completed, we next endeavour to remedy, by some one of the usual methods, the cleft in the *soft palate*, and as much as possible of that in the hard. Usually, and indeed in almost every case of *double fissure*, very little can be accomplished by an operation, and we have to rely upon a metallic plate (either gold or platina) for the closure of the openings in the palatine vault. The treatment in such cases, therefore, may be divided into three stages. In the *first*, we close the lip; in the *second*, the velum palati and a portion of the cleft in the hard palate are attended to; and *finally*, the metallic obturator furnished by a skilful dentist, closes the opening between the nostril and mouth. T. D. M.]

LECTURE VII.

DISEASES OF THE ANTRUM.—CARIOUS TEETH.—ERECTILE TUMOURS OF THE FACE.—SOLID AND ENCYSTED TUMOURS.

I MIGHT have mentioned to you, in speaking of epistaxis, in my last lecture, that the spirit of turpentine is a capital styptic, applied locally, one well known and lauded by some of the older surgeons. In some cases of passive hemorrhage, taken internally, it seems to produce a beneficial effect. It used to be employed to stop the bleeding, even from large vessels in open wounds, and on the face of stumps. Mr. Yonge, in a book in praise of this remedy, the "*Currus Triumphalis E Terebintho*," published in 1679, gives many instances of its efficacy, one only of which I shall read to you, as follows:—"A carpenter, by name Richard Sellar, looking up towards the top of a house, whereon some helliers were at work, by chance a shindle stone falling down alighted on his face, and made a long deep incision, from the right nostril towards the grinders; an artery that was wounded thereby spouted out blood in as large a stream as an ordinary syringe-pipe could vent. I stopped it with my finger, whilst my servant warmed some oil of *terebinth*

in an *uvula spoon*; when it was ready, I withdrew my finger from the bleeding artery, and it pissed out as before. I immediately poured the hot oil upon it, which instantly stopped the bleeding like a charm, and permitted me to stitch it up without any flux. When I had so done I laid a pledget of the same over the closed lips, and a plaster upon it. In the end a very fine seam was made." (Observation IV.) This application is more likely to stop an oozing from a surface, but to the nostrils and throat it is an unpleasant application; a very effectual one, I am told, on good authority, is the oil of ergot, or even a very strong decoction of this article, the ergot of rye.

Mr. Wright, of Nottingham, an excellent surgeon, told me of a case in which a strong decoction of the herb proved immediately efficacious in a case of very profuse and alarming bleeding. The case was a very odd one. A man in the country had been suspected of unfaithfulness to his wife, and she caught him at last in the embraces of another woman. She was in a great rage, snatched up his fowling-piece, which he had put down in the room, loaded, and when he had got fairly upon his legs, she presented it at him, and blew away one-half of his face. He went on recovering very well, for a time, from this dreadful and dangerous wound, but one day very profuse hemorrhage took place. The wound was so extensive that it was impossible to say where the blood came from; and it was doubtful whether even the ligature of one carotid would suffice. Knowing the powerful astringent effects of the ergot, Mr. W. begged of Dr. Sibson, the intelligent and active resident medical officer, to have decoction of the remedy injected into the wound, and amongst the ethmoid cells, and some dossils of lint, soaked in the decoction applied to the wound. It had the effect of instantly stopping the bleeding; a clot was formed, there was no recurrence of it, and the case did very well. The oil of ergot is, as I have said, reputed to be very effectual as a styptic, and I shall certainly use it on the first favourable opportunity that presents itself.

DISEASES OF THE ANTRUM.

The maxillary antrum is not unfrequently the seat of disease. We meet with cases in which there is inflammation of it caused by exposure to cold. I have seen inflammation produced by injuries of the face, but it most frequently arises in consequence of inflammation propagated from the sockets of the teeth and gums. A person has laboured some time under caries of the teeth, the crowns have wasted away, and the jaws contain some considerable number of stumps. The patient is, perhaps, out of health, or has been exposed to severe weather, and his face begins to swell, the

sockets of the teeth become inflamed, and, perhaps, an abscess forms at the root of one of them, or, sometimes a sort of fungus grows about it. The abscess thus formed extends, the walls of the antrum become affected, and the abscess may burst into the antrum; but I have seen very large chronic abscesses, causing a considerable expansion of the upper jaw, without any communication with the antrum. In this way inflammation may be propagated into the antrum, an abscess may be formed in it, and then you have the foundation laid for a great deal of mischief. The cheek swells, there are heat and fever, deformity from the swelling, and infiltration into the cellular tissue covering the affected bone. By and by the antrum becomes expanded from the accumulation of matter, and if relief is not given by surgical means, the matter may burrow its way out through the tuberos process, or, which is more likely, through the anterior wall of the antrum, or it may escape by the side of the incisors or some of the smaller grinders. Still the patient is not relieved, the cavity is not freed sufficiently, the swelling of the cheek continues, and is attended with a good deal of annoyance. My old master, Dr. Barclay, who was a physician, and scarcely even that, and did not attempt to practise surgery, used to talk of matter escaping, in these cases, through the nose, and he thought it a diagnostic sign of abscess of the antrum that matter would run out of the nostril when the head was well inclined to the side opposite to the disease. He was in the habit of showing the dry bones with the large opening into the sinus, and pointing out the way in which he expected the matter could escape. I have seen many cases of abscess, both acute and chronic, in this cavity, but I do not recollect one in which the escape could thus take place in whatever way the head was placed; for the opening is small, and it is lined with a mucous membrane, which swells to such an extent as is generally sufficient to prevent it. If the matter does escape it must be by an opening in the parietes, and this is generally by the side of the teeth, and then something must be done to relieve the patient.

Sometimes you meet, but less frequently, with a chronic collection in the antrum. The face swells slowly and gradually, without great pain; the deformity of the features is the first thing that attracts the patient's attention, and induces him to take surgical advice. Then, perhaps, the surgeon will find that the face is considerably enlarged, and that there is great swelling in the bone. At first he may suppose that he has a solid tumour to deal with, one of those fibrous tumours which grow slowly and gradually, but when he comes to examine the part carefully he finds that the tumour is elastic, that he can push the parietes before his finger, and that, on taking off the pressure, there is resiliation, attended with a crackling noise, like parchment. The cavity of the antrum contains a great quantity of thin and badly-digested matter, with flakes ex-

actly resembling the contents of a scrofulous abscess in any other part of the body. The walls of the antrum are thinned, and partly membranous; perhaps there is not a piece of tooth at all on that side of the jaw, and the disease has come on without any assignable cause.

How are these cases to be treated? In the acute cases you must endeavour to prevent the spread of inflammation by removing the cause, if there is any in existence. You will take away any bad teeth lying on the floor of the antrum, and endeavour, by the abstraction of blood generally, and the application of leeches to the gums, to reduce the inflammatory action, and prevent the accumulation of matter. Relief will be afforded to the patient by applying constant fomentations on the side of the face, but when matter is once formed some means must be taken to let it out. You may get to the floor of the antrum by taking out the decayed teeth, and if the sockets of the teeth are absorbed, which is generally the case when they have long been in a bad state, you may make a sufficiently dependent opening for the escape of the matter. The teeth having been extracted, the opening may be made by means of a perforator, a triangular-shaped instrument of sufficient size. The opening must be large, so that it may not be readily obstructed by any swelling of the gums, or anything of that kind. I need not

Fig. 87.



tell you how the teeth are to be taken out. If the crown of a tooth is present, and is not over decayed, it may be removed with forceps. You take out whichever tooth is decayed, perhaps one large or two small grinders, and all the stumps that are present, with a view of relieving the irritation, getting more readily at the antrum, and making a sufficiently large opening. For the latter purpose you use such an instrument as this, and the tooth being removed there will be no difficulty in carrying this up into the cavity, as you perceive I have done in the subject before us. That is the proceeding you would adopt where the teeth are decayed, but you would never take out a sound tooth with the view of getting an opening into the cavity of the antrum. In these cases, or in chronic disease of the antrum, you would make the perforation in another place. You would detach the membrane of the mouth a little from the cheek; you make an incision thus with the knife, and perforate the anterior walls of the antrum. In this situation, perhaps, it will be well to make the opening a little larger than in the former case. Here is the simplest and best form of instrument for taking out stumps. It is a lever, which you push in by the side of the stump, and with a slight motion of the wrist turning the instrument in the hand, you dislodge the fang, and turn it out of its bed. Here, again, are the instruments represented in Dessault's work for the perforation of the maxillary sinus. They look rather too large, perhaps, for making the perforation, but it is not so. If you widen the opening, so that you may get nearly the point of the little finger into the aperture, you are sure that the aperture will remain pervious until the walls of the cavity have taken on a healthy action, and ceased to secrete purulent matter. If the discharge of pus continues long, you may endeavour to check it by injecting a weak solution of sulphate or acetate of zinc or of alum, from time to time. Great good may be done by this proceeding, but the injection must be well and forcibly thrown into the cavity by means of a large injecting syringe, and I have seen occasionally very beneficial effects follow the practice. Some five or six years ago a young lady from a boarding school was brought to me with a large and unseemly swelling of the face, and a discharge from the nose and mouth. She had a perforation made in the most dependent part of the cavity; but still the cheek continued swollen, and she was much out of health. A sort of fungous growth filled the opening in the antrum, and at one period the case assumed a serious aspect. I applied an injection, throwing in, with some force, tepid water, in the first instance, and immediately a great mass of curdy stuff was protruded into the posterior part of the throat. There had been ulceration in the tuberos part of the bone; the discharge ceased instantly, and in a few days the swelling went down, and a very good cure was the result.

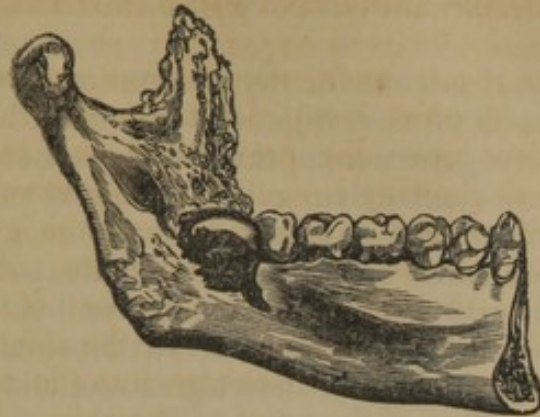
DISEASES RESULTING FROM BAD TEETH.

Bad teeth give rise to even more serious and troublesome diseases than this. A great many ulcerations about the mouth and face are dependent upon the pressure of bad teeth. In consequence of the teeth growing irregularly, being crowded, unpleasant symptoms very often arise—inflammation of the gums, the periosteum of the sockets and neighbouring parts. A very common case, where the teeth thus form in the front of the mouth, is a swelling about the fore and lower part of the inferior maxilla, followed by abscess, which may discharge into the mouth, or externally in the median line at the point of the chin. These abscesses get into a state of sinus or fistula, and these continue for a long period, till the patient applies to some one who understands the nature of the case, sees what gives rise to it, and removes one or two of the teeth to make room for the others. The same thing happens in the posterior part of the jaws. A papilla is formed, which continues to discharge, and which is only remedied by taking away one of the teeth and allowing the others to come forward. You may extract a grinder to make way for a wisdom-tooth, or, if the wisdom-tooth interferes with the others, that may be removed.

Sometimes immense mischief arises from the irregular growth of the teeth, and patients have even lost their life in consequence of it. My friend, Mr. Nasmyth, of Edinburgh, a most accomplished surgeon and dentist, who took the right way of studying his profession, having been for years a demonstrator of anatomy, met with the following case:—An old friend applied to him with an extensive abscess of the cheek and great swelling of the face and jaw, the abscess extending down to the clavicle. His mouth could not be opened, the inflammation locked the jaw, and the patient ultimately died. On a post-mortem examination it was found that the cause of the whole mischief was the wisdom-tooth growing forward and lying horizontally instead of perpendicularly. This is a rare case, but it shows you that much mischief and serious consequences may arise from a trifling cause. Here is a drawing of the preparation. (See fig. 88.)

From the decay of the teeth you frequently find great mischief arising in the neighbourhood. Many cases of ulcerated throat are caused by the presence of stumps, the affection being propagated along the lining membrane. The disease is kept up by, and cannot be removed till these causes are removed. Ulceration about the lips and nose sometimes arise from disease about the incisors or are kept up by it. I recollect the case of a gentleman who came from the West Indies, to be treated for an ugly ulcerated tumour on the cheek. Very active measures had been adopted in the

Fig. 88.



island where he resided. He had had the part cut out more than once, and corrosive agents applied in all sorts of ways. Recourse had been had more than once to the actual cautery. On the last occasion the surgeon had made him put a lime, a fruit like a small lemon, in the cheek, in order to distend it, and make the disease more apparent, and then a large red-hot skewer was thrust into the bottom of the wound. Still it did not heal, and he came here expecting to have some dreadful operation performed for the relief of his malady. The whole case depended on a decayed tooth in the upper jaw; it was taken out, and in a week he was well. He would have recovered at any period of the disease if that tooth had been attended to.

But there are still more serious affections arising from diseases of the teeth, of which I shall speak to you by and by, tumours of the gums and tumours of the jaws, requiring, sometimes, very difficult surgical operations for their cure.

WOUNDS OF THE FACE.

Wounds of the face are occasionally met with, and I need not tell you that it is of very great moment so to treat these that there shall be as little deformity as possible. It will much depend on the nature of the wound whether or not you are justified in putting the edges together and expecting union by the first intention. You must, however, in this region, endeavour, whenever it is feasible, to effect union, and for this purpose you will apply sutures of one kind or other. In some cases recourse must be had to a twisted suture, and in others to one or two points of interrupted suture, and thus you effect a cure by the first intention. These wounds involve the lips, the nose, the eyelids, and all parts of the face; some of them penetrate into the cavities, and they must be treated according to circumstances, according to the principles of the art.

TUMOURS OF THE FACE.

A great variety of tumours of the face are met with, and it is by no means uncommon to meet with erectile tumour here, and that in a situation where the treatment of the disease is most difficult. The tumour is sometimes extensive, and its removal may occasion deformity. It requires great care and nicety to manage these cases with propriety. I have before explained the nature of erectile tumours. The disease is admirably described by John Bell under the name of aneurism by anastomosis; but these tumours have not all thrill or pulsation, they are not all active, and are sometimes more allied to varix than to aneurism. The term *erectile* tumour is, perhaps, the best.

You can scarcely be puzzled in forming a diagnosis in these cases; their appearance is sufficient to convince you of their nature. Some of them are entirely subcutaneous; they, perhaps, occupy a portion of the cheek, and there they require a more attentive examination that you may not confound them with any other. The tumour is soft and doughy, and has somewhat the feeling of a fatty tumour. These last are exceedingly soft, so that you might suppose there was fluctuation, but they become more firm after removal. The diagnostic mark of erectile tumour is, your being able to diminish its size by pressure; that you cannot do if it be a solid tumour. By continuing to press the tumour on the subjacent bone it almost disappears, and then, by taking off the pressure and causing an excitement of the circulation, the tumour suddenly increases. When the skin is involved the appearance of the external parts will at once convince you of the nature of the disease. Now and then, however, mistakes as to the character of the affection are made. I took a tumour out of the thigh the other day which had puzzled many surgeons both in London and the country. The patient had been under treatment two years for erectile tumour. One surgeon punctured it, and was frightened by the blood spirting out against the wall. He then tied it up with plasters and bandages, and the limb was, in consequence, rapidly wasting away. On taking off the bandage it swelled up suddenly, and, on examining it, I was satisfied that it contained fluid, and, very likely, blood. It was determined to remove it. Not to place my opinion against those who had seen it before, I was prepared, if there had been great hemorrhage, to have tied the tumour, and was even provided with a tourniquet to put on in the event of there being excessive bleeding. I made my incisions, but there was no particular bleeding; I dissected the mass from the fascia of the thigh, and found one or two bags containing blood. There was nothing medullary about it, and there is every probability of the patient doing well.

Having ascertained that the tumour is of an erectile character,

and is so situated that there is a reasonable prospect of everything going on well,—that it does not penetrate among the bones, as it sometimes does; then you must consider the best way of removing it. Very slight cases may be got rid of by excision, but the tumour may extend half over the face, and you would not remove that by operative proceeding. You can, by applying nitric acid, fairly destroy such enlargements of the vascular tissue as affect the surface merely. It has been proposed to attack tumours of large size by more powerful caustics. Here is a cast in the museum of an erectile tumour of the face which had been attacked by the potassa fusa, but was ultimately removed by other means, after the patient, a mere child, had been subjected to great suffering and no small amount of risk from repeated and profuse hemorrhages.

Fig. 89.



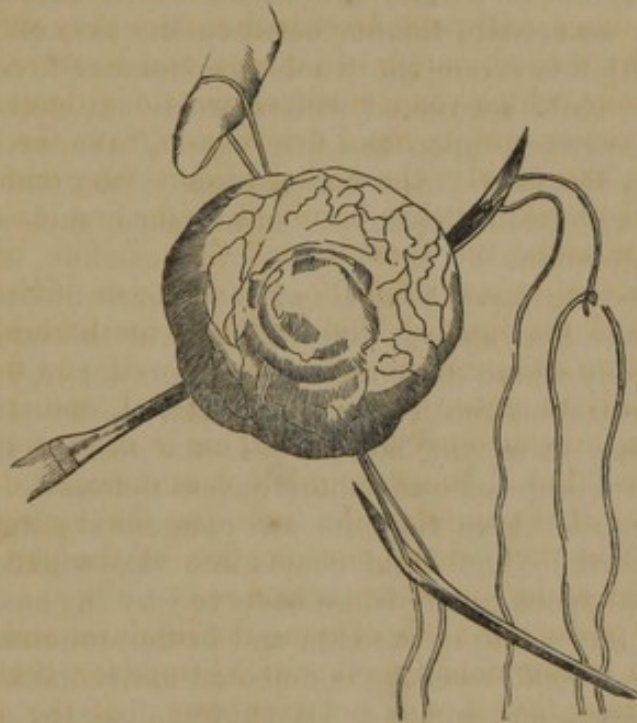
It has been proposed to deal with these tumours by simpler means than cutting them out or tying them. Dr. Marshall Hall, who has contributed to the advancement of surgical science, has suggested that they may be got rid of by introducing a fine needle from time to time, moving it about, and breaking up the tissue. I very much doubt the efficacy of this method; I have seen it tried, but I can scarcely say that I have employed it. It has been proposed to destroy these tumours by seton, so as to cause inflammatory action, but this does not answer the purpose either, and this I have tried over and over again in tumours so circumstanced that removal by other means would necessarily have caused some deformity. It has been suggested that the injection of stimulating fluids might be followed by obliteration of the vascular network,—to inject a solution of corrosive sublimate, for instance; but you can easily under-

stand the danger to which a patient is exposed by having poisonous matter passing into the circulation to which there is no bar. You dare not cut these tumours out unless they are very small, and you can go very wide of the disease. On looking into Mr. John Bell's admirable work you will find out the danger to which you expose the patient if the tumour be cut into; and it is of no use tying one vessel, or one vessel after another, as they run into the morbid tissue, because the supply will speedily come from others. Excision has been attempted in tumours of this kind in children, and sometimes with lamentable results. I think I have mentioned one case to you formerly, in which a practitioner of surgery attempted the operation of cutting out a tumour of this nature in his own house, and the patient died before he could be removed,—died, in fact, on the table, or in the nurse's lap—a very awkward sort of occurrence. You can sometimes extirpate erectile tumours very safely and advantageously by a combination of incision and ligature. By cutting round the tumour, which you can sometimes do without danger, and then tying it, you ensure its rapid destruction, save the patient considerable pain, and abridge the period of cure very materially. You cut through all the skin that is involved, in the first instance, or you pass a ligature under the tumour, and then, before tightening it, with sharp scissors, or a small knife, you make an incision between each two parts of the ligature, and tie it into the fissure, and in this way strangulation is sure to follow instantly. If you do not tie the mass very tightly at once, it becomes inflamed, and it may or may not perish from inflammatory action. This is always a painful and tedious process; but if you strangulate it at once, its destruction is instantaneous. It is painful at the time, but the aggregate amount of pain is far less than where mortification of the part takes place in consequence of inflammatory action.

I shall now show the mode of tying the ligature, and so on. You must have an uncommonly good stiff ligature for the purpose; it must be so strong that it will not give way. If the tumour is of some extent, you may, by a double ligature, cut off the parts. You put the armed needle through, under the disease and clear of it, take hold of the loop, and draw the instrument back. You then divide the ligature, take hold of the tumour, and, lifting it up, strangulate it by tying a ligature on each side; but before tying it you slit the skin a little with the point of a pair of good scissors, and that will be quite sufficient to get the patient rid of the disease. Sometimes the tumour is very extensive, but at the same time every part of the integument covering it is not affected, and there you may attempt to save a certain quantity of it, and in that way materially prevent deformity. You can, with great propriety and safety, cut through the sound integument, and make your incision in such a direction as to cause as little deformity as possible. Perhaps a portion of the skin is affected, yet the tumour is very extensive in

the subcutaneous tissue, and then you may cut round the discoloured parts of the surface in the sound skin, make an incision through the skin at the corners, and dissect back the flaps so as to uncover the tumour completely. Sometimes the coverings of the diseased part are quite sound, and of their natural colour; you may then save all the integument, and if you can, so much the better. In uncovering an erectile tumour you may do it without risk of hemorrhage, but if you cut the deeper parts the probability is that you will have great difficulty in arresting the hemorrhage. You proceed to detach the tumour in this way. Your first business is to pass a needle under the tumour completely, and without any ligature in it

Fig. 90.



at all. You then carry another needle, with a ligature you intend to use, across under the other needle, raising the tumour towards the surface by the one first introduced. The object in not passing a ligature in the first instance is that you may not entangle the ligatures. You then thread the first needle with a small thread attached to a strong ligature, and draw that through. You then detach this thread, and you have two double ligatures underneath the swelling. You separate the ligatures, and then you take two of them, it is indifferent which, and an assistant holds the others all very tightly. You tie these so that you will have three knots, and a reef-knot over all, to prevent them slipping. You then take up two of the other ligatures, and tie these also in the same fashion. You take the third pair, and while the assistant holds the remaining two,

very firmly draw these and secure them. Now you have your knots underneath, and all that you have to do in order to strangulate the tumour entirely is to draw the last two ligatures very tightly. You cut away the ends of the ligatures, and in a few days the whole mass will come away. The integument slips up, and the swelling of it abates as the tumour comes away, and when the latter is removed and the suppuration is abundant and good, the parts all relaxed, the former may be laid down and retained in their situation by compresses and bandages. It is astonishing how little deformity ensues. In this way I have got rid of tumours which had been subjected to all sorts of operations previously, but unsuccessfully, in consequence of the whole morbid tissue not being destroyed. I recollect one case, remarkable for the size and awkward situation of the disease, that of a child, which had been subjected to many operations for an erectile tumour between the side of the nose and the eye, but by this means the whole was removed, no return took place, and the child recovered with scarcely any deformity. This patient was operated upon the first year of the existence of the North London Hospital. She was presented the other day, a fine healthy girl, with but a slight scar on her face, such as would but little attract attention.

In this way you have to deal with tumours of the eyelids, on the edges of the lips, and on different parts of the body. In other parts of the body where these erectile tumours occur, you treat them after the same fashion, but you do not require to be quite so nice in your proceeding as on the face, where the loss of integument is attended with a large scar and more or less deformity.

The majority of these tumours are congenital; their seeds are sown before birth. The child comes into this wicked world with some small red specks, only to be observed by the anxious mother. This goes on increasing in the skin and in the subcutaneous cellular tissue; or a small swelling is detected under the skin, and this gradually enlarges and spreads. But these diseases now and then commence latish in life. We took away a tumour in the corner of the mouth for a policeman, the other day, in the hospital, about the size of a nutmeg; at least it was fully this size when the man stooped his head, and then caused him considerable pain, rather an unusual circumstance in diseases of the kind. It had all the characters of erectile tumour, but it had come like a small dark speck only two years before he applied for advice and relief. The disease was so situated and so limited that I thought it could be cut out: so it was without much trouble. The patient was instantly relieved of pain, and declared that the touching of the exposed surface did not give him one-twentieth part of the suffering that handling the swelling had done.

We meet now and then with encysted tumours of the face. I told you how to treat those of the head; these are connected loosely,

and they come away easily ; but that cannot be said of encysted tumours of the face, neck, or other parts of the body. Tumours upon any part besides the hairy scalp are generally composed of the same substances as those of the head, but their cysts are much thinner. You are often applied to by patients in whom these tumours have suddenly become inflamed and have enlarged very considerably. Under these circumstances a very trifling operation will suffice. If, when a tumour is thus inflamed, a large puncture be made with the point of a lancet, the contents may be squeezed out, and the cyst will often become contracted and obliterated. There is no further secretion of this sebaceous or atheromatous matter ; in fact, the case has advanced so far towards a cure that inflammatory action has been set up, and all that is necessary to be done to complete it is to subject the patient to this trifling inconvenience. I have over and over again brought about a perfect cure in this way. If you attempt, in this stage of the disease, to dissect out the cyst, you will in all probability find that you have a difficult business to accomplish. The operation is attended with a good deal of bleeding, and it is almost impossible to get away the whole of the bag. You might destroy a great deal of the integument in your attempts ; but, happily, there is no necessity for such a severe proceeding. But very many small encysted tumours of the face, uninflamed, can be treated thus with advantage ; that is to say, a radical cure will follow the mere puncture and squeezing out of the atheromatous or other matter. I treat many tumours thus, much to the satisfaction of the patients. They very often have had advice previously. This is often enough tendered by good-natured friends, and more so when diseases are staring them in the face. But, in truth, people, educated and uneducated, are fond of giving advice in all cases. Nothing, they think, is more easy than prescribing for a medical and surgical case. It is as much the business of a regularly-qualified surgeon to guard those who apply to him against dangerous advice of meddling and busy-bodies, and against the machinations of quacks, as to direct what is likely to be beneficial. Yet the public are henceforward, it seems, to be left to the tender mercies of all sorts of empirics. There may be a pleasure in "being cheated" in small matters ; not so, perhaps, when health and life are at stake. The mischief that is done by ignorant pretenders is inconceivable by those who are not in the daily habit of seeing people labouring under disease. There are many affections which, if let alone, may remain dormant, and cause little danger or even trouble for years ; but if interfered with and stirred up by imprudent meddling, will proceed with appalling rapidity. Quacks,—the majority of whom, utterly innocent of any acquaintance with the structure of the human body in a state of health, totally ignorant of the changes produced by diseased actions,—attack without hesitation any affection which has been declared unmanageable by

the means known to scientific men. The natural changes which occur in the progress of the malady are attributed to the means employed by the gifted tinker or cobbler. Malignant tumours are believed to be in the course of suppuration, and so on. The patient is fooled out of his money, and, in general, quickly enough hurried out of the world. Strange to say, people of education, those who occupy the higher grade of society, are the principal dupes of these charlatans and pretenders. They deserve well to be pillaged; they are often enough both pillaged and poisoned,—“cheated” out of their existence in many instances. But regular surgical advice may have been obtained. The patient comes prepared for a severe and bloody operation. The cutting out of the bag and its contents, and nothing short of it, has been advised as the only effectual cure. A very distinguished artist came to me, many years ago, in a sad flurry about a matter of this kind. He had his tumour punctured and emptied, and to this day he has had no return of his malady.

You may meet with cases where, from a gradual increase of a tumour of this description, and from its situation, as over a prominent bone, it causes deformity, and the patient is anxious for its removal. Such tumours frequently occur about the forehead, the eyebrows, and very frequently over the external angular process. You have, doubtless, seen many of these tumours dissected out in the hospital, and generally there is no difficulty in effecting it.

You make an incision in the direction of the orbicularis muscle, and remove the tumour, if possible, without opening the cyst. You make a dissection, and laying hold of the cyst or the tissue that surrounds it, by means of a pair of good forceps, you raise it up and dissect it out of its bed. The cysts frequently contain a quantity of hair growing from the interior surface, and it is of great consequence to remove the entire cyst. Sometimes, from the tumour being squeezed and rubbed previously the skin and cyst adhere, and it is difficult to separate them; the cyst is opened unavoidably and the contents escape, and then there is some trouble to get all away. I have before told you of a case in which I had occasion to dissect out a tumour from the inner angle of the eye. It had been twice operated on before, but the whole of the cyst had not been taken away, and the secretion had again commenced. The dissection was a difficult one, and the skin was incorporated with the cyst, and the lower part of the latter was pretty firmly adherent to the bone. The whole of this, however, I believe was taken away, and there does not appear any tendency to its reproduction. If the whole be not removed there will often be a constant weeping discharge of matter, and this will continue till means are taken to destroy the whole of the diseased surface.

Now and then you meet with solid tumours of the face of various kinds, and some of rather a questionable character. They form on

various parts of the face, very often on the cheeks, and they sometimes go on increasing in size and attain a formidable appearance. Occasionally they occur somewhat anterior to the ear. You are not to mistake glandular swellings in this situation, and enlargement of the lymphatics, for new growths. The tumours of which I speak are of slow and gradual growth, and perhaps, after a number of years, they attain a considerable size. Sometimes patients will carry tumours of the kind about, in this exposed situation, for a long period of time. I took, a few months ago, a tumour out of a gentleman's face as large as an orange, which had occupied that situation thirty years. There was some ulceration on the surface, but this was merely from the distension of the integument. These tumours are not of a malignant character, and they become inconvenient only from their bulk and awkward appearance.

In dissecting out these tumours you must recollect very well the anatomy of the parts, the situation of the parotid duct and the twigs of the portio dura, which may be interfered with. Sometimes it is impossible to remove the tumour without taking away part of the branches of this nerve, but it is better that the patient should be paralyzed in part of his face for a short time, than that any portion of the disease should be left. If the smallest part of the tumour, however benign, is left, it will grow again, and, perhaps, more rapidly than before. But, by a careful dissection, in the greatest number of cases you can avoid the division of the nerves. You make your incision so that the whole of the tumour may be included. You cut on the surface of the tumour, directing your knife towards it, and in the sound parts, always dissecting in the direction of the nervous fibrillæ. By proceeding in this careful way, you will frequently remove tumours without causing great deformity from scar or any paralysis of the face.

LECTURE VIII.

ULCERATIONS OF THE FACE.—NOLI ME TANGERE.—ULCERATIONS AT THE ANGLES OF THE MOUTH.—DISEASES OF THE TONGUE.—FISSURE.—RANULA.—TUMOURS.

It is well known to those who have had experience in surgical matters that morbid growths, or new formations in any part of the body, cannot be got rid of by the internal use of deobstruent remedies, as they are called, nor yet by local applications, however potent and stimulating; in fact, much mischief often arises from

meddlesome and imprudent interference with tumours of various kinds; their growth is often hastened, and their connections with their coverings and with neighbouring parts is often rendered more intimate.

You now and then, however, see glandular swellings give way under constitutional assisted by local treatment. Occasionally tumours occur in the face, occupying a space below the zygomatic process, anterior to the masseter muscle, and also under the lower jaw. Swellings in these situations are very likely to depend on inflammation and irritation in the mouth. They are sometimes firmly fixed, involve a considerable portion of the face and neck, and project outwardly to a great extent; but on the cause being removed, and the general health improved, they become gradually absorbed and disappear. These are very different from the sarcomatous tumours of this region, which are generally loosely connected to the surrounding parts, and are of very slow growth. Care must be taken to ascertain the nature of the disease before proposing a severe operation.

ULCERS OF THE FACE.

We have to deal with ulcers of the face, and they are of different kinds. We do not often meet with simple ulceration here except from accident. Ulcers in the upper part of the body heal very rapidly; the blood flows freely away, and this is very essential to the healing process. Wounds in the upper part of the body heal in one-fourth part of the time that they do in the lower.

Many ulcers here assume a specific character, and sometimes commence from very slight injury. A man has cut himself in shaving, and the wound has become poisoned, as the saying is, somehow. Some corrosive or irritating stuff has been applied to it by accident or design, the oxide of some metal, or such a panacea as brown soap or sugar; or a small softish wart appears, or a little eruption, and from this ulceration takes place. These ulcers arise about the alæ of the nose, sometimes at the corner of the eyes, and sometimes on the cheek. Occasionally they begin as hard tubercles, and go on extending. Perhaps the sore heals at one place and spreads at another. Although these sores are troublesome to the patient and intractable, they can scarcely be looked upon as thoroughly malignant. They may go on and destroy all the parts with which they come in contact; skin, muscles, cartilages and bones all perish before them. Cases which are neglected may proceed from bad to worse for a number of years, until scarcely any vestige of the bones of the face or their coverings is left. I have over and over again seen patients who had lost all their features, lips, nose, and eyes; nothing remained but the brain-pan and tongue, and they

required to be fed by a funnel introduced over the base of this organ and into the pharynx.

These ulcers have a sharp edge; the integument around them is sometimes slightly tuberculated, and the edges are now and then, as it were, worm-eaten, but there is no inflammation around, they are glazed on the surface, and there is no appearance of granulation in them; they may continue for a great many years, causing the destruction I have mentioned without the lymphatics being at all affected, without the constitution suffering much, and without the disease appearing in other tissues or organs of the body.

These sores, however, may be made to heal by proper treatment, however extensive they may be. We had a man in the hospital lately, an honest dealer in horses, from Yorkshire, who had lost a great part of the nose, the lips, the side of the face, and one eye. The disease had been going on for a great many years; when he came in there was a sore on the cheek as large as the palm of the hand, extending in all directions, but he left with this sore not one quarter that size, and the ulceration was, to a great extent, healed, though not entirely, and it is doubtful whether it ever will be. There being such an excessive loss of substance, the remaining soft parts could not come together, so as to assist in covering the void.

Here is a drawing, made by one of the pupils of the hospital, of a disease of this same kind, which had first seized upon the nose. The patient was a woman eighty years of age. The upper lid, the side of the nose, and the eye is destroyed. In this case the greater part of the upper jaw was removed. Here is another drawing where

Fig. 91.



the same disease has attacked the appendages of the eye—a part of the nose is healed. In another case the disease has attacked the

Fig. 92.



corner of the mouth, but it has been checked, and you observe to what an extent it has cicatrized. If no treatment had been adopted the disease would have gone on and ended in the destruction of the integuments of the face and of the bones; the patient might have died from profuse discharge and irritation, or perhaps from hemorrhage.

Now, this affection, which has been termed *lupus*, or *noli me tangere*, or *herpes exedens*, &c., may be at once put a stop to by appropriate treatment. It has been supposed that internal medicines do good; arsenic is said to be efficacious, but it is by local treatment that you principally succeed. There may be some slight swelling in the part, and the parts underneath may be healed, but whenever you see the edges assume a sharp appearance they may be destroyed by an active escharotic. You may employ arsenical paste, but the constitution is apt to be dangerously affected by it. The best application is the chloride of zinc, mixed up dry, with an equal quantity of flour, and then moistened, by adding a little water to it. It must be mixed up to the consistence of bird-lime, and you may spread it on lint; but the better plan is to put it on a spatula, dip your finger in water, and then lay it on with accuracy round the sore, and then over the whole of it. It subjects the patient to some pain, but that ceases after a time, and the paste becomes elevated at the edges. You then find that an extensive

slough has formed, and immediately that separates; instead of the old eating ulcer you have substituted a healthy granulating surface, the part furnishes good matter, and there is soon the commencement of cicatrization all around. This may be done in all stages of the disease; even where the greater part of the features are destroyed you may in this way check the disease; and where the affection is not so far advanced you may destroy it altogether, and obtain a healthy cicatrix without much deformity.

The chloride of zinc used thus is a most active and effectual remedy, but it causes, as might be expected, severe pain for some hours after its application. I shall read you a case from the hospital journal, to show you what may be expected from this practice.

T. B—, aged fifty-one, married, admitted under the care of Mr. Liston, January 10, 1839; a groom, of robust conformation and sanguine temperament; has enjoyed the best health, and never had anything the matter with him (except kicks and bites from horses, and from which he has generally quickly recovered), since he was a boy. He has been married thirty years. He never had any syphilitic sore, or swelling of the glands in the groin, and never contracted gonorrhœa.

About six years ago he was severely bitten in the face, hands, and arms by a horse. Amongst other severe injuries the lower lip was bitten through, and the left alæ of the nose torn off. The wounds all healed perfectly well with the exception of one part on the bridge of the nose, which, "about the size of the broken end of a tobacco-pipe," never completely cicatrized. For some time this sore remained much in the same state, but about a year and a half after the accident it began to increase in size, and to discharge a thin watery fluid. Ever since then the ulceration has gradually extended along the edge of the mutilated side, towards the left eye and cheek. It also spread over the tip of the nose to the opposite ala, and along the septum nasi. His general health has continued very good; he has continued to work as usual without anything to cover the sore. He has occasionally applied to the edges a little lunar caustic, which, though it did not appear to arrest the progress of the disease, always had the effect of diminishing, for a time, the quantity of the discharge.

Present state.—At present the edges of both nostrils, the tip of the nose, and the lower part of the septum, are covered with unhealthy ulcers, with tubercular and irregular edges, which discharge a watery fluid, and form on their surface a thin, semi-transparent yellowish scab. There is slight ectropium of the inner angle of the lower lid in the left eye, owing to the contraction of the skin over the corresponding part of the nose. The sore is not very painful except in cold weather, when it smarts very much. General health good; bowels open.

Treatment.—A poultice to be applied, in order to get the sores perfectly free from the scabs which now adhere to them.

Jan. 14th.—The ulcers being quite clear, a thin layer of paste (composed of equal parts of flour and chloride of zinc), was put over the surface of the sores, and over the tuberculous elevations surrounding their edges. Middle diet. Half a grain of muriate of morphia every night.

15th.—Suffered very severe pain from the application of the paste. Had very little sleep during the night; the face is very much swelled and red; the left eye is closed by the increased size of the cheek; the scalp is also tender; the head aches violently; the pulse is rather hurried and full, and the tongue is foul. To take two tablespoonfuls of castor oil immediately, and to repeat the dose if the bowels are not freely opened.

16th.—Less swelling of the face, so that both eyes are now visible; head very painful and tender; pain in the nose not so severe; bowels open. Did not sleep last night owing to the pain in the head. Half a grain of morphia every night.

17th.—Swelling and redness gone down except in the immediate neighbourhood of the ulcer; pain also much diminished; scalp still very tender, though neither redness nor swelling is visible. The patient says his head feels as sore as "if it had been well beaten." Full diet.

19th.—Better. Scab beginning to loosen from the nose. Not much pain, but feels weak after so much severe suffering. Appetite good; bowels regular.

20th.—The scab formed by the dried paste, and the slough adhering to it, has completely separated, exposing a healthy-looking ulcer, which discharges pus instead of the thin sanious fluid which used to flow from it. There are still some tubercular elevations on the upper edge of the sore and on the left side, beneath the eyelid. Water-dressing to be applied to the sore.

23d.—A little more of the chloride of zinc paste was applied to the tubercular edge at the upper part of the nose and angle of the eye. Half a grain of morphia every night.

31st.—The sore has assumed a much more healthy aspect at its upper part, and is now healing rapidly, (cicatrizatio*n* having already commenced at several points.) The discharge, also, is more healthy. General health good; bowels regular.

Feb. 6th.—Mr. Liston ordered a little of the zinc paste (reduced to a more fluid state with water), to be applied to some parts of the edges of the sore which do not show a disposition to granulate by means of a camel's hair-brush. The greater part of the sore is perfectly healed. The new skin is firm and healthy.

23d.—The sore is nearly healed, but a small portion near the inner angle of the left eye is still unhealthy in its aspect, and shows little disposition to alter its character. To this part, previously made clean and free from eschars by liquor ammoniæ, a small quantity of the zinc paste was applied with a camel's hair-brush. Half a grain of muriate of morphia at night.

24th.—The upper part of the face very much swelled and inflamed. Fomentations to be applied. One ounce of castor oil immediately.

25th.—Much better. Swelling reduced. Water-dressing.

March 16th.—The sore is now completely healed and the skin is sound.

18th.—Discharged cured.

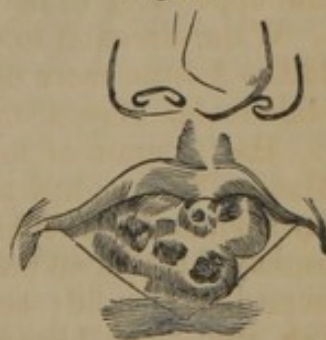
ULCERS OF THE LIP.

You meet with ulcerations of the face of another character, commencing sometimes on the cheek, and very often on the under lip, near the angle of the mouth; it is very seldom that they appear first on the upper lip. They may begin as warts, or scaly eruptions, or the lips may be chapped, and kept so by constant meddling with the parts and by improper applications. The disease may sometimes be traced very well in the lower orders to the lip being burned, and the sore kept from healing, by the constant and almost unremitting use of a short tobacco-pipe.

This affection of the lips occurs generally in people advanced in life. It is attended at first by mere induration with a little ulceration, but by and by the latter extends, and the edges of the sore then become very much indurated, and the surface presents more or less of a warty appearance. The lymphatic glands are very apt to become affected at an early period. Here is a specimen in the advanced stage—the edges of the sore are swollen, everted, and of stony hardness.

The disease in general goes on with considerable rapidity; it spreads along the prolabium, or perhaps only a bit of the edge of the lip is affected externally, and it extends more deeply towards the jaws. The glands may not be affected in the first instance; the disease may exist six or eight months, and still you can trace no enlargement, but, unfortunately, though the disease may be removed from the part in which it originated, and that may remain sound, yet the glands, sooner or later, become affected, and, perhaps, at the distance of two or three years from the extirpation of the original indurated ulcer of the glands under the jaw, show that they have been contaminated. The lymphatics in the course of the facial artery, and the glands under the jaw, down the side of the cheek, and under the chin, are all involved. Here is a representation of the disease,—there are malignant carcinomatous tumours of the glands,

Fig. 93.



passing down the neck, and immovably fixed to the jaws, presenting all the characters of true cancer. There is a great loss of substance, a sort of warty granulation all around the edges, and hard knobs in the vicinity. The tumours are of a bluish-black colour, the veins are distended, and the lumps are as hard as stone or marble. The ulcers do not involve the bone, but they adhere firmly to it; the patient suffers a good deal of lancinating pain, and at last he generally perishes, in consequence of the affection of the lymphatic glands of the neck, which sometimes swell up suddenly. I have more than once seen an enormous swelling, occupying the whole of the neck, take place in a few weeks in patients who had

Fig. 94.



laboured under cancer of the lip for some months previously. Sometimes they threaten suffocation, and occasionally patients have been suffocated. The disease, however, usually continues to advance, a large deep ulcer takes place, in the end involving the blood-vessels, and the patient perishes after two or three profuse hemorrhages. I have seen within the last two years eight or ten cases of disease of this nature in the lymphatic glands, where there was no trace of any previous affection of the face or lip, and where the glands of the neck become, without any assignable cause, affected by carcinoma, in some cases the hard and in others the soft cancer. I mentioned one of these cases to you the other day, which became fatal in a few months. The disease commenced in the glands, under the jaw, without cause; the glands on the other side became

affected, at last the neck was occupied by an enormous tumour, depressing the windpipe, and every instant threatening suffocation. The circumference of the neck and tumour was fully twenty-six inches. We inspected the neck and chest, and it looked as if the muscles, vessels, and nerves had been dissected out, and some substance like bees' wax had been poured in amongst them, so thoroughly did the carcinomatous substance involve all the tissues. A cure was confidently promised in this case by a doctor even to the last, and for some time looked forward to as possible by some of the patient's very sanguine friends. It was to be brought to a kindly suppuration by some very minute doses of sulphur, or charcoal, or something of the kind. I was asked to open the supposed collection of matter. The patient died within the week, and I need not tell you that there was no trace of purulent matter, or trace of any but the most malignant action.

It is desirable, if possible, to remove the disease of the lip before the glands have become in any way contaminated. You must look with great suspicion upon all ulcerations, with induration upon the lips, and even upon warty excrescences.

But you meet with ulcers of the lips now and then which are not of a bad character, and which may be made to heal up by appropriate local applications, by keeping the lips at rest, and bandaging them. It is not unusual to meet with cases of superficial ulceration, without any hardening of the surrounding parts. You are not to set every ulcer or tumour in this situation down as a cancer, and cut it out; you must look to the character of the sore and its progress, and to the state of its base.

But suppose that you have a cancerous sore to deal with; that it is recent, and of limited extent; that you can discover no disease of the lymphatics, and you, at the patient's request, mean to remove it? If it extends along a considerable portion of the prolabium, you may content yourself with shaving the part away to a sufficient extent. The object is to remove the whole of the disease, wide of any induration. If you can do that, and yet leave the patient without deformity, all the better; it is a great matter to do so. You have disease affecting, perhaps, only the prolabium, perhaps only extending along two-thirds of this structure. In that case you take up the lip, lay your knife on it, and, cutting to a considerable depth, remove all the affected part. You cannot here attempt to bring the whole of the edges together so as to effect union by the first intention; but you put a point or two of suture through the lining membrane of the mouth and skin, and bring them together, so as to diminish the size of the wound, but this is not absolutely necessary. You stop the bleeding, put on a bit of moistened lint and oil-silk over it, and the parts heal by granulation. There is often but little deformity from this proceeding; the lip grows up, and there is a substitute furnished for the prolabium. In cases where there is

merely a wart, or induration to a certain extent, you may so take out the part as to bring the edges together. You take out a triangular piece, by a V incision of the lip. You make the limbs of the V incision of equal length, so that the surfaces shall come together smoothly. You may take hold of the lip by one of these forceps, then lay the knife on the prolabium, and cut down along the edge of the blade, and then, taking hold of the other side, repeat the process. I have seen the operation performed in this way, I may venture to say, in fifty or sixty cases; for no surgeon, in former times, thought himself safe in attempting the operation without a contrivance of this kind. One blade was sometimes made broader than the other, and covered with wood, on which the incision was to be made; but we use simpler tools now-a-days. We have knives made like this, a narrow sharp-pointed bistoury, and do a great deal of work with them. We take the lip up with the fingers, an assistant holds one side, and the surgeon the other. He stands by the side of the patient, or in front of him, but it is as well to stand out of the way of the blood, and he puts the knife through the lip, at what will be the angle of the V, and cuts up towards himself wide of the disease. He has thus made one side of his V incision, and he enters the knife again near where he put it in before, and carries it upwards also. He may take hold of the edge of the lip, and make the second incision by carrying his knife down, from the edge of the lip to the commencement of the first incision, to the point where the lip was first transfixed; but the cuts are made cleaner the other way; with a touch of the point of the instrument the triangular portion is detached. The lip can be put together without difficulty, for generally the cheeks are flabby, and the grinders are lost. It is in old people that the operation is usually performed, and there is plenty of substance to spare. The incision must be put together by two or three points of twisted suture, according to the extent of the wound. You put in one of the pins close to the prolabium, apply a twisted suture, and then put in another at some distance below it. You may put in three, but, generally, two, well applied, will be sufficient. You insert them sufficiently deep to bring the surfaces perfectly in contact; by doing that you compress the ends of the vessels, which would otherwise bleed very profusely, and not only arrest the hemorrhage, but bring the parts so closely together that there is no oozing between the edges to prevent the union. I have before told you how to put in the pins, and the time at which they may be taken away with safety. I have also cautioned you against applying dressings of any kind, and muffling up the parts in bandages and handkerchiefs, or allowing the patient or his friends to do so, in order, as they say, to keep out the cold.

In bad cases of the disease, of course, you will not interfere with it. You will not attempt to remove even trifling ulcers if the lymphatics are at all affected, still less will you be so unwise and so cruel

as to attempt the removal of the lymphatics affected by malignant disease primarily or secondarily under any portion of the jaws. This has been done now and then. Some young surgeons have tried to signalize themselves by taking away tumours of this kind. I have known a great fuss made more than once about extirpating the jaw where the bone has been involved secondarily in cancerous disease, where the operation was, to say the least, exceedingly unjustifiable. The operation must have been very painful and very bloody; it is a proceeding attended with great risk of life, without the most remote prospect of the patient's being cured of the disease. They have, as might have been predicted, died more rapidly, more miserably, than if they had been let alone. Older surgeons, and of some experience, have, it is said, looked on during their butcheries, and countenanced them by their presence. They ought to have known better, and accordingly been ashamed of themselves.

[When the cancerous tumour cannot be removed by the ordinary V shaped incision, and when it involves the entire lip, it becomes necessary to perform some plastic operation in order to remove the deformity occasioned by the loss of so much of the organ. The following case, and the subsequent remarks in relation to cheiloplastic operations, are extracted from one of my recent publications on plastic surgery.

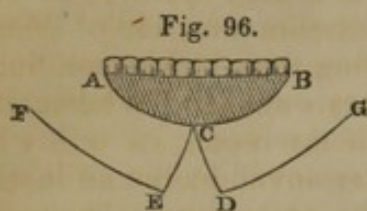
In the month of January, 1842, I was requested to see I. Lambert, aged about 50, who for several years had suffered from a cancerous affection of the entire lower lip. The appearance of the disease is well represented in fig. 95. The general health of the

Fig. 95.



patient being excellent, the glands in the vicinity apparently perfectly sound, and the season of the year favourable, I determined to attempt at once the removal of the disease, and at the same time restore the lip by a plastic operation. Accordingly, the patient was brought before my class on the regular clinical day, and the following operation performed.

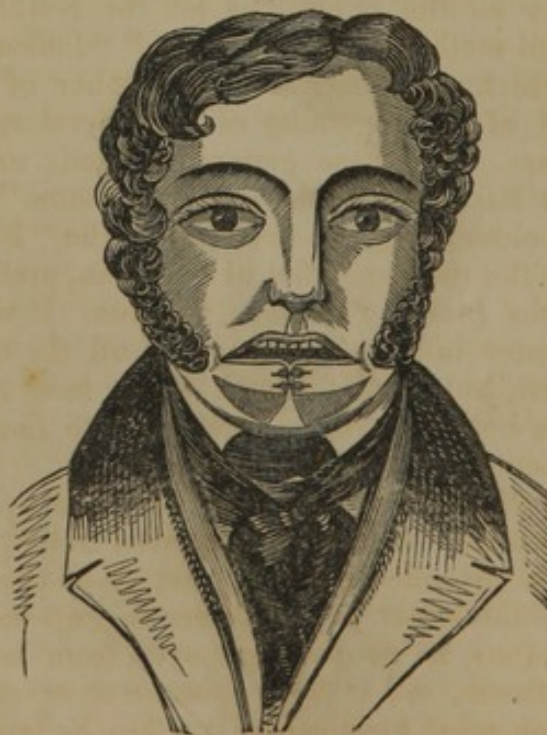
Having seated him in a favourable position, with his head supported against the chest of an assistant, I proceeded to the removal of the entire diseased mass, by a semi-elliptical incision, which started from the commissure of the mouth on one side, and terminated at a corresponding point on the other. (See diagram, curved line A B.)



From the centre of this line two slightly curved incisions, indicated by the lines C D and C E, were carried downwards and outwards, until they reached the base of the inferior maxillary bone. It is obvious that these incisions were

separated from each by a triangular piece of skin, the superior angle of which nearly reached the first incision, A B. Then, from the terminal extremities of the incisions C D, and C E, two others were carried upwards along the base of the lower jaw, until they reached a point opposite the initial and terminal points of the incision A B. Two quadrangular flaps, A C E F, and B C D G, were thus marked out, and immediately detached from the subjacent bone.

Fig. 97.



The hemorrhage having been arrested, and the patient allowed a few minutes of repose, the flaps were raised and placed in the position originally occupied by the lower lip, and then united to each other at the mesial line, and also by their lower thirds to the triangular piece of integument, by means of the twisted suture. By the elevation of these flaps, a raw surface on each side was left to heal by the modeling process, or by granulation. The parts were dressed with the "tepid water dressing," the patient placed in bed, with his head elevated, and a rigid antiphlogistic system of treatment ordered. Nothing of interest in the subsequent management of the case presented itself; the parts healed kindly, and the patient recovered, without a trace of the disease remaining. More than two years have elapsed since the performance of the operation, and Mr. Lambert is perfectly well, and actively engaged in business.

Remarks.—From the conspicuousness of the organ, its utility in articulation, and also in the prevention of an involuntary and incessant flow of saliva, the lower lip may be considered one of the most important portions of the face. Unfortunately, it is exceedingly prone to diseases of various kinds, especially tumours and ulcers, requiring for their relief the loss of either a portion or the whole of the organ involved. It would appear that its importance was long since recognized, and attempts made by the older surgeons to remedy its loss. But it is to our modern brethren, especially Diefenbach, Liston, Velpeau, Roux, Lisfranc, Dupuytren, Blandin, Blasius, Zies and Rigaud, that we are indebted for the most valuable information relative to the best modes of curing its diseases, or remedying its destruction.

Velpeau classes all the operations for the restoration of a lip under three general methods: the "*Italian*," "*Indian*," and "*French*"—each one of which comprises a vast number of "special methods," the result of the ingenuity of the operator, and the exigencies of the case. To these general methods might be added that which Græfe has designated as the "*German*." Taliacotius, and most of the older surgeons resorted to the "*Italian*" plan of procedure; while the moderns, almost to a man, prefer some modification of either the *Indian*, *French* or *German*. It would be worse than useless to enter into a description of all the operations that have been devised, but a brief sketch of the most novel and important may prove both useful and interesting to those not familiar with this department of plastic surgery.

Chopart's Operation.—The operation practised by Chopart consisted in making on each side of the diseased tissue, a perpendicular incision, which extended from the margin of the lip to a point below the base of the lower jaw. Dissecting up the flap inclosed between the incisions, he carefully removed from its upper margin all the affected tissue, either by a *transverse* or *curvilinear* cut. Then, pulling upon what remained of the flap, he brought its upper

edge to the level of the margin of the natural lip, and there retained it by suture, straps, and placing the head of the patient in such a position as to prevent all strain upon the part.

This method, though apparently simple and easy of execution, does not generally answer, in consequence of the subsequent contraction of the tissues. Nevertheless, it is well thought of by Velpeau, Rigaud and some others. In my own cases I have been obliged to perform a second operation, similar to that proposed by Thévenin, where the tissues are tight, and refuse to yield readily, viz: a *transverse incision* about an inch below the free margin of the lip. By doing this, and thus taking off all traction upon what forms the new lip, I have succeeded in making a very good cure.

Horn, or Roonhuysen's Operation.—When the tumour or ulcer to be removed is small, a common V shaped incision, including the whole mass, is sufficient. The raw edges of the wound are brought together, and treated like a case of common hare-lip; but where the mass is large, this process is sure to diminish the orifice of the mouth, and thus give rise to deformity and inconvenience. To obviate this difficulty it was proposed by Horn to detach the adjacent parts by free dissection from the maxillary bones, which would of course afford more material for the lip. The only objection to this method is the circumstance that, in many cases, the orifice of the mouth is rendered so small as to be almost useless, besides presenting great deformity.

Operation of Dupuytren.—This, in ordinary cases, was nothing more than cutting away, by a semi-elliptical incision, all the diseased tissue. Granulations spring up from the margin of the healthy skin, occupy in part the place of the original lip, and conceal, to a certain extent, the deformity. It is only in mild cases, however, that such a measure could succeed. In more desperate ones Dupuytren himself resorted to some of the usual methods employed by others.

Celsian Operation.—Celsus, who was in truth one of the best plastic surgeons that ever lived, proposed, in cases where great deficiency of tissue existed, to perform the following operation:—Having carefully removed the diseased part by a V shaped incision, he next divided the tissue remaining *horizontally*, carrying the cuts as far into the cheek on each side as he deemed necessary, after the manner of Horn; but in order to take off the strain from the flaps, he made a *semilunar incision* in the cheek, just beyond the base of each. This enabled him to bring the parts together without difficulty; and the only objection to his operation is the danger of wounding the larger vessels, nerves and ducts of the cheek, in making the semilunar divisions. This operation is spoken of by Galen, Paulus and others, and was imitated by Guillemeau and Thévenin, who made *straight* instead of *semilunar* incisions.

Operation of M. Serres.—It sometimes happens that the disease

is confined to the integuments or subjacent muscles, leaving the mucous lining of the lip perfectly sound. In such cases, Serres *cuts away only the affected part*, and then *turns the mucous membrane over* the margin of what is subsequently to form the lip. A few stitches are sufficient to hold it in place; and union by the first intention usually occurring, a very natural and useful organ may thus be made. This method, however, will only answer in cases of *superficial and recent* disease.

Operation of I. N. Roux.—After removing the affected tissues, and forming suitable flaps of the adjacent parts, M. Roux takes away with the saw or cutting instruments the *prominent centre of the maxillary bones*, so as to make room for the proper and easy adjustment of the integuments intended to replace the organ destroyed. I have never, as yet, met with any instance of a defect that required for its relief the performance of so severe an operation, and am not disposed to advise its employment, inasmuch as I believe *most*, if not *all*, cases may be cured with much less suffering and hazard by operations equally successful in their results. Cambrelin, Thomas, Nichet, and Velpeau, however, have all had recourse to it, and, according to their reports, with decided advantage.

Operation of P. Roux.—Professor Roux, not satisfied with the measures of his namesake, goes so far as to *saw out an inch or more* of the bone, and then, by drawing the lateral flaps towards each other, he thus diminishes the *breadth* of that part of the face involved in the disease. Then detaching the flaps, he draws them across the opening in the bone, and the sutures which hold and unite the soft parts are for the most part, sufficient to hold the bones in their proper places.

Operation of Mr. Morgan.—The operation of Mr. Morgan consists in, *first*, removing the entire lip by a *semilunar incision*, the *concavity* of which is uppermost; and *second*, in making an incision also curvilinear and parallel to, and about an inch or more *below* the first. The skin included between the two is then carefully detached, except at its extremities, and lifted into the place occupied by the diseased lip. Velpeau gives another explanation of this plan of Morgan; but from all I can ascertain, the process, as just described, was the one practised by that gentleman.

Operation of Blasius.—M. Blasius has performed a very simple operation, when the tumour was large; and, according to his statement, with decided success. After removing the diseased mass by a common V-shaped incision, he next divided the integuments along the base of the lower jaw, by two incisions which commenced at the entering angle of the V and extended an inch or more in the direction specified. Lifting the flaps, he made them occupy the place of the original lips. It will be perceived that this plan is somewhat similar to the one employed in the case I have just reported.

Operation of Dieffenbach.—This extraordinary surgeon has, among many other plans for restoring the lip, performed one apparently hazardous and severe, but, nevertheless, according to the reports of others as well as those of Dieffenbach himself, exceedingly useful. The following description is taken from Zeis:—

“Having pared away the useless remains of the former diseased lip, or separated the cicatrized margin, a horizontal incision, about two inches long, is carried from either angle of the mouth outwards, through the cheeks, so as to throw the mouth widely open. The length of these incisions must be regulated according to the width of the mouth; or, as a general rule, the combined incisions must somewhat exceed in length the breadth of the upper lip. From the outer point of each of these, another incision is next carried obliquely downwards and towards the median line; the section in this case likewise extending through the whole thickness of the cheek. Thus, by means of the first operation for paring the cicatrix, and by the succeeding horizontal and vertical incisions, a flap will be prepared on either side to replace the defective lip; this flap is of a quadrangular form, and maintains a connection of more than an inch wide with the soft parts covering the tissue of the lower jaw. It may be useful further to separate the mucous membrane at its attachment to the gums, to allow of the more ready traction of the flaps.”

The severe injury inflicted on the facial nerve, the large arteries and veins, and possibly the parotid duct, has rendered this operation anything but popular. Yet, as already remarked, it has been performed with success by several, among whom is my colleague, Professor Pancoast.

Operation of Liston.—Any opinion of this truly great surgeon is always deserving the utmost respect and attention, and, although my own observations lead me to a different conclusion in relation to the best mode of restoring a lip, I cannot for a moment hesitate to advise the repetition, whenever practicable, of his method, (a modification of the Indian,) by all who desire experience in this department of our art. It consists in first removing the diseased mass by a horizontal and two perpendicular cuts, or by one curvilinear in shape; and, second, in detaching a flap from the chin and neck, twisting it on its pedicle, placing it in the seat of the original lip, and there retaining it by suture. After adhesion has taken place, the pedicle is divided, and a “wedge-shaped” piece removed, so as to allow the flap to be laid down smoothly. This method, it is obvious, is frequently applied to the restoration of other parts, and will answer here exceedingly well in many cases; but I prefer the one I have reported, as there is *less scar*, and *less risk of sloughing* of the flaps. Mr. Liston proposed this operation ten years since, but some give the merit of the principle to Lallemand.

The operation reported by myself has been claimed by several,

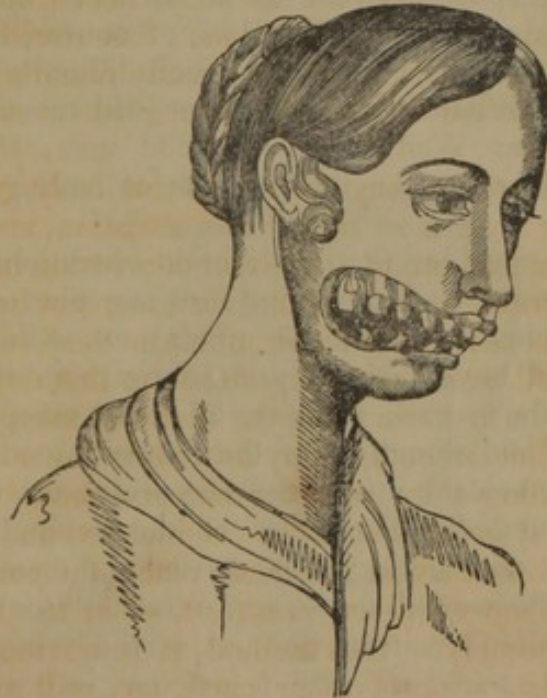
among whom are Dieffenbach, Blasius, Buchanan, and others. I can only say, that I performed it in 1834, and if any surgeon has a prior claim to the merit of its introduction into practice, I am both ready and willing to award to him all the honour that may accrue from its authorship.

ULCERS OF THE CHEEK.

Plastic surgery is also frequently required in cases of simple or cancerous ulcers of the cheeks after the ulcerative process has been arrested. The following "meloplastic operations" will serve to illustrate the importance of this novel department of our science.

In the month of March, 1842, N. O., aged 30, of Clearfield county, Pennsylvania, applied to me for the relief of a distressing deformity, occasioned by the abuse of mercury. About six years before I saw her, she had been most severely salivated for a bilious fever; and in consequence of ulceration attacking the right cheek, nearly the whole of this portion of the face was destroyed. The extensive loss of substance is well represented in fig. 98. To con-

Fig. 98.



ceal the deformity she has been in the habit of keeping her face "tied up" in a handkerchief; consequently, but little motion being allowed the lower jaw, this partial rest of the organ persevered in for more than six years, has produced a permanent contraction of

the masseter muscles on each side, so that scarcely any motion exists in the temporo-maxillary articulations, and it is impossible to introduce any substance more than the sixteenth of an inch in thickness between the upper and lower jaw. Her speech is of course very much impaired, and all her food is reduced to the smallest possible bulk, or taken in the shape of liquids. Her general health is excellent.

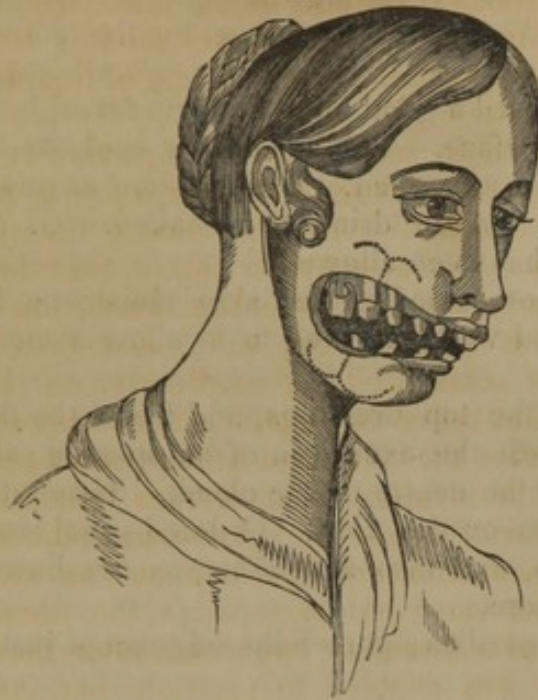
The first indication in such a case was obviously to obtain as much motion in the articulations of the lower jaw as possible; and this could only be accomplished by increasing the space between the maxillary bones. To accomplish this it was deemed best to divide the masseter muscles, (the entire muscle on the left, and what remained of it on the right side,) and then separate the bones by a lever of some kind. Accordingly, on the first Wednesday in March, that being the regular clinical day at the college, she was brought before the class, and the operation performed with a common scalpel, the muscles being divided from *within*, and the edge of the knife carried obliquely downwards and outwards. The wounds were dressed with dry lint, and on the second day the lever of Heister was employed to separate the jaws. Each day the screw was turned a thread or two; and, after the lapse of two weeks, the patient was enabled to protrude her tongue without difficulty,—a thing utterly impossible when the treatment was commenced,—and the space between the teeth, when the lower jaw is depressed, is nearly an inch. She has, of course, free motion in the part, and chews her food without much difficulty.

The most difficult part of the treatment still remained to be accomplished; and on Wednesday, the 23d inst., she was again brought before the class, for the purpose of having this put into execution.

After carefully considering the different operations usually performed in such cases, I adopted the following plan:—Having first extracted the useless teeth of the upper jaw, which, from their irregularity, would have materially interfered with the proper adjustment of the flaps, and, besides, by their sharpness, possibly caused ulceration and sloughing of the tissues forced against them, I proceeded to detach the integuments by which the opening in the cheek was surrounded. The edge of the scalpel was directed towards the bone, and the incisions carried sufficiently far to allow the margins of the wound to be approximated to a considerable degree. This callous margin, formed of the “inodular tissue,” was then carefully pared off with a bistoury, in order to obtain, if possible, union by the “first intention” between the edges of the flaps. An effort was then made to close the wound by sliding the detached integuments, from all sides, towards the centre, but they refused to yield, and it became necessary to make the incisions

indicated by the dotted lines in fig. 99. By these incisions *four flaps* were formed, and detaching them carefully from the subjacent

Fig. 99.



parts, we found no difficulty in uniting them at a line which indicated the longest diameter of the opening. The twisted suture was employed, and the wound presented, after their introduction, the appearance exhibited in fig. 100. To support the whole, one

Fig. 100.



or two straps were passed over the points upon which there was most strain, and over all a thin pledget of patent lint was laid, and the patient placed in bed. The hemorrhage was comparatively trifling, but few arteries requiring the ligature; and the operation, though painful and tedious, was borne by the patient without a murmur.

24th. Patient passed a good night; has no fever, but slight headache, and warm surface. The wound is cool, and but slightly tumefied; bowels not opened. Ordered an enema of salt and water, &c., and no food or drink to be taken. Of course no attempt at speaking has been allowed.

25th. Patient more comfortable; skin moist; no fever; thirst; enema had operated well; allowed to swallow a mouthful or two of water.

26th. Removed the top dressings, and found the flaps cool and united perfectly, with the exception of an opening, about the size of a small shot, in the centre of the cheek. General condition of the patient same as on the 25th. Ordered gruel and cool water every hour or two, and also an enema, as the bowels were not opened the day before.

28th. Removed needles; parts adhered, except just at the centre of the wound.

30th. Touched the edges of the orifice with argent. nit., and applied a cerate cloth.

Simple dressings, with the application of the caustic, were continued for several days, but the little wound refused to contract or

Fig. 101.



granulate; and I therefore freshened the edges with the scalpel, and drew them together with a twisted suture. Union, by this plan, was speedily accomplished, and my patient relieved of a most shocking deformity. (Fig. 101.)

Remarks.—There is probably no defect, for the removal of which “plastic surgery” is required, more difficult to remedy than an extensive opening in the cheek. On this point, Dieffenbach, Blandin, Roux, Liston, Zies, and, indeed, all surgeons who have directed their attention to this department of surgery, unite in opinion. To Delpech and Lallemand the credit of being the *first* to make an attempt at relieving the deformity is usually rendered; although Franco, in all probability, is better entitled to it. Several operations have been devised for the defect in question; but it must be obvious that, while certain *general* rules of action may be laid down, no one series of details will answer in every case.

Lallemand's Method.—The plan usually resorted to in cases of partial destruction of the cheek, unless the opening is very small, is that proposed by Lallemand. In this operation, after having first freshened the edges of the wound, a flap is taken from the adjacent integument of the neck, *turned upon its entire pedicle*, by which means torsion is obviated, and then attached by the twisted suture to the margins of the wound it is intended to occupy. The accompanying figures, taken from one of my cases, illustrate the steps of this operation better than language can describe them.

Fig. 102.



Fig. 103.



In Lallemand's case there was much difficulty experienced, from the restive disposition of the child, but the operation eventuated

successfully. From the fact that in this method the base of the flap is subjected to but very slight torsion,—the great obstacle to success in most cases of plastic surgery,—it has found many advocates, and is to be preferred, in my opinion, whenever practicable, to any other.

Dupuytren's Method.—Dupuytren, in cases similar to the above, was in the habit of taking his flap from the most convenient parts, but often *twisted it upon its base, as is done* in some forms of the Rhinoplastic operation; and, according to his statement, with the most perfect success. There is more danger of sloughing, of course, when the flap is subjected to torsion, and although the method has been followed by successful results, yet it should never be employed when the operation of Lallemand can be carried into effect.

Gensoul's Method.—In a case of most extensive destruction of the cheek, Gensoul, of Lyons, succeeded in relieving the deformity by an operation somewhat different and more simple than those described. After extracting the teeth, which were irregular, and in the way, and freshening the edges of the wound, he detached the integuments from the subjacent parts, above, below, and over the masseter muscle, and then, by sliding the flaps, caused them to unite about the centre of the opening. The success of this operation was most gratifying, and induced me to attempt its execution in the case reported, but the adhesion between the integuments, muscles, and bones, was so firm as to oblige me to prefer the modification of it already described. When the opening in the cheek is small, this operation must answer a most excellent purpose. A similar case occurred to I. N. Roux, and was relieved by an operation almost identical with that of Gensoul.

Method of Prof. Roux, of the Hôtel Dieu.—Prof. Roux has succeeded, by a most ingenious method, in relieving a deformity of the cheek so vast that all other operations appeared to offer but little prospect of success. His plan consists in procuring the required portion of integument from a distance, and gradually carrying it, by *separate* operations, to the defective spot. By this *migratory process*, as it is termed by Blandin, Roux cured the deformity of a girl who had lost a portion of the left side of the upper lip, the corresponding ala of the nose, and part of the cheek. The flap was taken from the lower lip, and first attached to the upper, and then subsequently transferred to the cheek. The patient was under treatment a year, and submitted to several *severe operations*.

Method of Dieffenbach.—In those cases where the flaps are made to approach each other with difficulty, Dieffenbach, to relieve them from the strain, and thus obviate the danger of separation of the wound after the sutures are withdrawn, has been in the habit of making an incision across the base of the flap, as first advised for *other operations*, in which the parts are too tense, by Thévenin.

In the case from which the following drawings were taken, I

adopted the plan of Dieffenbach in part, and with the most decided benefit. After freshening the edges of the wound, I drew them together, and then made the incision indicated by the dotted line

Fig. 104.



Fig. 105.



in fig. 105. All strain was thus taken off the flap; and, inasmuch as this was attached by its extremities, and could thus be well supplied with blood, I made the cut as soon as the wound in the cheek was closed.

My operation, in the first case, differs in many respects from those just described, although it resembles, somewhat, that of Gensoul; but future repetition must prove whether or not it is to be preferred.

T. D. M.]

CONTRACTION OF THE MOUTH.

Sometimes the aperture of the mouth becomes closed to an inconvenient degree. This may sometimes depend upon constitutional causes; but it is also occasioned by injury. In these cases something may be done, as in the following case, by surgical interference:—

M. H., ætat. 22, admitted under Mr. Liston October 18th. About a year ago she was knocked down in a brawl, and a man jumped upon her, lacerating and bruising her cheek and mouth very extensively, and fracturing her jaw. She went to St. Thomas's Hospital,

where her jaw was put up and bandaged. These were not removed for some time, and when taken off, the wound on the right side of the mouth was found to be healed, and the cicatrix considerably contracted. Since then the contraction has continued somewhat, and now the mouth is so small that she can scarcely get any solid food to pass her lips. There is a large and dense white cicatrix on the right side of the mouth, rather puckered, and sharp towards the angle of the mouth.

23. Mr. Liston removed a triangular portion of the cicatrix on the right side of the mouth, dissecting it off the mucous membrane, which was then divided to the extent of the external wound. Lint dipped in cold water was then laid over the surface to suppress the oozing of blood, which was by no means considerable. About five hours after the operation all oozing having ceased, the mucous membrane was turned over the cut edge of the cicatrix, and united by three or four points of suture to the skin of the cheek; by this means a mucous surface was secured to the newly-formed prolabium, and the gradual cicatrization and consequent contraction dispensed with.

24. A little swelling round the wound; not much pain.

25. The sutures were removed to-day. Adhesion appears to have taken place between the mucous membrane and skin. Water dressing to be applied to the lip.

Nov. 1. The water dressing has been continued. Union between the mucous membrane and skin took place to a considerable extent by the first intention; the remaining parts are granulating favourably. The mouth is much improved in appearance and usefulness.

4. The lip nearly healed; only a small sore remaining in the lower lip. Red-wash dressing to be applied to it. Discharged much relieved.

[The following case also illustrates the value of the operation described by Mr. Liston, which originated with Dieffenbach. It was reported in the American Journal of Medical Sciences, and came under my charge the last of November, 1836. The individual affected was the daughter of a highly respectable practitioner of medicine residing in South Carolina, and, at the time the accident productive of the deformity occurred, about 11 years of age. Her general health has always been perfect, though her temperament is a strongly marked lymphatic.

In the commencement of the winter of 1835, while at play with her companions, she was by some means or other thrust against a heated stove, by which her hands, arms, neck, and the lower part of her face, were severely burned.

Her wounds were treated in a most judicious manner by her father; but in spite of all his efforts, those about the mouth cicatrized with so much contraction, that the entrance into this cavity

was almost obliterated. As soon as the tenderness of the part was somewhat diminished, he commenced a course of treatment calculated to restore this orifice to its natural size. He first began by introducing sponge tents, which were allowed fully to distend themselves; but, after repeated attempts with them, by which he caused the child much suffering, without materially benefiting her, they were abandoned.

He then attempted to dilate it, by first making an incision of about six lines in length, extending from each angle of the mouth, in an outward and nearly horizontal direction, and afterwards introducing the tents to prevent the lips of the wound from uniting. This appeared at first to be productive of some good, but in a short time they cicatrized and contracted, and the patient remained in as uncomfortable a condition as before.

Finding himself foiled in both attempts, he determined to visit Philadelphia for the purpose of consultation. She was accordingly brought on, and became a patient of mine. When I first saw her nearly a year had elapsed since the occurrence of the accident. Her appearance at this time was very singular. Firm and dense cicatrices nearly surrounded the mouth, but were most marked on the lower lip, and about the angles; while the orifice of this cavity was barely large enough to admit the point of the finger, and presented an oval form. The cicatrices of the incisions made by her father, were also very apparent at each angle. (See fig. 106.) Her

Fig. 106.



general health was perfect, and it was only on account of the deformity and difficulty of taking food that the operation was requested. Her speech was not much affected, although some of the labial sounds were imperfectly pronounced. The lining membrane of the mouth was perfectly normal.

From the history of the case, I concluded at once that it would be utterly useless to attempt a cure by the repetition of the measures already employed, and which are the ones usually had recourse to. I therefore proposed the operation recently devised for such cases by the celebrated Dieffenbach, and her father consenting, it was accordingly performed on the 28th of November, 1836.

The patient was seated in a low chair, with her head supported by her father, and exposed to a good light. Following the directions of Dieffenbach, I then introduced the extremity of the forefinger of my left hand into the mouth, and placed it under the left labial angle, which, by this means, was rendered prominent and sufficiently firm to permit the second step of the operation to be readily executed.

This is accomplished by the introduction of one blade of a pair of narrow, straight scissors into the substance of the cheek, between the mucous membrane and the other tissues, and a little above the commissure. The blade is then slowly pushed from before backwards, separating as it passes along the mucous membrane from the muscles and integuments until its point reaches the spot at which we wish to locate the new angle of the lips; the blades are then closed, and the parts included between them cut squarely and smoothly at a single stroke. The first incision being completed, the scissors were withdrawn, and a second one, parallel and similar to the first, made in the lower lip; the distance between the two being about three lines. These incisions were then united at their posterior termination by a small crescentic section.

By these cuts, it is evident that a small strip of muscle and integument was insulated from the surrounding parts, and it only remained to separate it from the buccal mucous membrane, which was easily done by a single stroke of the scissors.

The second step of the operation being thus finished on the left side, similar incisions were performed on the right.

Looking at the lines traced out in fig. 106, which show the course of the incisions on each side, it will be seen that two wounds, each about three lines wide and six long, the floors of which were formed by the mucous membrane of the mouth, had been made. The next steps of the operation, and by far the most difficult of the whole, were the division into equal portions of the mucous membranes, the eversion of the flaps, and their attachment to the edges of the incisions just made, as well as to the red pellicle of each margin of the lips.

To divide the membrane equally, I separated the jaws of the

child as much as possible, by which measure the former was put upon the stretch, and kept sufficiently firm to bear the operation of the scissors. The incisions in the membrane did not extend so far as those made in the muscles and skin, but stopped about three lines from the union of the latter. This was done in order to make the outer portion of this tissue adapt itself accurately to the new commissure. The flaps were then brought out, reflected over the margins of the wounds, and firmly attached to them by means of the twisted suture, the needles used being very short and fine. (It should be recollected that the membrane must be first attached to the commissure, by which measure we secure the proper adaptation of the flaps to the other parts.)

Everything having been properly adjusted, a common roller bandage was applied, as in cases of fracture of the lower jaw, in order to prevent any derangement of the wounds. The patient was then placed in bed with her head elevated, and, as she had, just before the operation, eaten freely of some light food, ordered to take no nourishment of any kind until the next visit, and to be perfectly silent.

Nov. 29th. Passed a good night; slept well; no fever; and complains of no pain; parts merely a little sore; needles all in place; writes that she is hungry. Ordered thin oat meal gruel as diet, which, as well as her drink, is to be given with a small teaspoon.

30th. Quite as well as yesterday; everything in place; bowels costive. Ordered an injection of white soap and water; diet as before.

31st. Complains of stiffness in the wounds, but no pain; dressings all secure; injection had operated well; pulse natural. Ordered chicken soup for diet.

Dec. 1st. The bandage was removed, and the first dressing commenced. The sutures, which had been closely bound down to the parts by blood, were carefully softened with warm water and cut away. As soon as they were removed, and the parts properly dried, the most gratifying exhibition of the success of the operation was afforded. On both sides, union between the everted mucous membrane and the margins of the wounds had taken place nearly throughout, and the *new lips* presented an appearance almost natural. Some of the needles were then removed, but as there appeared to be a feebleness in the adhesion at some points, the needles passing through them were allowed to remain, and a thread cast loosely around them. The bandage around the head was also reapplied.

2d. Second dressing, parts all firm and healthy; the remaining needles were now removed, and the bandage only reapplied, which was done to prevent talking; no pain in the part, and the patient in fine spirits. Ordered bowels to be opened with an injection, and the diet to be more nutritious, but still liquid.

Nothing remarkable occurred in the subsequent treatment. All

dressings were taken off on the 15th inst., and the child allowed to pursue her ordinary course of life. The mouth presented a very good appearance, though the lips were somewhat thinner than natural, and there was some difficulty in bringing them into close contact, especially at the central portions. I have no doubt, however, but that this defect will soon disappear. (*Fig. 107* represents her eight weeks after the operation.)

Fig. 107.



Remarks.—The annals of modern surgery hardly afford an example of more ingenuity than is exhibited in the design of the operation just detailed. Dieffenbach, whose fame as a plastic surgeon is just beginning to be appreciated in this country, and whose skill and success fully justify the eulogiums which are now bestowed upon him, having been foiled in several attempts made to relieve cases similar to the above, at last hit upon the beautiful expedient illustrated by the operation. The great difficulty, in all such cases, arises from the constant tendency to contraction manifested by the cicatrice, which occasionally goes on to such an extent that the orifice of the mouth is almost closed. At the first examination of such a deformity, the remedy which seems to promise most success is mechanical dilatation. Unfortunately, this is productive of but temporary relief, and has never, I believe, effected a permanent cure. Next to this method, comes incision of the commissures. We might naturally expect such a course to be sufficient to effect the end desired, and in all probability, this would

be the case, could we by any means prevent reunion of the edges of our incisions. But this, it would appear from the statements of the best authorities, has hitherto been impossible ; for, notwithstanding the introduction of tents, leaves of sheet lead, cerate cloths, &c., between the lips of the wounds, their adhesion, more or less complete, is sure to take place.

The primary indications in the treatment of such cases, then, are, 1st, the division of the commissures ; and, 2d, the application of some measure by which the margins of the incisions may be made to cicatrize separately. Aware of the difficulties attendant upon the fulfilment of these indications, it occurred to Dieffenbach that if we could cover these margins with a tissue which would not readily unite with itself, a cure would be accomplished. He accordingly performed the operation which I have just described, and his success was such as to lead to his repetition of it in several cases, in all of which the most happy results were obtained. There can be no doubt relative to the value of this new process, as it is applicable to almost every case of contraction of the natural openings, either congenital or acquired. It is moreover safe, and but slightly painful. The whole operation, when performed on the mouth, may be accomplished in ten or fifteen minutes, and there is little or no hemorrhage to be apprehended, for the branches of the coronary arteries which are divided are so small that they contract of their own accord, and do not require the ligature.

There is one case, however, in which it would not in all probability succeed, viz., when the buccal mucous membrane itself participates in the lesion. But this complication must be of very rare occurrence, as the injury, in almost every instance, is confined to the outer surface of the surrounding parts. In conclusion, I may remark, that although this is the only case that has come under my immediate observation, the success attending the operation has been such as to lead me to recommend its performance in every instance in which the mucous membrane surrounding the orifice is in a sound condition.

T. D. M.]

I think I had better now say something about affections of the mouth, of the tongue, of parts under the tongue, and of the throat. We shall in that way discuss the diseases of the lower parts of the face, and we shall then speak of some affections of the bones. You will perceive that there is a great deal of surgery about the head and face ; more, perhaps, than in all the rest of the body taken together.

AFFECTIONS OF THE TONGUE.

The tongue itself is the seat of disease, and not unfrequently you meet with inflammation and swelling of it produced by injury,

or following upon the exhibition of mercury, and the exposure of the patient to cold and damp during the mercurial action on the system; but sometimes inflammation of the tongue occurs independently of any cause of this kind; it takes place as an idiopathic affection; I have seen it happen now and then from injuries in the neighbourhood of the organ. I recollect being dreadfully alarmed in one case where there was a large encysted atheromatous tumour under the tongue. It was punctured, and the atheromatous matter let out, and not then understanding diseases of the tongue or other parts quite so well as I do now, I attempted to get rid of the tumour by putting a seton through it. After it had been introduced for two or three hours I was sent for in great haste; it was said that the patient was almost suffocated. I found that such was the case, that his tongue was of a dark colour hanging out of his mouth, that the swelling had extended into the parts behind, and that the cellular tissue was much infiltrated. The seton was taken out and he did well. I have seen from a small quantity of mercury—the exhibition of Plummer's pills—the tongue become enormously swollen. This was in a case where the patient had previously been saturated with mercury; he had lived in a warm climate, and for disease of the liver had taken a great quantity of medicine. He was very susceptible of its action, of which I was not aware. As an alterative I had ordered him a couple of Plummer's pills, one of which he took two nights in succession. I was sent for in a great hurry, and I found him in a miserable state, his tongue protruding to a great extent, and very much inflamed. Sometimes when the inflammation runs high the tongue swells very much, and it is attended with great inconvenience. There are casts on the table representing this affection.

The disease may be combated by active antiphlogistic means—by bleeding at the arm and applying leeches at the side of the neck. If the tongue is much swollen and fills up the whole mouth, and if the respiration is at all interfered with, you must take even more active means than these—an incision must be made in the organ, and you must treat it as you would inflammatory swelling in other exposed parts of the body. If this is not done, deep suppuration may take place in the tongue, and the patient be placed in great jeopardy. You make a free incision in the direction of the tongue, one, perhaps, along each side of the median line, and this will be attended by profuse hemorrhage. Although the incision may be a large one, yet as the swelling goes down, it appears inconsiderable. The same circumstance occurs in other enlargements; an incision may be made in a limb, three or four inches in length, apparently to a great depth, but as soon as the swelling subsides it looks like a mere scratch.

Ulcers of the tongue are often dependent on derangement of the digestive organs. This barometer of the stomach, as it has been

called, becomes affected with sores, but these are removed on the proper condition and tone of the digestive organs being restored.

Ulcers take place from the constant irritation of the tongue, as in old persons whose teeth are in a state of decay. A man becomes tired of having the stumps taken out; he is averse to submit to the pain it occasions; perhaps one or two wrecks of teeth stand up very sharp, the tongue is constantly grating against them, and thus ulceration is established. If the cause be not removed, if the ulcers are allowed to continue for some months, malignant action may take place, and the tongue become indurated.

Independently of anything of this kind ulcers may form on the tongue the same as on the prolabium, and a disease of the same character as cancer is presented. It may involve the tongue to a limited extent, or involve one half to the median line. This disease is attended with great inconvenience; the patient does not move his tongue about without great pain; he cannot take hot ingredients into his mouth, pickles, or anything of that sort, or even a glass of wine, without experiencing pain, and sometimes salivation. You frequently find, when the patient applies, that the disease has advanced pretty far, that the lymphatics have become affected, and unfortunately they in general exhibit disease after the affection of the tongue has been got rid of.

Slight ulcers of the tongue, which are not of a malignant kind, may be removed by some local application, and a healthy process brought about. Endeavour to make the patient keep the organ as quiet as possible, touch the surface of the sore perhaps pretty freely, once for all, with nitric acid, and then let him have some lotion to clean the part—a solution of alum or of the biborate of soda. At the same time you must endeavour to correct the state of the constitution by some alterative, some of the preparations of arsenic or of iodine.

A middle-aged woman was in the hospital lately with a very bad-looking tongue. It was fissured and a good deal indurated. She had leeches applied to it twice with advantage. She was enjoined not to talk, an injunction not easily obeyed, it is said, by the sex. Instead of any empirical practice being resorted to, she had the state of her stomach improved by diet, by avoidance of such articles as caused acidity, from which she had suffered much, and by the exhibition, after meals, of an alkali in bitter infusion. Many threatening-looking affections of this and other parts are presented, which do well under simple means. I give you a case, from the journals of the hospital, of warty excrescences, which had been looked upon as indicating malignant disease. For something of the same kind on the male genital organs recourse has been had to the knife, even to amputation of the member. This shows you how cautious you must be in diagnosis.

S. B., ætat. 35, admitted under Mr. Liston, Dec. 7, 1838, with

warty excrescences on the tongue. Two years ago she had an attack of spitting of blood, by which her strength was much reduced, and for which she took a good deal of medicine. The gums were not made sore; but soon after this illness she noticed a swelling of the tongue, accompanied with tingling and smarting sensations, particularly on taking food. The appearance of the surface of the organ at this period varied considerably; it was sometimes very red, and at other times white and furred; it was often rough and sometimes deeply fissured, but never bled. Several decayed teeth and stumps were extracted, but the tongue did not improve, and she noticed that little lumps began to grow from its sides. She has taken iodide of potassium, five grains, three times a day, regularly, for many months, but the little excrescences have steadily, though slowly, increased in number and size.

These excrescences, the largest about the diameter of a split pea, most numerous at the sides of the tongue, are rounded, flattened, attached by tolerably broad pedicles, but overlapping their bases, of a purplish red colour, soft, moist and smooth. The mucous membrane over them is nowhere ulcerated. They are not tender to the touch. There is little, if any, general enlargement, and no cracking of the tongue. The patient complains of frequent tingling, amounting almost to pain, when food containing acid, salt, or other irritating substance, is taken into the mouth. Taste does not appear at all affected. Speech a little thick. The patient does not notice that the secretion of saliva is increased during the day; but at night, since her tongue has been bad, she generally sleeps with her mouth open; saliva flows involuntarily from the mouth, and the tongue is very dry in the morning. General health, digestion and appetite excellent. Ordered ten grains of rhubarb and a little magnesia, in a draught, night and morning. Two decayed stumps removed.

Dec. 17. Mr. Liston, with a pair of scissors curved on the flat, removed the excrescences from the left side of the tongue, cutting them close to their bases. Bleeding, free at first, easily arrested by washing the mouth with cold vinegar and water.

26. Nitrate of silver (in substance) lightly applied over a few prominent granulations which still remain on the left side of the tongue.

29. The right side of the tongue treated in the same way.

Jan. 2. Nitrate of silver again applied lightly. Nothing further was done; the ulcers left by the removal of these little growths soon healed.

On the 15th of January the patient was discharged, the surface of the tongue being nearly as smooth as in the natural state of that organ, and free from pain.

Abnormal erectile tissue is met with in the tongue, sometimes to a great extent, so as to forbid interference with it. I have sometimes removed such by ligatures.

A young woman applied at the hospital the other day with a small tumour, like a filbert, at the point of the tongue, the germs of which had existed from infancy, possibly it was congenital. It had been treated by escharotics, but without advantage. It was cut out with a V portion of the point of the organ, and the edges put together by a suture. There was no troublesome bleeding, and the case terminated most satisfactorily.

If you find that the sore is of a malignant character, but is not extensive, and there is no affection of the lymphatic glands, you will be warranted in having recourse to an operation. You take hold of the tongue with a small vassellum, and cut away the affected part, wide of the ulceration, with a common scalpel or bistoury; that is better than cutting the part out with scissors. It is of no use, however, to cut, unless you can keep clear of the disease, and cut clean away beyond the ulcer. To stop the bleeding you may seize the vessels with a hook or a tenaculum, or if that does not answer, you may pass a needle and ligature under the bleeding part and tie it. Oozing may be prevented by touching the part over with some astringent, alum, oil of ergot, or some other strong styptic. The part may thus heal up and the patient remain free from the affection afterwards. But if the disease be very extensive you cannot take away the diseased portion of the tongue by incision without a great risk of hemorrhage. Here you may have recourse to ligature. You transfix the tongue, beyond the indurated portion, by means of such a needle as you saw me use the other day. By passing two or three ligatures through the tongue you are able to embrace the whole of the diseased portion of the organ. If the disease is far back, and the patient will put his tongue out, you pass the ligature through it, draw back the needle, and divide the loop, placing one part of the ligature to tie behind the disease. You then arm the needle again with the other half of the ligature, pass it from above downwards, and detach the ligature altogether. You then put another ligature through the eye of the needle, and draw that through the tongue. In this way the whole of the diseased part is included in the ligatures. Before tying them you may give the tongue a snip with a pair of scissors, so as to allow the ligatures to cut into its substance, and on tying them you strangulate the diseased part. With a very little management, passing the needle only twice through the tongue, you carry all the ligatures.

However, too frequently the disease

Fig. 108.



returns after the operation, the success of which cannot be depended upon, and it is only in the more favourable cases that it can even be attempted. I have known cases where the tongue has been removed to a great extent, and the patient has remained free from the disease. It is astonishing how little the articulation has been interfered with; after a short period the patients speak very distinctly.

TUMOURS UNDER THE TONGUE.

Under the tongue you meet with many diseases that require the attention of the surgeon. Various tumours occur there, and as the tissue is very loose, sometimes the tumours attain a considerable size. It is not often that you meet with sarcomatous tumours in that situation, but they do occur by the side of the *frænulum*, and grow so as to push the tongue back in the mouth. I have over and over again taken fatty tumours from under the tongue, of considerable size. There is one in the collection, which I showed when speaking of tumours generally, the size of the fist, taken from this situation. It was supposed to be what is called a *ranula*, a fluid tumour, but, on examination, I found that it was solid, and it was removed without the necessity of an extensive dissection. Fortunately, it was surrounded by a loose cyst, and by cutting freely upon the tumour through the membrane of the mouth, it was, without difficulty, lifted out. You cannot cut here with safety, and if you wound a vessel there is great difficulty in stopping the hemorrhage.

The solid tumours under the tongue, to which I have referred, are generally of a benign character; they are loosely connected, and can be easily removed. The encysted tumour is the most common form met with here. These sometimes attain a considerable size, and they generally contain glairy fluid. The cysts are very thin, and are adherent to the neighbouring parts. They pass away back under the tongue, and amongst the muscles. Occasionally they contain atheromatous matter. Sometimes they can be taken hold of after being exposed by incision, and on the cellular tissue being pulled out and touched lightly with a knife, they may be removed. But where there is a thin cyst containing glairy fluid, it is impossible to remove it in this way. You open these tumours pretty extensively, and allow all the fluid to escape; then take a bit of potassa fusa, put it into the opening, turn it about quickly, withdraw it, give the patient vinegar and water to wash his mouth out, and the end is answered. There is some inflammation, but the cyst is removed, and there is no return of the disease. I would not advise you to pass a seton through these cysts; the texture around is so loose that rapid infiltration is apt to occur.

Swellings sometimes take place from enlargement of the salivary duct. It becomes obstructed and distended, and you find that upon opening it a quantity of mucus and saliva is discharged. Not unfrequently, in these cases where the saliva is retained, deposits take place from it of the same nature as those that occur on the inner surface of the incisors of the lower jaw, and outside the grinders, opposite to the entrance of the parotid duct. This calcareous deposit, I believe, consists principally of carbonate of lime, and takes place in the extremity of the duct. These enlargements are very frequently met with under the tongue, but I have only seen one instance in which the occurrence took place really in the parotid duct, and there it was attended with a great deal of inflammation from time to time, and the patient suffered great pain from the swelling of the gland. If the submaxillary ducts are obstructed, sometimes the swelling attains a great size, projects under the tongue, and occasionally, by ulceration, a portion of the concretion is exposed.

Now and then you are called upon to extract these calculi, and there is no difficulty in effecting it. You have nothing more to do than to enlarge the opening of the duct, and with a bent probe turn out the foreign body. There is no risk and no inflammation. The only difficulty is where the concretion is small, and it slips backwards and forwards in the duct. Occasionally it will elude the attempts of the surgeon. In the case of a young lady in whom attempts at removal of the concretion had repeatedly failed, I felt the foreign body with my finger, but, on an opening being made, it slipped back to the gland. By presenting something savoury to the patient which excited a desire for food, which made her mouth water, as is vulgarly said, the saliva flowed freely, and out came a concretion not larger than a millet-seed. The patient was thus relieved from a source of considerable annoyance.

RANULA.

[The disease termed *Ranula*, to which Mr. Liston refers, is often a most troublesome affection. It takes its name from the fancied resemblance of the tumour which characterizes the complaint to the belly of a frog; or, according to some, from the fact that the voice is rendered by it hoarse or croaking. The anatomy, as well as the functions of the organs concerned in this disease, were but little understood by the older authorities, and hence it appears that ranula was often confounded with other affections. For instance, Celsus describes as ranula what must have been a common encysted tumour. Ætius supposed it to be nothing more than a varicose condition of the sublingual veins. Aranzi thought it a common abscess. Fabricius and Dionis considered it an encysted tumour of

the melicerous kind. While Abul Kasem, and the Arabians generally, viewed it as a malignant or cancerous affection. Louis, of Paris, was the first to indicate its true character, and the disease was shown by him to be nothing more than "a tumour containing fluids of different kinds, in which solid matter was occasionally found, and which originated from obliteration, either partial or complete, of the excretory ducts of the submaxillary and sublingual glands." It appears that the disease is confined to these sublingual ducts—those of the parotid and pancreas being too dense and unyielding to admit of the distension requisite to form a tumour resembling that found in ranula.

Although the definition of Louis is generally received as one correctly indicating the nature of ranula, we yet find some difference of opinion among modern surgeons relative to the precise mode of origin of this complaint. Dupuytren, for instance, states that up to this time it has not been clearly shown, by dissection or otherwise, whether the complaint is in reality situated in the sublingual ducts, or whether it consists merely in a serous cyst, or whether it may not originate in the dilatation of a mucous follicle. He, as well as Malgaigne and Breschet, believe that many cases reported as dilatation of the sublingual ducts are nothing more than a serous cyst. Admitting the possibility of such mistakes, we shall yet consider ranula as a tumour, filled in its commencement with fluid, saliva or mucus, and originating exclusively in the obliteration of the salivary ducts of the sublingual and submaxillary glands.

From the experiments of Gmelin, however, it would appear, that in some cases after the disease has existed for a short time, the fluid is essentially different from saliva, containing no sulphocyanate, and only a small quantity of salicin, with some albumen. The albumen amounts to only two per cent., though the fluid is as thick as others, containing about five per cent. It is supposed, therefore, "either that the fluid of ranula contains some peculiar material to which it owes its thickness, or else that the albumen in it is of some peculiar kind."

There is usually no difficulty in recognizing the disease—especially in its early stages. The tumour is either oval, or round, or lobulated; situated on one or both sides of the frænum linguæ; usually transparent, so that the nature of its contents may be detected at once; elastic when fully distended, but sometimes yielding a distinct fluctuation; scarcely if at all painful; and rarely producing any inconvenience, unless it attains a large size, when it displaces the anterior portion of the tongue, turning it back upon the fauces, and thus occasioning difficulty in deglutition, as well as imperfect and indistinct articulation. When the tumour has existed for some time, its walls become thicker and less transparent, and its contents change in consistence, so that the diagnosis is more difficult. The fluid, at first, is nothing more than saliva or mucus, but it soon

becomes of the consistence and colour of white of egg; sometimes it is purulent; and often we find concretions of a calcareous or even stony nature; and in a case reported by Tulpius, the whole mass was composed of a dense hard tissue, and was removed by the application of the actual cautery. Whenever these changes, or any one or more of them take place, the disease may be confounded with tumours of different kinds occupying the location of ranula. In a case to which I was recently called by my friend Dr. McCleane, a steatomatous tumour, of the size of a small orange, occupied the precise spot of ranula; and from the sacs containing fluid sufficient to give rise to fluctuation, I was under the impression that it was nothing more than an example of salivary tumour, with its walls thicker than usual, and containing along with the fluid a portion of solid matter. In removing it, it was found necessary to dissect out a large sac nearly filled with a caseous substance, and the case was, in reality, one altogether different from ranula.

Although ranula cannot be considered an affection of much danger, we have cases reported by Hildanus, Marchettis, Alix, Tailardan, Allen Burns, Cline, Velpeau, Bonnet, and others, in which, from the immense size of the tumour, the patients were in imminent danger of losing their lives from suffocation and compression of the carotid arteries. Cooper also cites cases where the tongue was much displaced, and mastication and deglutition materially interfered with. In infants it prevents the action of sucking.

Causes.—The closure of the ducts of the sublingual or submaxillary glands may be occasioned by inflammation of the tongue or its mucous coat, by aphthæ, or common ulceration of the ducts themselves, by wounds of the ducts, or the operation for tongue-tie or stammering, and by the lodgment of calculous matter, or inspissated mucus or saliva, in their orifices. Occasionally the disease is congenital, as the cases of Stoltz and Dubois clearly prove. Dupuytren and Breschet doubt this, and suppose that all such examples are in reality only serous cysts.

Treatment.—Ranula, although generally requiring an operation for its relief, is nevertheless susceptible, though rarely, it is true, of spontaneous cure. Sometimes a fistulous orifice may be formed in the walls of the tumour by ulceration; and occasionally, when the tumour acquires considerable size, it bursts, and its contents escaping, the sac is obliterated; in either case a cure may take place without the assistance of the surgeon. But inasmuch as the treatment is usually devoid of danger, and certain in its results, we should never trust to nature where a case is brought to us. We must relieve the patient as soon as possible.

The indications in the treatment are very simple. We must, in the first place, carefully remove the obstruction of the duct, provided this is practicable. If this cannot be done, we must establish a fistulous opening through which the saliva may escape, or

we must obliterate the sac, by causing its inner surface to granulate after its contents have been removed, or we may remove it.

The first indication is readily accomplished—provided the obstruction be calculous or inspissated mucus—by picking out the foreign body with the forceps, or by cutting it out where we cannot remove it by the forceps alone. When the obstruction is the result of chronic inflammation with thickening, we may sometimes overcome the difficulty just as we do in affections of a similar nature, involving other mucous cavities or tubes, by the repeated introduction of small bougies or probes, or by allowing small leaden stilets to remain for a day or two at a time in the duct, as advised by Louis. When the ducts are obliterated, we must resort to other means. The plan first tried was nothing more than making a simple incision into the sac, by which its contents were evacuated, and then leaving the case to itself. These incisions universally fail to afford relief, inasmuch as the cut soon heals, and then the integrity of the sac being restored, the fluid soon accumulates. In order to prevent the closure of the wound, it is proposed to make an oval or round incision and then touch the margins with nitrate of silver, so as to render them callous. This plan, originating with Louis or Camper, is the method I prefer to all others, and will succeed in nearly every case of pure ranula. To accomplish the same end, it was long since proposed to introduce some foreign body into the wound—pieces of lint, a temporary style, hollow tubes, &c. &c.; but Dupuytren was the first to propose the introduction of something intended to remain until the cure was accomplished.

He used a little button, termed by him “*bouton à demeure*,” (from the circumstance of its being left a long time in the wound,) consisting of two elliptical plates or buttons, five or six lines broad in their greatest diameters, and joined together by a pedicle or stem two or three lines in length; the external surface of these plates was convex, the internal concave. A puncture two lines long being made in the tumour, and its contents discharged, one button is introduced into the cyst, and the other remains in the mouth.

This plan, a modification of that of Lecat, will answer in some cases, but is not to be preferred to that of Louis or Camper. Various attempts have been made to destroy the sac, or cause it to granulate, some of which are occasionally useful; but they should never be performed where we can possibly get along with the more simple methods just described. The most ancient of these operations is probably that in which the sac is destroyed by *caustic* or *escharotics*, or the *actual cautery*; it is rarely resorted to at the present day. Injecting the sac with some stimulating liquid, as we do in hydrocele, has also been employed, but with a success so partial, as scarcely to warrant our receiving the method among those deserving confidence. The introduction of a seton with the same view, has been recommended by Physick, Home, Laugier and

others, and is unquestionably sometimes a successful means, but it causes great inconvenience, and is not so certain as the operation of Louis. Finally, when all other measures fail, and the tumour is large, it may be necessary either to excise a considerable portion of its walls, or dissect out the whole mass. T. D. M.]

HYPERTROPHY OF THE TONGUE.

The tongue is now and then met with enormously enlarged, resulting from hypertrophy. It is sometimes congenital, or comes on soon after birth. It hangs out of the mouth, and there is constant salivation attended with great deformity. The patient cannot close his jaws; this may continue for a series of years, and then your advice is asked about it. If there is nothing but hypertrophy, simple enlargement of the organ, the swelling may be reduced by the application of bandages till the tongue can be got fairly within the jaws, and if the jaws be kept closed the swelling soon goes down. It has been proposed to cut out a portion of the tongue and put the edges together; and it has also been proposed to tie it and remove portions by that means; but neither of these plans should I recommend. I think that in the "*Pathologie Chirurgicale*," of Lassus, there is a case of this kind, but it is not a very common affection. Mr. Crosse, of Norwich, has also related one.

[My excellent friend Dr. Thomas Harris, surgeon-in-chief of the navy, has reported two cases of hypertrophy of the tongue entirely relieved by the extirpation of the redundant portion. I have also performed a similar operation with success. So firm was the swelling in all these cases, that compression exercised not the slightest influence, and without the knife the patient must have remained incurable for life. While, then, in the main, I agree with Mr. Liston in reference to the importance of compression in chronic hypertrophy of the tongue, I cannot refrain from advising an operation whenever the circumstances of the case are such as to induce us to believe that the former agent would be a long time in accomplishing a cure, or that, in all probability, it would utterly fail.

T. D. M.]

STAMMERING.

Some rascally operations have been practised on the tongue to cure stammering, such as cutting a wedge-like slice out of it, as you would out of a salted and boiled bullock's tongue at table, and bringing the edges together. These operations are not founded upon any sound physiological principles, and so far from being successful, some prove fatal, and even where patients have recovered, they have not spoken better.

[Every surgeon, I believe, will unite with Mr. Liston in his opinion of the operations for stammering. They are truly "*rascally*," and with the exception of that practised upon the frenum linguæ, when this from its shortness prevents distinct utterance, all, notwithstanding their high reputation for a time, have been consigned without a single regret, to the oblivion to which they are so justly entitled.

T. D. M.]

LECTURE IX.

DISEASES OF THE VELUM.—ABSCESS.—ENLARGEMENT OF THE TONSILS; REMOVAL.—ENLARGEMENT OF THE UVULA.—ULCERATION OF THE TONSILS AND VELUM.—GUM-BOILS.—FUNGUS GROWTH OF THE GUMS.—EPULIS.

INFLAMMATION AND ABSCESS OF THE FAUCES.

I now proceed to speak of affections situated at the posterior part of the mouth—of the fauces.

In the first place, you have to treat inflammatory affections of the soft palate and tonsils. These affections are common enough, and many of them do not require more treatment than the patient himself or his friends can conduct. They arise from the exposure of the external surface, or of the mucous membrane, to the influence of cold and moisture. The pain and the swelling will disappear on adopting some means to restore the functions of the skin—warm water, and the exhibition of a diaphoretic.

But now and then these inflammations run so high, as to demand the attention of the surgeon; the swelling becomes greater and greater, deglutition is performed with great effort, and the breathing, perhaps, becomes affected. The latter cannot be seriously interfered with, unless the passage to the nostrils is obstructed as well as that by the mouth. Patients have been suffocated by the inflammatory swelling, whether attended by the formation of matter or not. This has occurred where the tonsils have been affected before, and have swollen to a great extent. By the inflammatory action you frequently find the tonsils enlarged: the whole of the parts are called into such violent action, that there is no passage down the throat, and it has been followed by sudden suffocation. The patient has died in a moment, in the same way as from affection of the rima glottidis—by the entanglement of mucus in the narrowed fissure of the fauces, betwixt the two tonsils.

The swelling is sometimes occasioned by the formation of matter

between the folds of the velum, and these abscesses sometimes require active surgical interference. If an abscess is allowed to form to a great extent, and the breathing becomes embarrassed, there is even some risk, by its sudden and spontaneous opening, of the matter getting into the windpipe, and causing suffocation.

You will be called upon to remove this collection of matter ; and it is, in general, very easily effected. There is no necessity for providing yourselves with this instrument—a pharyngotome, a sort of lancet, in a spring case, with a screw in the handle to regulate the extent of the incision and the length to which the blade can be protruded. An abscess in the throat may be opened quite well with a common pocket bistoury. By feeling the parts, ascertaining that the swelling is elastic, and perceiving that it is red and turgid, you make up your mind that there is matter there, and that it is necessary to evacuate it. You also consider the duration of the inflammatory action, in determining as to the existence or not of purulent fluid. You depress the tongue with the finger of one hand, and having wrapped lint round the blade of the knife to within three-quarters of an inch of the point, you introduce it with its back towards the tongue. The patient's head must be uncommonly well secured, lest he should make a sudden effort, and the incision should be made either in a wrong place, in a false direction, or too deep. The operation may be performed with perfect safety, if you employ these precautions. The instrument must be directed straight backwards : if you incline it to one side, towards the pterygoid process, and the patient were to make a sudden movement of the head forwards, you might push the instrument among the large vessels, and even wound the internal carotid : cases have occurred where fatal hemorrhage has been produced. It is advisable to interfere with these cases early, because, now and then abscesses of an unhealthy kind destroy the parts ; perhaps the abscess at last bursts spontaneously, the ulceration proceeds, large vessels may be opened, and the patient have violent and even fatal hemorrhage from the throat. The matter is generally collected between two folds of the velum palati, and occupies one side.

There are some other operations practised here ; they may be of little moment, but still all these operations in deep cavities require some precautions, and are often of more difficult execution than may, by the uninitiated, be supposed.

REMOVAL OF THE TONSILS.

Sometimes it is advisable to remove portions of the tonsils. When they are in a state of hypertrophy the patient breathes with difficulty ; he perhaps is subject to occasional inflammatory attacks,

and he runs the risk, in some of these, of being suffocated. Children often labour under this affection; the voice is altered considerably, and it is desirable to have the swelling removed. I do not know that there are any possible means of doing so except by attacking them with a cutting instrument. You find these swellings occurring in people of delicate habit, and in scrofulous children; but they may take place in persons enjoying apparently a very good constitution. The affection of the tonsils may be accompanied by swelling in the lymphatic glands of the neck, and you may try to reduce them by iodine. Attempts are made to promote absorption by the employment of gargles, and touching the surface with dry powdered alum or nitrate of silver; but these means seldom answer any good purpose. You cannot by the constant application of the nitrate of silver expect to get rid of the swelling, except you produce deep ulceration, and it would be rather a painful business to burn away the tonsils by escharotics, and might be attended with considerable annoyance and risk.

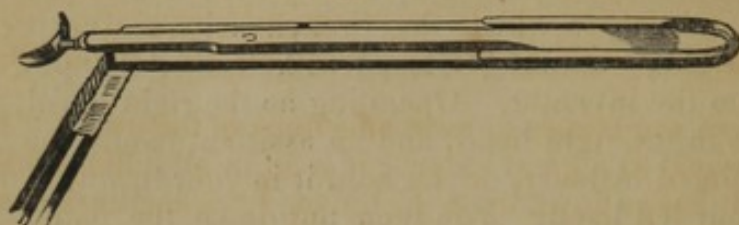
You may be called to the case of a young subject—a child, where the swelling has arisen to such an extent that it threatens suffocation during the night. I have seen such cases over and over again, and, in order to prevent fatal consequences, it may be necessary to take away one or both tonsils. Where a patient has suffered long under this affection, does not speak with freedom, performs deglutition with difficulty, and every means have been tried in vain, it becomes desirable to get rid of the swelling, and this may be done with facility if you go the right way about it. It is stated in old surgical writings, (in “Cheselden’s Anatomy” there are plates representing the manner in which it is to be performed,) that the swelling of the tonsils is to be removed by ligature; and even in the “Medico-Chirurgical Transactions” of the present day, there are papers giving an account of the best modes of tying the tonsils. I am not sure that some surgeons do not resort to it even to this day. If ligatures succeed, the patient is subjected to a tedious process, and a very painful one. It is some days before the ligatures come away; there is a discharge of putrid matter from the throat; and as in the cases of tumours of the mouth attacked by ligature, there is profuse salivation. The parts swell, and the patient is obliged to have a basin under the chin to catch the discharge. This is the instrument of Mr. Chevalier, who published a paper on tying the tonsils. It was intended to transfix the tonsil, and then to separate the ligatures, and tie one on one side and one on the other. This was to be turned so as to bring the point through the tonsil from behind forwards. The needle I used to tie the tongue or erectile tumours will answer the purpose if you propose to try this proceeding, but it is one that I do not advise. There is no necessity for tying these tumours, because the swelling is a mere enlargement of the tonsils; there is no necessity for taking the whole of it away;

you see the follicles containing sebaceous matter, which smells very offensively ; the swelling is by no means vascular, and any wound made in it heals up with great rapidity. There is nothing malignant about the swelling, nothing scirrhus or cancerous, and if the patient is at all steady, you may take it away with great ease. You place the patient in a good light, and lay hold of the tonsil by means of this instrument, to which the French writers give the name of "pince airigne," meaning forceps with hooks, or "pince de Museux," from the inventor. Operating on the right tonsil, you hold the forceps in the right hand, and an assistant hands you a narrow, straight-pointed bistoury, or you hold it in your lips with the handle towards your left hand. You then put down the patient's tongue with the forefinger of the left hand, and get a view of the tonsil ; you carry the knife along the tongue, with its back towards this organ, slip it under the tonsil, and with a sliding motion cut it off, and draw it out with the forceps, taking care not to wound the velum or lips. You repeat the operation on the left side, using the forceps with the left hand, and the bistoury with the right. You do not attempt to extirpate the whole of the tonsil ; if you did, you would endanger the vessels. You merely cut off, by a perpendicular section, the prominent part of the tonsil, to give room to the patient to swallow and breathe. In adults, this operation is preferable to any other, that is, when you have to deal with sensible people, who will afford every facility.

I have even performed the operation thus in a good many children, and I have very often found them willing enough to submit to it. They have been often suffering previously from difficult breathing, and, afraid of suffocation, they have come to me with their mouths open, and have borne the operation without wincing. I once saw a little lady under these circumstances, with my friend Dr. N. Arnott, and her only remark after the affair was over, and when she saw a little blood hawked up, was—"Dear mamma, I think they must have hurt me a little." But you sometimes find that they will not open their mouths, and then you will have great difficulty with them. Of course, you will not have recourse to the operation in children unless under urgent circumstances, because it is possible that, as they attain maturity, improve in health, perhaps, or have it improved by proper treatment, the swelling may subside to some extent. Children are brought now and then by their parents, who have noticed that they do not speak well, and on looking into the throat you find the tonsils swelled ; the parents become fidgety about it, and are anxious to have it removed ; but you must not always please them in this point. It is not always necessary to perform the operation, and you may find a difficulty in accomplishing your object, even in young people of sixteen or eighteen, who are brought to you on account of an indistinctness of voice, their parents being anxious perhaps that they should sing like their

neighbours' young ladies. If you can get them to keep steady and open their mouths, you may take off the part in the way I have described, but where there is difficulty you may employ such an instrument as I now show you. Two or three years ago there were an

Fig. 109.



immense number of instruments of this fashion produced all at once—American and French—for performing this operation. Every writer thought it his business to contrive or to say something about these instruments. There is one depicted in Desault's works, which I think he calls a *kiotome*. This celebrated French surgeon was a cotemporary of our John Hunter; he used the instrument, if I am not much mistaken, for various purposes, for opening cysts in the bladder, but he recommends the excision of tonsils also to be made with it. You must first of all, then, endeavour to get the tonsil within the range of the instrument, and you must have them of different sizes. You will find it advisable to provide yourselves with a hook, or small vulsellum, with which to pull the enlarged gland more completely through the opening or fenestra of the instrument than you can do by other means. Having effected this, you push the slipping blade forwards, and cut off the prominent part of the tonsil. I have seen some of these machines provided with a sort of skewer, which is to be thrust forward first, and when the tumour is so transfixed, it is raised up by another contrivance of a hinge. All this is for the use of those gentlemen practising surgery who are deficient in dexterity, and for the benefit of the cutlers. But although this is a very nice-looking instrument, it is not a very useful one, and I would not advise you to burden yourselves with it, though I must have almost every instrument that has been contrived, both old and new. This operation of excision, however managed, is very much preferable to tying the tonsil; it is a proceeding accomplished at once without any great difficulty, in ordinary cases, and scarcely with any pain to the patient. It is quite effectual; there is no return of the swelling; and under any circumstances it is an exceedingly satisfactory proceeding.

[I agree with Mr. Liston entirely, as to the inutility of most of the instruments invented for the removal of the tonsil gland. But, surely, no one who has witnessed the facility with which the operation is performed with the instrument of Dr. Fahnestock, can doubt, for a moment, its superiority over every other. It has been so fre-

quently described in other works, that any explanation of its action here is altogether unnecessary. I may remark that, nearly every operating surgeon in Philadelphia employs it in his practice, in preference to any other instrument.—T. D. M.]

ELONGATION AND HYPERTROPHY OF THE UVULA.

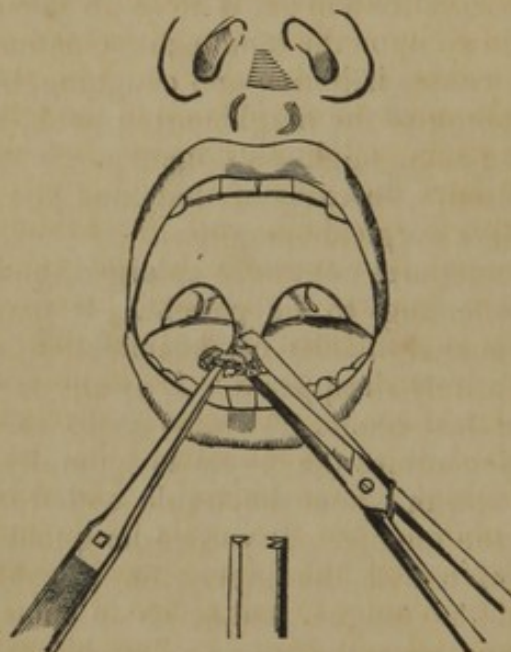
You have sometimes to treat affections of the uvula. It is sometimes enlarged to a great extent; it is so in all inflammations of the throat. It hangs down upon the tongue; it sometimes comes on the rima glottidis, and causes irritation and coughing, but that goes off, along with the swelling of the neighbouring parts, by general treatment. By applying some slight astringent gargle the parts resume their natural condition. In cases of that kind you would not have recourse to any active surgical operation.

But the uvula sometimes continues enlarged, and it causes occasionally unpleasant feelings to the patient. It may be swollen, in consequence of repeated attacks of inflammation, and the enlargement of it never entirely disappears. It swells more and more at each attack, and at last hangs down, so as to cause considerable inconvenience. Sometimes the uvula is naturally long. I saw a patient some time ago in whom the uvula coiled up in an extraordinary manner on the tongue. It was so long that you could have easily taken hold of it with the fingers, for it could be blown out almost to the tip of the tongue, and so as to come in contact with the incisors. I have seen the uvula often bifurcated, and sometimes there are one or more warts of considerable size on its extremity. Here is a specimen of a very large one, which I removed lately; it is as large, you perceive, as the kernel of a filbert.

You will be called upon to take away this elongated uvula at the request of the patient, but not otherwise. The patient to whom I just now referred, still keeps his enormously elongated uvula; I never said anything to him about removing it. But if a patient wishes to have it removed, how is it to be done? You cannot take hold of it with the forceps in common use; it will constantly escape; and yet you cannot attempt to cut it off with a chance of success, unless you can seize and hold it fast. Scissors have been contrived for this purpose, and are referred to and delineated by Mr. Cooper, in his "First Lines of Surgery." There is a sort of bend upon the blade, and a blunt end coming across one of the blades. It is proposed to put this behind the uvula, and snip it. You may catch the uvula in that way, but you cannot be certain of it, nor of the size and length of the portion you remove; you may take away much too little to give relief, or you may snip away the greater part of the organ; this would not answer, as the articula-

tion is sometimes rendered indistinct by the loss. In order to be sure that you take away just as much as you wish, you must lay hold of it with these long forceps with hooks at the point, something like the artery forceps. These are more suited for the object. You thus take hold of the uvula lying on the tongue or dangling about, and with a pair of long scissors carried back in the throat, cut it away. It relieves the patient of all the symptoms, and after a very short time the wound heals. Adventitious growths are now

Fig. 110.



and then seen in this situation, betwixt the layers of the velum, and they are not always to be got away easily. I have removed some loosely connected, by merely laying them bare and detaching their cellular connections. A tumour deeply and firmly attached, of course cannot be meddled with. Occasionally, pendulous tumours are found here, and may be removed by the same means as the enlarged uvula is.

ULCERATION OF THE TONSILS AND UVULA.

The tonsils and the uvula are the seat of ulceration; but this subject was, no doubt, partly treated of by my worthy and excellent colleague, when he spoke of syphilis and the effects of mercury on the constitution. All ulcers that occur in this situation are generally attributable either to the one cause or the other. Syphilitic ulcers are to be treated by general measures, such as affect the constitution and remove the poison from the system. But many of the

small ulcers which are seen in patients who have suffered from syphilis or taken mercury, do not require any general management; they heal up very rapidly, by local applications. You touch them with some substance that will destroy the surface, and put them in a more healthy condition. Phagedenic ulcers are often stopped by touching them with a solution of mercury and nitric acid. You may pencil them over very lightly once or twice, at a considerable interval, with the nitrate of silver in substance or solution. I do not mean to say that attempts should not be made to improve the patient's health, by the exhibition of preparations of sarsaparilla and iodine. The iodide of potassium is often very beneficial. It is very desirable to put a stop to these ulcers, but you will not succeed unless you employ active local measures. You must attack them vigorously, and make such an application of the remedy as will destroy the sloughing edge, or the edge where the ulcer is going on rapidly. You then find the same effects follow here as in other situations; the ulcer is checked, and the healing process commences. If this be not had recourse to, the velum becomes destroyed, the parts are deformed, and their functions seriously impeded. Deglutition is performed with great difficulty; unless the patient is careful in attempting to swallow liquids, a portion comes through his nose; his voice is considerably affected, and when the parts become stretched, it is so much altered that the patient snuffles, and in a very unpleasant fashion indeed. The voice of a friend of mine who has lost nothing but the uvula, is so indistinct, that he never makes an observation but I am obliged to ask him to repeat it. To be obliged constantly to ask a man when he is talking to you, "Eh, eh; what did you say?" is very annoying both to the individual and to those who come in contact with him. You must be very careful to prevent the spread of these ulcers; sometimes they go on to a great extent without being detected, and unless a surgeon has his eyes about him and all his faculties, he will often be deceived. The patient complains of a slight sore throat, and the ulceration may not be noticed. I have seen ulcers, over and over again, occur on the posterior aspect of the velum; these have been neglected, and at last, gradually, from the destruction of the parts, perforation has taken place through the velum; the anterior surface has first of all become discoloured, it has then become whitish, and ulcerative absorption has gone on. This opening will not heal up again without the parts being inconveniently stretched; and even after it has healed, some inconvenience remains.

AFFECTIONS OF THE JAWS—CYST AND ABSCESS.

I have thus given you a slight sketch of the disease of the soft parts, and I will now talk to you about some affections of the jaws.

I have already spoken of the bad effects of decayed teeth and stumps, and have told you that an abscess occasionally forms at the fangs of the teeth. You will find, now and then, on taking out the stump of a tooth, that there is a swelling, and on examination you discover that it is a cyst, containing puriform matter. Sometimes these cysts are of very large size. I have seen a cyst—a complete abscess as large as the tip of the finger, come away on removing a tooth. These abscesses even break externally, and if any of the cyst is left, matter will continue to be discharged for some time. These abscesses sometimes so increase in size as to lead to a swelling of the jaws. An abscess formed at the socket of a tooth, now and then makes its way along the tooth. If the sockets have been a great deal absorbed, the matter at last comes up, and presents itself under the gum. It is described under the name *parulis*—gum-boil. There is a superficial swelling of the gum, followed by suppuration; but the troublesome cases are those in which abscesses form in the very sockets of the teeth; they are attended with great pain, swelling of the face, and so on. The abscess gradually advances, and may be discovered fluctuating very distinctly. You open the mouth, and see a large swelling on the upper or lower jaw, which you find to be elastic, and on putting a lancet into it, there is a great escape of putrid matter, which is attended with much relief to the patient. If a patient has suffered from this once, the cause ought to be explained, and means ought to be taken to prevent the recurrence of it. He is unwilling to have the teeth taken out when the parts are quiet and going on well, but some of these collections form deep in the jaws; they go on increasing, the parietes of the abscess expand, and cavities in the bone are at last formed of a considerable size. When formed in the upper jaw, the abscess may burst into the antrum, and sometimes there is a cavity, independently of that in the upper jaw, a large chronic abscess. The same thing occurs in the lower jaw. Sometimes the plates of the bone separate to a great extent, and if neglected for some time, you find tumours formed, of very large size, which are gradual and slow in their progress. These cases are known under the name of *spina ventosa*. It is only in patients who have been neglected, and in whom the disease has been allowed to increase from month to month, that anything of this kind is observed.

[The following extract from one of my published clinical lectures, offers an excellent illustration of a severe form of disease occasionally resulting from diseased teeth.

A. B., aged about 13 years, of a fine constitution and good general health, about twelve months since perceived, for the first time, a distinct swelling of the upper maxillary bone, which gave him no pain, however, and hence caused no complaint. Since that period the swelling has continued to increase, until it now equals in size a hen's egg, and occasions the swelling of the face and also projects

across the roof of the mouth. It is scarcely at all painful, and he seeks relief in consequence of the deformity, and also for fear of the disease becoming worse. When we press the tumour its walls *yield and crackle like parchment*, and as soon as the pressure is removed, *return by their own elasticity to their original position*. Externally the surface is smooth, and no adhesions exist between it and the adjacent cheek. Its colour is *mottled*, being red in some spots, and grayish or whitish in others. The alveolar process seems to be sound, and there is *but one carious tooth on the side of the tumour*.

The lymphatic glands in the neighbourhood are healthy, and in short there is no trace of any constitutional disturbance.

Remarks.—The case before us, gentlemen, is evidently one of those termed by Hawkins and others, "*serous encysted tumour*" of bone, which Dupuytren called "*fibro-cellular tumour of bone*," and to which the terms *Spina ventosa*, *Wind-ball*, *Egg-shell tumour*, &c., have been given by the older authorities.

Causes.—The causes of such growths are often obscure, but frequently they originate from blows and injuries of various kinds inflicted on the bones, giving rise to inflammation and its products, and when met with in the jaw may usually be traced to some disease of the *teeth or alveolar process*.

That disease of the roots of the teeth characterized by the growth of little cysts attached to the fang at the bottom of the alveolar process, and which are often removed along with the tooth, perfectly sound and entire, is especially the cause in many cases of the formation of a tumour of the kind under consideration. When the cyst is on the *side* of the fang, it often makes its way by progressive absorption through the bone to the gum, and there forms a tumour similar in shape, colour, and consistence, to a common parulis, and ultimately discharges spontaneously by ulceration or remains stationary for a length of time, producing more or less local inconvenience. If opened it often heals without difficulty; but occasionally it remains fistulous, discharging pus of a healthy character, and requiring for its cure the entire destruction of the cyst.

Where the disease commences in the alveolar process itself, the cyst either forms a tumour on the inner or outer surface of the gum, or takes a direction upwards (if in the superior maxillary bone), until it reaches the antrum, and there either empties itself or gradually enlarging, gives rise to a tumour of large size—the walls of the antrum yielding from pressure until they become almost of the consistence of parchment. It is not improbable, too, that this form of tumour may originate in the establishment of certain entozoa in the cellular tissue of the bone. We must be careful, however, not to confound this tumour with that described by Hawkins, as the "*hydatid encysted tumour*," in which the disease may be traced, in every instance, to the presence of hydatids.

Bones most liable to be attacked.—Although any of the bones may

be attacked with this disease, some are much more liable than others. The *upper and lower jaw bones*, the *extremities of the long bones*, the *vertebræ*, and the *bones of the fingers and toes*, are of this class. The predisposition seems to be dependent, for the most part, on their higher degree of organization and the looseness of their tissue; for in no case does the disease *originate* in the *compact* texture of the bone.

Effects upon the bone.—The change in the structure of the bones attacked with this form of disease, is very interesting, though we cannot trace precisely the agents operating in the production of this change. It appears, however, that the cellular tissue first, and then the compact immediately around the cyst, are removed in part or entirely, by a process analogous to progressive absorption in other organs; but as the cyst reaches the outer laminæ, nature, in order to protect herself from worse evils, deposits a smaller quantity of earthy matter than usual in the parts pressed upon; and thus the animal portion being in excess, the bone expands and becomes thinner and thinner until it resembles parchment. Were it not for this provision ostitis, caries, necrosis, or some malignant disease of the bone, would result from the continued irritation kept up by the presence of the cyst.

Size and shape of the tumour.—These tumours vary much in shape and size: generally they are oval or round, occupy one *side*, or the *entire circumference* of a long bone, when these bones are attacked and are rigidly *circumscribed*; not spreading off into the surrounding parts, as tumours of a different character are wont to do. In size they vary from that of a garden pea to masses of several feet in diameter.

Age most liable.—We have no data upon which to found a statement here: I have seen the disease in children, adults, and old men; but so far as my own observation extends, it is much more frequently met with in young persons.

Symptoms.—The phenomena characteristic of serous encysted tumour of bone are modified by the location of the disease, its duration, size, and shape. But there are certain general symptoms by which its presence may usually be inferred. Where, for instance, we find a tumour *indolent in its character*, but *slightly if at all painful*, presenting no evidence of malignant action, *smooth on the surface*, *elastic even when of small size*, *crackling under the pressure of the finger*, *circumscribed and occupying one side of a bone*, or *involving regularly its entire circumference*, it is highly probable that it belongs to the serous encysted class.

Sometimes the tumour, when small, is firm and hard, like other osseous tumours.

Diagnosis.—This form of tumour has been, in consequence of its elasticity, confounded with medullary sarcoma, or fungus hematodes: but the crackling of the walls under pressure, together with the his-

tory of the case, and the general condition of the patient, will be sufficient to distinguish one from the other. It has also, in its early stages, been mistaken for exostosis. It has also been mistaken for "osseous aneurism," but the pulsation in the latter disease will be sufficient to indicate its presence. In all doubtful cases puncture or an attempt to puncture with a trocar or grooved needle, will give us its true character, and should be invariably had recourse to.

Prognosis.—When the disease is confined to a small bone or a cavity readily reached, as the antrum, where it is of a small size, and the cause producing it of such a nature as to be readily eradicated, the prognosis is favourable; for there is no reason to believe that the constitution is involved, or that there exists any local malignant action. But where the case is of long standing, the tumour deep seated, or very large, and the cause more or less permanent in its nature, the loss of the organ involved, the loss or disorder of an important function, or possibly the loss of life itself, may be the result.

Dissection.—When we examine this tumour carefully with the knife we find that it is composed of a thin shell of bony, fibrous, or cartilaginous matter, within which in some cases there exists a number of *spines of bone*, passing in every direction, either attached at both ends to the walls, or by one only, the other projecting into the centre of the cavity and hanging like a stalactite; in other cases there are none of these. These spines of bone divide the cavity into a series of cells, communicating with each other, lined by a delicate membrane, and filled with fluids of different kinds. For example, we may have a thin watery or slightly mucilaginous liquid, of a reddish, opaque, or yellowish hue, or it may be transparent; sometimes it is thicker, like jelly or steatomatous matter; again, it may be almost solid, looking like cheese, but easily separated from the cyst. The soft parts covering the tumour are mostly condensed and thinned, or perhaps partially absorbed or displaced by the pressure, but we find in them no traces of disease.

Treatment.—Various methods of treatment have been proposed for the relief of this disease; some of these are harsh and cruel, while others have been feeble and inefficient.

The following are the general means now employed, to the exclusion of all others; but it is obvious that the *size, location, and nature* of the *contents* of the tumour must determine which of these plans is best adapted to the case.

1st. *Simple puncture of the cyst and the evacuation of its contents.*—This operation will often succeed in removing the disease where the *tumour is small, of recent origin, and filled with thin fluid*, which is readily drawn off. I have in two or three cases, when the upper jaw was the seat of the disease, opened the cyst by the extraction of a tooth, or when it extended into the antrum, by puncturing this cavity with a small trocar. The swelling generally subsides in a

few days and the patient recovers without the use of any other remedy.

2d. *Puncture followed by compression.*—In small tumours, about the fingers or bones of the forearm, it is stated that the evacuation of the contents of the cyst, and then the compression of a bandage firmly applied, have answered a very good purpose. I have never tried this method myself, but from the fact that the walls of the cyst are flexible, am disposed to recommend its employment.

3d. *Puncture followed by the seton.*—In obstinate cases where the fluid is secreted after each puncture, and when the tumour is tolerably large, a very good plan is to open it freely and then introduce a piece of lint which will act as a seton, and cause the secretion to change from a thin serum to a healthy pus in a few days. Every day the lint must be removed, and the cyst washed out with some mild injection—warm water, or flaxseed tea will answer very well.

The walls of the tumour gradually contract under the influence of interstitial absorption, while the cavity is filled up, in part, by granulations. This method is exceedingly useful when the upper jaw is the seat of the disease.

4th. *Puncture followed by injection of stimulating fluids, breaking up the spines with a probe, the application of caustic, or the actual cautery.*—These plans of treatment are only justifiable in cases of long standing, when all the other means have failed, and the lining membrane is so callous that it is necessary to destroy it entirely before healthy granulations can form. There is always great danger of necrosis of the adjacent bones, and sloughing of the neighbouring soft parts from these powerful applications. Much benefit, however, occasionally results from the injection of *weak* solutions of sulphate of zinc or copper, or nitrate of silver where the lining membrane is more dense and callous than usual.

5th. *Opening the tumour, removing its semi-solid contents, destroying its surface, and pressure.* This operation is, of course, confined to one variety of the disease, and is always attended with the risk of exciting inflammation and all its consequences. I have known it to succeed in one case, but I would much rather remove the whole tumour or amputate the limb, than resort to it again.

6th. *Excision of the tumour, or amputation of the limb on which it has formed.* Where the tumour is large, more or less solid, the adjacent bones diseased, and the patient old or feeble, if anything is done, the disease should be removed entirely, either by excision of the part attacked, or by amputation.

In the case before us, I shall first puncture the tumour in order to ascertain the character of its contents, and then decide as to the subsequent course of treatment. I now introduce the trocar, and you perceive a few drops of gelatinous fluid, so viscid as scarcely to flow, escape through the canula. From this circumstance and the large size of the tumour, I shall make a free opening into the

antrum, so that the fluid may readily escape. I will first extract the diseased tooth, and probably its fang may reach the cavity of the cyst.

It does not, as you see. I will, therefore, take out the next which I find is also diseased, although I did not detect this before. I am firmly resisted here, and it seems that anchylosis has taken place between the tooth and the alveolar process: we will divide the process with the cutting forceps, in order to save the patient pain, and also be certain of opening the antrum. Now it comes away, and the contents of the tumour are discharged. We shall order warm flaxseed washes—keep the patient at home for a few days—restrict him to vegetable diet; and, should inflammation supervene, leeches, purges, and the antiphlogistic plan of treatment will be employed. The result of the treatment will be reported to you.

T. D. M.]

TUMOURS.

Then, again, in removing decayed teeth, or portions of them, which have been allowed to remain long, you will now and then perceive a fungous growth on the extremity—a soft, pulpy swelling, adhering to the apex of the fang. Again: if you notice a carious tooth when extracted, you will sometimes find a soft fungus in the hollow of it, and if you take the trouble of splitting it up with a pair of cutting pliers, you will find that the whole canal is filled up by a swelling, which expands like a mushroom. These swellings often increase in size; they fill up the remainder of the crown of the tooth, and sometimes form a connection with the spongy gums. In other cases, the swelling commences at the gum, by the side of the decayed tooth, it gradually increases in size, and perhaps involves the gums of the adjoining teeth. Some of these swellings are as hard as the gum; some are soft and pulpy, and bleed on a slight touch; and some, again, though very seldom, assume a malignant character. These tumours are generally of a benign nature, they are firm in their consistence, and, if thoroughly extirpated, are not reproduced, but if any portion is left, they return. If the socket of the tooth, in which the disease commenced, is not taken away, and indeed the whole gum, the disease is sure to come back in a few months, following the analogy of tumours in other parts. I have told you that, however benign in its nature a fibrous or fatty tumour may be, if any portion of it be left, it will be reproduced; but take away the whole, and there is little chance of the patient being again troubled with it.

These tumours sometimes are of a bad character; but even in those of a contrary nature, where the operation is imperfectly per-

formed, there is a return of the disease. The patient, much annoyed of course, again recurs to his surgeon; caustic is perhaps applied

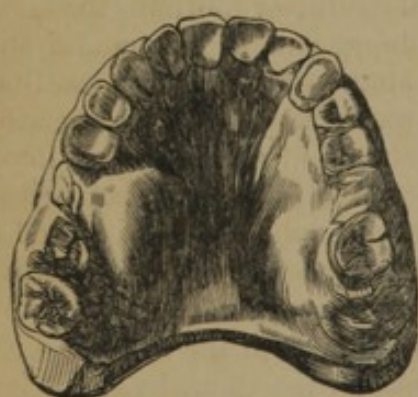
Fig. 111.



from day to day; becoming alarmed, he at last places himself under a person of more experience; the whole is then taken away, and there is no further trouble. Here are some drawings from preparations belonging to Mr. Nasmyth, of Edinburgh, showing tumours of the gums. One represents a tumour occupying the posterior part of the upper jaw, with all the stumps stuck in the middle of it. The teeth are all in a bad state. Those persons who are foolish enough to allow useless portions of the teeth to remain

may lay their account to suffer from this disease. The pain has gone off, the nerve is destroyed, and they think there is no occasion for

Fig. 112.



interfering with the teeth, or having them taken out. They do not care about the fetor of their breath; they have, perhaps, arrived at a time of life when they think nothing of it; but there is always a deal of mischief if these stumps in the jaws or gums are not taken out. They keep up the swelling and the tumours in the gums. Here is another drawing, showing a tumour of the gum, where the swelling has gone up from the interior of the tooth, and

has spread over in a mushroom-like form, and becoming adherent to the spongy gums, has formed a large swelling. The following is an extract from a letter which I lately received from Mr. N.:—

“I was much interested in a notice of a clinical lecture of yours in the *Lancet* of February 18, 1843, and as I have some casts and preparations of cases which have had their origin very distinctly in carious teeth, I thought you would like to have some notice of them. You have often, I doubt not, observed a fungous growth sprouting up in the hollow of a carious tooth. This often goes on till it fills a large cavity, or rather the whole excavated crown of the tooth.” My attention was drawn to this fact years ago. “By and by, the caries advancing, the attenuated walls give way, the growth in the centre of the tooth forms a connection of the gum, and then increases with rapidity. In the case No. 1, the tumour was connected with its base by a narrow neck; in No. 2, the base

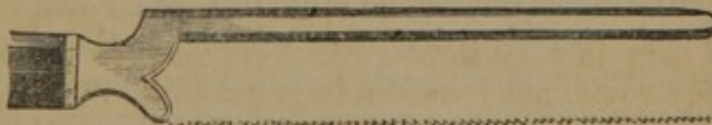
was broader, and, as you will observe, had spread the roots very much asunder.

“The principal value of these cases is, of course, to show that it is best in general to get rid of broken teeth, especially where there is a tendency to the fungous growth, or a relaxed spongy state of the gums.”

From what I have observed, I have no doubt that he is correct in saying that these tumours of the gums, these cases of epuli, often depend upon a growth in the interior of the tooth, as well as in the gums.

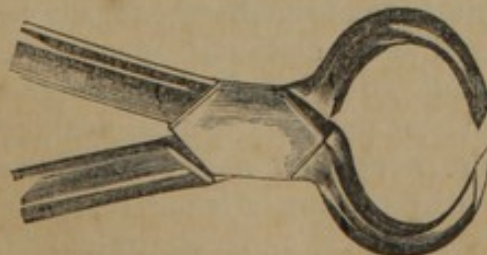
In order to get rid of these tumours effectually, you must take away the whole of the growth. Most frequently you find them connected with the decayed fangs of the small grinders upon one side or other of the jaw, and most frequently the lower jaw. Sometimes you find them far back in the lower jaw, growing from the decayed roots of the last large grinder, and spreading their influence to the gums of the wisdom-tooth and the grinder anterior to it. It is then a difficult matter to get quit of the swelling. If it be of large size the patient can only open his mouth with difficulty, and you get but an imperfect view of it. In the fore part of the mouth there is no difficulty at all. All you have to do, then, is to extract a tooth, sound or unsound, on each side of the tumour; the gums are more or less involved in the disease, and you can take them out with the forceps. If the disease were connected with a canine tooth, you would then take out the first small molar tooth, and the lateral incisor: or suppose it were confined to the gums of the canine and first molar, then you would take away the lateral incisor of that side, and the second small molar. You then apply a small saw (such as this) to the socket, and cut down the jaw, with

Fig. 113.



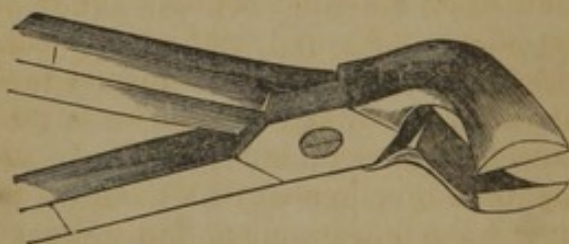
a view of getting rid of the parts from which the disease has commenced, of removing the alveoli and the diseased sockets of the

Fig. 114.



teeth. Before you apply the saw you carry your knife round the base of the tumour, and having applied it, and cut down the bone on each side, then, by means of cross-cutting pliers, you remove the teeth and the sockets, together with the tumour. Here is a drawing, representing a case in which the tumour had been taken away over and over again from the neck of the tooth, but it always grew again. The epulis was found adhering to the neck of the tooth, having commenced in the periosteum, but on that being removed there was no reproduction. When the gums of several teeth are affected you must take away a tooth on each side, and cut away the sockets of all the teeth. If you do this, there is no necessity for any further proceeding. Some surgeons recommend that you should employ an escharotic, as the potassa fusa, to remove the disease more effectually, but this is unnecessary. It is better to go far enough with the saw and the forceps. In order to get rid of tumours far back, and to avoid the necessity of cutting open the cheek, it is necessary to have the forceps of various sizes and forms. Although these instruments look very large and coarse, and such

Fig. 115.



as one might say farriers would employ, yet they enable you to remove the affection with less trouble and pain to the patient than if you use small and inefficient forceps. If you were to apply forceps half the size, you would find that you could not cut the sockets through cleverly; that they would bend, and you would have to repeat the operation; whereas, if you go properly to work, you will have no difficulty in accomplishing your object.

[The following case and the remarks on "Epulis," are extracted from a clinical lecture published some time since in the "Examiner."

CASE.—Epulis developed in the substance of the gum, and originating in neglected Parulis.—The patient, a female, aged 35, had suffered from the presence of the disease for the last twelve months. The tumour belonged to the class of "spongy epulis," and equaled in size a small walnut. It bled from the slightest cause, and was occasionally painful; the patient's general health was excellent, and the glands about the neck were not at all affected. Professor M. removed the tumour by passing a tenaculum through its substance in order to have it completely under control, and then with a probe-

pointed bistoury separated it from its attachments. The teeth and bone in the vicinity being sound, it was deemed sufficient to limit the operation to the excision of the tumour. The hemorrhage was profuse, and after the usual agents, pressure and styptics, had failed to arrest it, the actual cautery was applied, which at once accomplished the object in view.

Remarks.—The term epulis, derived from two Greek words, (*επι*, upon, and *ουλα*, the gums,) has been applied to tumours of different kinds which are developed in the gums, membranes of the teeth, periosteum of the alveoli, the surface or internal structure of the bones, or the membranous lining of their cavities. The proximate causes of such growths are for the most part obscure, but many cases may be traced to carious teeth, neglected parulis, by which the bone was rendered carious or necrosed, blows upon the part, and fractures of the bones, as in the cases of Marjolin and Berrard, the chewing of acrid substances, as bad tobacco, and finally to some constitutional taint.

These tumours presenting different appearances and producing altogether dissimilar results, have been divided into distinct groups.

1st. The variety most commonly met with, is that characterized by the development upon the gum, between the roots of the teeth, or in the alveolar socket, of a red, soft spongy mass, but slightly sensitive, and bleeding from the slightest touch; the constitution is but slightly, if at all involved, and the tumour is generally curable, but often returns when removed, and thus causes much anxiety to the patient. If neglected, or treated with caustics, it may assume a cancerous, or rather a malignant action, and ultimately prove fatal. When the tumour originates in the alveolar cavities, the first indications of the disease are the loosening of the teeth, which are perfectly white and sound, swelling of the gums, and a slight discharge of pus. This form of epulis is sometimes described as “Fungus of the Gums,” and may be referred in many cases to carious teeth or injuries of the bone.

2d. A tumour very similar in appearance, but characterized in its commencement by pain, a foul and acrid discharge, disposition to ulcerate and bleed, is also found in the same spot. This is genuine cancer, and is one of the most intractable and obstinate of all the diseases of the gums.

3d. Another variety of epulis is characterized by a tumour, the tissue of which is much firmer than that composing the first and second kinds. The swelling is also beneath the mucous membrane, is usually smooth, very red, elastic, more or less compressible, and often pulsatile; affording no hemorrhage, unless wounded, and possessing but little sensibility. When cut into, these tumours bleed freely, and when excised, present all the peculiarities of erectile tissue. They may be the result of injuries—but usually

appear without any appreciable cause, and occasionally degenerate into malignancy.

4th. A fourth form of epulis is known by its roughness, hardness, pale and livid colour, denoting slight vascularity, and often severe lancinating pain. The latter symptom is not, however, invariably present, and generally indicates, when met with, a malignant disposition in the tumour. It is this form from which the most danger is to be apprehended. Like all other tumours composed of this tissue, they may remain indolent for many years, but depending as they usually, but not invariably do, upon a constitutional taint, such a result is not to be anticipated.

When either of the tumours just described, after having remained stationary for a longer or shorter period, takes on a new action, and grows rapidly, a new series of phenomena is at once developed. The teeth are loosened, the bones, if not before diseased, become carious, fungous masses of large size shoot up; the tumour, if originally hard, softens; a fetid, purulent and bloody discharge is established; neighbouring parts, especially the lymphatic glands, are speedily involved in the disease; the whole constitution gradually gives way, and finally death, occasioned either by hectic, hemorrhage, or suffocation, closes the scene.

The lower jaw is the most common seat of epulis, although the upper is by no means exempt from it; usually the tumour occupies the anterior portion of the bone, but occasionally it is seen on the sides, or very far back. Its form and size vary; some are circumscribed with pediculated attachments, others have extended bases, and are lost in the adjacent parts, while in size there is the greatest diversity.

The prognosis will depend entirely upon the nature of the tumour, its size and disposition to increase. When of the first class, and dependent upon carious teeth or bone, of moderate size, and with little or no disposition to spread, the case is one of easy management. Erectile epulis, although more serious in its character than the first kind, is yet a disease susceptible of cure, and rarely degenerates into cancer. But when the tumour is hard and fibrous, accompanied by pain, and increases gradually, although certainly, and the constitution becomes involved, the case is one requiring all our attention, and often proves indomitable. The same may be said of the second variety of epulis. Mr. Liston is under the impression that a genuine malignant tumour of the gum is *rare*, and in this I agree with him.

I have removed a great number of tumours of the jaws, in fear of their becoming malignant, and to relieve the patient's mind as much as anything else, and have rarely failed in making a complete cure.

The only diseases with which epulis can be confounded are parulis, exostosis, spina ventosa, osteo sarcoma, and periosteal

tumour, the result of inflammation. The history of the case, with an examination into the symptoms, will be sufficient to enable us to arrive at a correct diagnosis.

The treatment of this affection is of course modified by its nature and extent. Where it is merely a fungous mass arising from a carious tooth, or bone, or from necrosis, the indication is to remove the exciting cause, and then either pare off the tumour with the knife or scissors, or keep it down with cauteries and pressure. I prefer the knife, and if the granulations sprout they may be suppressed by caustic or astringents. The hemorrhage which always takes place after the use of the knife may be arrested by compression or styptics, or the cautery. Erectile epulis, if pediculated, may be removed either by the knife or ligature, but where the base is extended its removal will require a much more extensive operation, for no part of the disease is to be left behind. The most profuse hemorrhage is sure to be developed by cutting out such a tumour, and the actual cautery is usually required for its arrestation. If the tumour is small, compression with lint steeped in creosote or muriated tincture of iron will sometimes be sufficient to arrest the hemorrhage.

But whenever the tumour is hard, knotty and painful, or spongy and painful, in other words, presents traces of scirrhus or cancerous action, a very different operation has to be performed, if we desire to eradicate the disease.

Nothing short of the complete removal of the tumour, teeth, and bone connected with it, and the application of the actual cautery to the surface from which we take them, will accomplish our object. For removing such tumours some propose the chisel and mallet, but the operation best adapted to the case, and one which will occasion the least suffering, is the following:

Having placed the head of the patient in a good light, and against the chest of an assistant who stands behind the operating chair, the surgeon makes a perpendicular incision on each side of the tumour with a pair of strong scissors, or rather cutting forceps, and without stopping to arrest the hemorrhage, at once detaches the mass by dividing the alveolar process *above* or *below* the tumour, as the upper or lower jaw happens to be involved, with cutting forceps, one blade of which is applied to the inner portion of the jaw, and the other to the outer. The raw surface is next carefully examined, and every vestige of the disease removed with the knife or scissors. If the bone appears affected it must be cut away, and often a very good preventive to a return of the disease is the use of the actual cautery. The bleeding may be arrested either by the cautery, or by placing a pledget of lint dipped in creosote in the chasm, over which a slice of cork may be laid, and then closing the jaws make the sound one act as a compress. To secure the dressing the bandage for fracture of the lower jaw may be applied. The parts

should not be examined in the first twenty-four hours, but after this period a daily dressing is required, the nature of which depends on circumstances. If there be no disposition to a return of the disease, it will be sufficient to wash the parts with some detergent solution, until cicatrization is completed. But if fungous granulations make their appearance, the vegetable caustic, or actual cautery should be applied, until this disposition in the wound is destroyed. When the healing process is finished the deformity occasioned by the loss of bone and teeth can be readily removed by the introduction of false gums and teeth.

Instead of making the perpendicular cuts with the short forceps, some prefer a thin saw, but the method just described is less painful, and accomplishes the object in a much shorter period. Where the tumour is very large, the saw may be required, and should be always at hand in case the edges of the forceps should turn in making the first cut.

Where the tumour is very large or seated on the side of the bone, or far back, the cheek should be divided in order to enable us to reach it without difficulty. In such cases I have found great advantage in using a cutting forceps so curved as to pass readily to the back part of the mouth, and then allow of the blades being passed above the base of the tumour, when the upper jaw is affected, and below it, when the inferior maxillary is the seat of the disease.

After the removal of the diseased mass, the wound of the cheek must be closed and union by the first intention attempted, and where the dressings are carefully attended to, the deformity resulting from the incision is scarcely perceptible, unless the *portio dura* is extensively injured, when paralysis, generally incurable, ensues, often giving rise to a very unpleasant expression of countenance.

T. D. M.]

LECTURE X.

ABSCESS OF THE THROAT.—TUMOURS OF THE UPPER AND LOWER JAW.

ABSCESS OF THE THROAT.

I SHOULD have stated yesterday that abscess occurs in the throat, independent of the velum or tonsils.

You meet with these abscesses at the back of the throat, on one side, or in the median line, immediately behind the velum, and

partly covered by it. They occur in the cellular tissue, betwixt the back of the pharynx and the fore part of the vertebræ, and are often unconnected with any disease of the bones. Sometimes they go on gradually increasing; the patient perhaps feels no pain, but at last there is difficulty in swallowing, and perhaps there is some obstruction through the nostrils. He does not breathe through his nose, but through his mouth; and on looking into the throat, you see this swelling. These abscesses are sometimes connected with disease of the vertebræ. I have already given you a long account of diseases of these bones. I told you that abscesses formed in connection with them, and that now and then portions of them were discharged through the cavity of the abscess. The disease may go on for weeks or months after the discharge of these portions of bone; but, as you are well aware, there is great risk when caries extends in this situation so as to detach large portions of bone, and if the head falls forward, the patient is paralyzed and dies instantly, or perhaps in a few hours.

Abscesses unconnected with disease of the bones may be opened, and if the orifice be made sufficiently large, and in a dependent situation, they will, after a time, heal up; but you will be called upon also to open abscesses that are connected with disease of the bones, to prevent bad consequences. A large abscess, suddenly bursting there, might suffocate the patient, and it is desirable that it should be opened before discharge takes place spontaneously. For this purpose, if the abscess be large, you employ a long flat trocar, such as you puncture the bladder with above the pubes. You carry this into the lower part of the abscess, and allow the matter to escape by the mouth. After a time, when the contents of the abscess have been so far discharged, and there is no fear of any matter getting into the windpipe, you may insert a bistoury and enlarge the opening sufficiently. The parts will then, if there is no disease underneath, contract and heal.

I stated yesterday, with reference to epulis, that there is no necessity for applying caustic, provided that you take the disease entirely away with a proper instrument. John Bell inculcates the use of the actual cautery, but if you take the tumour thoroughly away, together with some of the sound parts, there is no chance of the affection recurring.

TUMOURS OF THE JAW.

You meet with tumours here of a more serious character, and large size, involving great portions of the bone. I shall first direct your attention to some affections of the upper jaw.

I have spoken of swellings of the neck; swellings of the upper

jaw ; inflammation and abscess of the antrum : I have also spoken of chronic abscesses ; and I have cautioned you against mistaking these swellings for solid tumours. But, unfortunately, the antrum is subject to malignant affections, and you find them occurring at all periods both in young subjects and those advanced in life. The patient complains of an aching in the jaws, and of a swelling, which perhaps is supposed to arise from a decayed tooth. The jaw swells out very rapidly, and then, after a short time, the corresponding nostril becomes obstructed, and there is discharge from it. On looking at it, you perceive that the walls of the antrum are expanded : they are soft and pulpy, and the tuberous process projects. The anterior wall of the antrum is attenuated and thin ; you can press your fingers, as it were, into the bone ; the nostrils project, and you find a tumour filling up the whole cavity, not resembling the mucous polypus, but coated with lymph, irregular on the surface, and, if handled at all roughly, bleeding very freely. The disease advances very quickly, and generally in a few weeks the tumour will have extended back to the throat, interfering with deglutition, and at last it will be found hanging down there and furnishing discharge. The bones become wasted from pressure ; the patient gradually loses his health, gets emaciated, his bowels become affected from his swallowing the putrid discharge from the ulcerated surface of the tumour, and he has occasional hemorrhages, which reduce him in strength still farther. This goes on rapidly : the face continues to swell ; an enormous fungus is often thrown out from the upper part of the tumour : the eye is turned out of the

Fig. 116.



socket, and a fungus occupies the space, and though the optic nerve appears to be much stretched, the vision is not always quite destroyed. The tumour may come through the sockets of the teeth to the mouth, and at last an enormous swelling is in this way produced. Here is a drawing representing the appearance presented in these malignant tumours of the antrum: the tumour is not confined to one side, but, displacing the septum of the nose, it involves the other jaw-bone. The patient generally dies very miserably, from the discharge and hemorrhage, within six months of the commencement of the disease: the last stages are very rapid.

Fortunately, all tumours of the upper jaw are not of this character; the bone and the periosteum become involved; disease sometimes commences in these parts from accidents. Now and then the patient suffers a severe injury of the face, strikes his cheek against some hard substance, or receives a blow with the fist on the upper jaw. The old woman here represented, and figured in the "Practical Surgery," dated the origin of the tumour to a blow received on the edge of a table, when stooping suddenly, fifteen or sixteen years before her application for relief. Here is a portrait of another woman, who struck her face violently against a child's head, and had a tumour form in consequence. This was also engraved on wood by Mr. Bagg, for the book alluded to, and which some of you, no doubt, have seen. There was some swelling of the jaw at first, which went down for a time; the tumour then commenced growing, and it was many years before it attained this size. These tumours are met with in all stages of their growth, and of various sizes, perhaps a year or two after they have commenced growing. Their character is very different from that I have described. The tumour is limited; it does not spread about and involve all the neighbouring parts, as the soft medullary tumour does, but it goes on increasing, very gradually projecting down to the mouth. The nostril may be occupied to a certain extent, but it is often quite clear, even when the tumour has attained a large size, and bulges out on the cheek. Growing year after year, the tumour attains at length a great bulk, and the swelling, which projects towards the mouth, involves the gums; but it is unbroken on the surface, being covered by an extension of the membrane of the mouth. The tumour feels hard and solid, and the surface is very often lobulated. Here is a specimen of one of these tumours, which had been in progress for a very long period; there are many nipple-like processes upon it; it is what the mineralogists would call botryoidal. The tumour at last, by its size, causes great inconvenience to the patient, and very serious deformity. When touched, it is insensible, and does not bleed; there is no discharge from the surface, and it attains a large size without the patient suffering in health, and without the least contamination of the neigh-

bouring parts. Although it is inconvenient from its bulk, yet it is not hurtful, and will not destroy the patient.

The one tumour, as you can easily understand, can scarcely be interfered with by surgical operation with any propriety; whereas the other can be taken away safely and certainly. I take no credit to myself for the operation of removing the jaw; it was performed by Gensoul, Syme, Lizars and others, several times before a favourable opportunity occurred to me for doing it,—but I take credit for having corrected the diagnosis in these cases, and for having pointed out the manner in which an operation could be performed with safety and success. In the cases operated upon by the gentleman to whom I have referred, the disease almost uniformly returned. It was of a malignant character. In such cases, there is great vascularity in all the parts around, and when you take out a swelling of this kind, however cleanly, you find all the vessels pouring out blood with great rapidity. If you are foolish enough, or unfortunate enough, to cut into the tumour, and leave any part of it,—and in bad cases this is not unlikely to happen,—then you may lay your account with a most fearful hemorrhage. I rejected a case from the hospital in Edinburgh, where the patient had been suffering under the disease two or three months. Seeing that the disease was of a malignant character, I would not attempt to remove it; but a gentleman of my acquaintance, in private practice, was bold enough to undertake it. There was no fungus in the mouth, and he was determined to have the part out, right or wrong. He first of all tied the carotid, as a commencement, and set to work with the tumour. He made his incisions in the cheek, but the bleeding was so profuse that he was obliged to stuff the wound, huddle the parts up, and leave the operation unfinished. This was on a Sunday. On the following Sunday he tied the external carotid on the other side, and to work again he went. He cut open the cheek still further; but notwithstanding the above-mentioned vessels were tied, so extreme was the vascularity, that he could not finish the operation. Had he done so, the man would, in all probability, if he had not died from the immediate effects of the operation, have had a return of the disease, and have died perhaps more quickly than if he had been left alone. At this stage of the disease an operation can hardly be proper. In the very commencement, whilst the tumour is confined in the bony cavity, before the neighbouring parts are contaminated, the tumour may be taken out; but if the nostril is filled up, it is madness to attempt any operation.

Long ago, the operation which was practised in these cases was to trephine the antrum. This operation was recommended and practised by no less celebrated a surgeon than Dessault. The cheek was cut through, the bones of the antrum removed with a knife,—for in these cases the bones are thinned and softened, and can be easily cut and broken down without any force being applied,

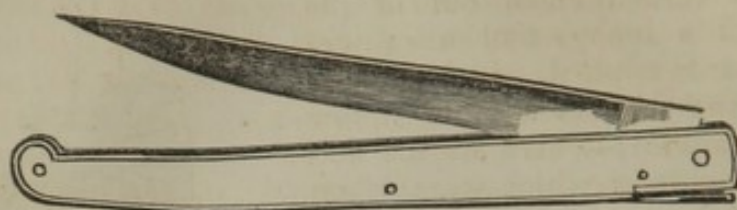
—the tumour was taken hold of with forceps, or turned clean out of the cavity with a scoop, and a cautery was afterwards applied. I was simple enough, twenty years ago, to follow Dessault's advice,—(here are the soft and friable masses which were taken out)—and I have seen the same thing done many times. No good was effected: the tumour returned in a short time, and the patient died very miserably. If anything is done in this disease, it must be, as I have said, at a very early period; you must take out the whole of the mischief, and entirely remove the upper jaw containing this tumour. I have in my collection a tumour of this description; it was removed early, and before there was any threatening of fungus, or the wall of the antrum had given way. It was taken from a young lad, who went through the operation very well, and was recovering rapidly; but he was attacked by erysipelas of the face and head, and became comatose. In this state he would, in all probability, have continued till death had terminated his career. He was relieved, however, by applying blisters to the back of his head and spine, and he survived the attack. I traced him, and found that five or six years afterwards he was alive and well; there was no return of the disease; but this result is scarcely to be looked for, and it is only in the most favourable cases that you would attempt the operation.

The other description of tumour, though it may have attained a very large size, can be taken away with perfect propriety. It is wonderful how easy these tumours come out, and with how little hemorrhage. You must make the incisions so that there shall be as little deformity as possible, and that the scar shall scarcely be seen. Here is a representation of a patient very much deformed by incisions; the poor woman had undergone a very severe operation long before she applied to me. It was a tedious process, having occupied more than an hour, and was attended with great hemorrhage: after all, only an inconsiderable part of the disease was extirpated. These tumours must be taken out whole; for if you cut into them they also will bleed, and you would have great difficulty in arresting the hemorrhage. You must cut the cheek open, but you do it scientifically, keeping wide of the disease. Having to work amongst bones, you must use a good, strong and broad knife, one with which you can make free and proper incisions. You must, in your operation, be guided a good deal by the size of the tumour. In a large tumour, the skin is very much

Fig. 117.

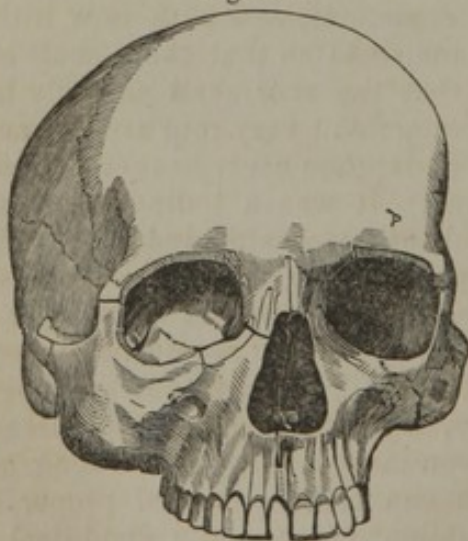


Fig. 118.



stretched and very thin, and you might think of taking away some of the skin. I did so in one case—[referring to a specimen]—but I regretted it afterwards; the integument was much thinned and discoloured from the enlargement of the superficial branches of veins, and I was afraid that if I left it it might slough away, and I did not know how far this process might extend. To uncover a very large tumour, you may make one incision from the point of the cheek bone to the corner of the mouth, carrying it outwards also along in the direction of the zygoma, another from the angle of the eye to the middle of the upper lip. The mark of these incisions must always be more or less apparent. But if you have a tumour of moderate size to deal with you would make one incision from the angle of the eye down the side of the nose, bring it under the ala, and cut away the ala from the edge of the superior maxillary bone; then you bring the cut down well towards the columna nasi, push the knife through the lip, and cut right down the median line. A scar from that incision will scarcely be perceived if the parts are cleverly and carefully put together. You make another and much less extensive incision from the same point, in the course of the fibres of the orbicularis palpebrarum out towards the zygoma, carrying the knife under the eye; you can then turn backwards and

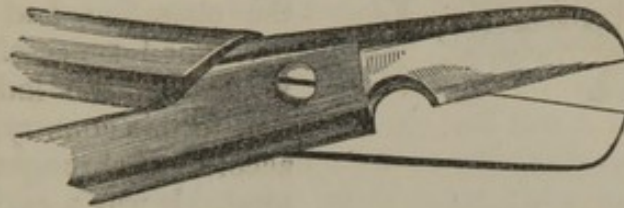
Fig. 119.



outwards a large flap, uncover the tumour, and get to the processes of the bones. These you divide at the points indicated in the cranium, which I here show you. Having done this, the tumour almost tumbles out; very little pressure is required to displace it. You stand opposite the patient to make the incisions. It is a most difficult thing to take the bones out in the dead body, and I shall merely divide the process of the bones to show where and how this should be done. Before commencing your incision, or after you

have turned the flap back, you may require to take out one tooth, and you remove the lateral incisor from one or the other side, as may be. You must be provided with strong-edged cutting pliers for dividing the bones, and very strong scissors also for separating longitudinally the palatine arch. Before applying them, you cut a notch out of the alveolar process of the tooth removed, with the point of the cutting forceps. Very often you are obliged to take

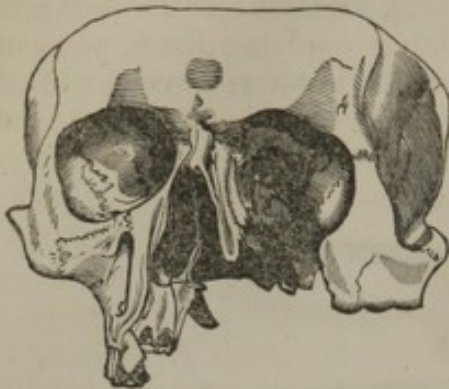
Fig. 120.



away the os mala, or perhaps you may saw it through. Supposing that you are going to take away the os mala by the forceps, you divide the zygomatic arch, and also the junction of the bone with the frontal bone at the transverse facial suture. You cut the nasal process of the maxillary bone; then, putting one blade of the scissors into the nostril, the other into the mouth, cut down, and you have destroyed all the attachments of the tumour. You must next carefully detach the parts within the orbit, cutting the superior maxillary nerve far back; that must not be drawn out from its origin; then, putting your finger on the tumour, you detach with the knife any remaining connections, and out tumbles the mass. You will be astonished to find how little blood follows an operation of this kind: it can be done in a very few minutes. There is seldom any necessity for stopping the bleeding temporarily by pressure on the carotid: after you have turned the tumour out, perhaps you will not find a single vessel to tie, or only one. You take hold of that with the fingers, put on a ligature, and then lay the flap down. The tumours should come out quite entire, and, after stopping any vessel that may bleed, you put a dossil of lint into the cavity, bring over the flap, and put the parts neatly together. You introduce some points of interrupted suture under the eye, and by the side of the nose; you attach the alæ, and then put two points of twisted suture into the upper lip. In a short time the cavity fills up, and it is altogether an exceedingly satisfactory operation. I have extirpated the upper jaw to remove fibrous tumours nine or ten times, without the loss of a single patient. It is an operation more successful than the amputation of the leg, or, at all events, of the thigh, and is attended with as little risk. You are justified in performing it, because the disease does not recur. There are here on the table the bones of a patient who submitted to this operation, not on account of the fibrous tumour, but for erectile tumour, dis-

placing and involving the upper jaw. The poor fellow did not,

Fig. 121.



certainly, die from the effects of the operation. He had been sent here from Gibraltar. A surgeon in the garrison, Dr. Mitchell, had seen the case, and proposed to operate; but he was discouraged by the medical men there. Knowing that the operation had been often performed successfully, he advised that the lad should be sent to this country, and he was accordingly brought to our hospital. It was a curious-looking

tumour, and it struck me that it was of a fibrous character, not growing from the jaw, but involving it. Mr. Marshall some months afterwards discovered that the whole mass was erectile; it was taken away in the manner I have described. The os mala was merely sawn down, and the whole of the maxillary bone taken out, except the end of the nasal process. You will see that it is as complete and beautiful a specimen of an erectile tumour as any that I have yet shown you. He perfectly recovered from the operation, and the cavity, or palate, was filled up, leaving only a little space, into which you could put the point of the finger. His speech was indistinct, and after being in the hospital three months I sent him to my friend, Mr. Nasmyth, in Hanover Square, to have an artificial palate fitted. The poor fellow went from thence to see the lord mayor's show, and afterwards stood about in the wet. He came back to the hospital, and had an attack of shivering, followed by erysipelas. He recovered from this disease, as also from a relapse, though he had the former in a very aggravated form. He died, in the end, maniacal. The parts were healed up, and there was no chance of any reproduction of the disease. You may cut out tumours of this kind, but you must not cut into them, nor must you meddle with any of the other soft ones, unless under peculiar circumstances.

[The following case is taken from the clinical report of my intelligent young friend and former pupil, Dr. Squibb.

"Mr. I. Marshall, *ætat.* 54, had, for six months, suffered from a tumour in the right antrum, which rapidly increased in size in despite of all the remedies which could be suggested, implicating the surrounding parts, and giving rise to intense suffering.

"On the 23d of October, when the patient presented himself at Professor Mütter's clinic, at the Jefferson Medical College, the tumour projected from the right side of the face to the size of a closed hand, deploying the bone and integuments as it grew. Every

means by which to arrest and dissipate it having been tried in vain, and the character of the tumour having been fully made out by exploration, it was deemed necessary by the professor, as a dernier resort, to remove it, and this could only be done by removing the entire maxillary bone of the right side. The patient, already fully convinced of the necessity for the operation, and anxious for the chance of relief from his sufferings, at once assented, and it was commenced by an incision through the soft parts, extending, in a curved line, from the commissure of the lips outward and upward to a point about half way between the meatus auditorius externus and the external canthus of the eye. Another vertical one was then made down the side of the nose and through the upper lip. The flap was next quickly dissected up and given in charge of an assistant, and the bone detached from its articulations by the cutting forceps. The connecting soft parts were then divided and the whole tumour and bone removed. The hemorrhage was arrested by ligature and cautery, the flap brought down and secured in position by the interrupted suture, and the antiphlogistic treatment, with cold water dressings, applied. The patient speedily recovered, the wound uniting throughout by first intention.

"On the 6th of November the patient walked to the lecture room and allowed the professor to exhibit him to the assembled class, nearly well."

I have removed the superior maxillary in part or entirely, in several cases, and met with no difficulty in any one of them, I therefore agree with Mr. Liston in the opinion that the operation, though serious, is by no means one of much hazard. In the case reported by Dr. Squibb, the disease returned some time after the parts had healed, and the patient ultimately died from its effects.

T. D. M.]

The lower jaw is also the seat of diseases requiring operation, which often commence in the same way as those in the upper jaw.

You here meet with malignant tumours, which may commence in the bone, but they generally begin in the parts exterior to it, and involve it. I have spoken of cancerous tumours of the lip and face, which generally increase rapidly in size and surround the lower jaw, and I deprecated any interference with them. Some people have made a great fuss about extirpating the jaw in cases of this kind; there have been from time to time a great hue and cry about it; but such proceedings ought, by all means, to be discouraged. There was at one time a great rage for taking out jaws, and so determined was one gentleman to obtain the credit of having accomplished this feat that he published a paper purporting to give an account of taking out the *whole of the lower jaw*, whereas he merely enlarged and divided some sinuses, and pulled out a dead and loose portion of the bone. There are cases in which it is not advisable to interfere with the lower jaw even where the tumours

commence in the bone. You meet with a tumour, which grows rapidly, and speedily throws out a fungus. Here is a tumour of that kind. This case was sent to the Edinburgh Hospital, soon after I became surgeon of the establishment, under the impression that I should take it away. The tumour had grown in a few months; it commenced on the exterior of the jaw, and this horrid fungus was thrown out very shortly. The patient perished within a week or two after his admission.

Fig. 122.



You meet with tumours growing between the plates of the lower jaw. Sometimes they are composed in part of fluid, of cysts con-

Fig. 123.



taining a glairy fluid; they increase in size, expand the jaw gradually, involve it completely, and pass along perhaps the whole of one side. Here is a bone, the plates of which have been separated in this way; one-half of the jaw, as you see, has been removed, and from its articulation with the temporal bone. The patient's countenance is thus greatly deformed, the motion of the jaws is impeded, and he is very willing to submit to some operation for relief. The tumour will go on increasing more and more, and it may take on some malignant action. Here, again, is a specimen of a tumour which has not a very benign look. It had been growing in the lower jaw for only a few months, and involved, as you see, much more than one-half of the bone, from an

opening which had been made to explore its nature. There was

Fig. 124.



some fungus, but it did not grow rapidly, and I felt justified in taking the tumour away. I am satisfied that it will not grow again. The patient has been going about the hospital for the last four or five years, without there being the least appearance of mischief. She has only the ramus of the left side remaining; yet she continues, somehow, though far advanced in life, to take sufficient nourishment.

You meet with tumours of the jaw, however, not of a questionable character, but solid, composed of bone and cartilage. You may see them of moderate bulk where they have only been growing a short period—two or three years; or you may meet with them after they have attained a monstrous size. I have seen tumours of the lower nearly as large as some of those before you of the upper jaw. These tumours also may be taken away. I think it was Mr. Cusack,

Fig. 125.



of Dublin, who led the way in the performance of this operation, and it has been repeated with success a very great number of times. The operation undertaken in favourable cases of this kind is not more dangerous than amputation of the limbs—it is equally successful, and in every way quite justifiable.

You may be obliged to take away only two to three inches of the jaw from near the symphysis, perhaps to the angle, or from the symphysis to one articulation, or it may be necessary to take away nearly the whole of the jaw. If I am not mistaken, Mr. Syme

took out the whole of the lower jaw lately, but the case did not turn out successfully.

In performing this operation, you will endeavour to make your incision in such a manner, that there shall be no perceptible scar afterwards, or very little, and this may here be easily enough managed. Patients have had the cheek cut open from the angle of the mouth to the ear; the nerves and vessels have been divided, and so far paralyzed; the lip has been cut right down, and an incision has been made from the middle of the lip through it, and down under the chin. I would not advise you to follow such a bungling procedure by any means: you will make your incision entirely underneath the jaws, and not divide the aperture of the mouth at all. Suppose the right side of the jaw is to be taken away from its articulation, you will put in the point of the knife, and bring it over the ramus in contact with the bone. Here is the articulation; you use the knife in the left hand, and draw it down along the ramus of the jaw to the neck underneath the jaw. Then you finish your incision: you bring it to the point of the chin, and no further. You raise the flap so made, cutting through the muscles, membrane of the mouth, and everything else. It is of no use doing this bit by bit. You cut right down to the bone at once, and uncover it. In cutting away the masseter in the living body, you are dissecting the flap from the tumour, and care must be taken not to remove any of the tumour with it. Then you push your knife through the parts behind the symphysis, meet it with your finger in the mouth, and thus detach the bone completely. I should have premised the taking out of one of the teeth, after which you apply a small saw, such as I showed you in speaking of the removal of epulis; in case of need, Hey's, or even a small amputating saw, will answer. You cannot cut that bone through with the pliers, but you need not saw it entirely through. You put the forceps into the notch you have made, and then divide it. You next lay hold of the bone, and you must, in some of these cases, be exceedingly careful that you do not break it. The bone is very tender, as in the first specimen I have shown you to-day, and you handle it very tenderly to get it out of the articulation. In some cases, in spite of all your care, the bone will snap through, and leave the ramus, the coronoid, and the articulating processes, in the wound. If the bone should break at its angle, or in the ramus, what is to be done? Unless the portion were removed, in all probability the patient would be subjected to a return of his malady. The portion must, therefore, be seized with a pair of strong forceps; the point of the knife must be carried close to the bone, so as to separate all the attachments, and the articulation is, if possible, to be opened in front, but this will occasionally be found perfectly impossible. The fragment, then, must be pulled forwards, the articulation opened from behind, and, by twisting it inwards and forwards, the tip of the coronoid process

may be reached, and the tendon of the temporal muscle detached. In other cases, as in the last specimen, the bone is firm, and affords a good fulcrum to depress the ramus by; you gain readily the coronoid process, and cut away the temporal muscle from it; you turn the bone further down, and open the joint at the fore part; then cutting close to the ramus, you detach the tumour entirely, and bring it out. There is more bleeding here than in the operations in the upper jaw, and it is better to put an aneurism needle under the maxillary artery than to be taking up the different vessels as they appear in the wound. Tie clean, then, the largest portion of the external carotid with a single ligature, and it is easily exposed in general at the posterior and lower angle of the wound. You put some dossils of lint, dipped in cold water, into the gap, lay down the flap of the cheek, and cover that over with a cold pledget also. Five, six, or seven hours after, when the bleeding has stopped, you put in points of interrupted and twisted suture. You perceive that there is scarcely any deformity. The cheek will fall in a good deal, but even that can often be prevented. It is a good plan, before having recourse to this operation, to get a good dentist to make what are called caps fitted to the teeth of the upper or lower jaw on the side not to be operated upon. Immediately after you have taken the diseased portion of the jaw away, to prevent the bone being drawn by the muscles of the upper side, you put these caps into the patient's mouth, so as to keep the teeth that remain of the lower jaw opposite those of the upper jaw. This apparatus is to be worn for a very considerable time, so as to prevent the chance of the parts being drawn awry, and then something can be made to fill up the cheek and keep it out. There was an exceedingly handsome young woman who underwent this operation in the hospital a year or two ago, and by pursuing this plan she was very little deformed indeed. You have had an opportunity of seeing all these operations performed, both in the upper and lower jaw, over and over again, on the living body; and that is more than the pupils of any other hospital in London can say: they are frightful to behold, but they are really not attended with so much risk as would be imagined, and are exceedingly satisfactory in their results.

[I have repeatedly removed large portions of the lower jaw for tumours of different kinds, and, generally speaking, as with Mr. Liston, the operations have been readily executed, and given rise to but little subsequent inconvenience. I have never lost a case from the effects of the measure itself. A few days since, (Nov. 1st, 1845,) I had occasion to remove a very large tumour, which occupied the symphysis, and about two-thirds of the left ramus of the bone. The operation was performed before the class, and proved exceedingly interesting, from the circumstance of my being able to preserve the form of the chin and jaw, and also to avoid all scar about the face. The patient being seated with her head supported by an assistant,

I laid bare the tumour in its entire extent, by detaching the lip and integuments of the chin and cheek from the adjacent bones. *No external incision was made*, and yet I had no difficulty in turning the soft parts down under the bone, so as to leave its base perfectly visible. I next, partly with a saw, and partly with a strong scalpel, cut through *the base of the tumour, leaving a small rim of bone composed of the rounded portion of the base of the lower jaw*. Two perpendicular cuts were then made, (one on each side of the mass,) with the cutting forceps—and the tumour thus loosened, was readily removed with a few strokes of the scalpel. As the hemorrhage was profuse, the actual cautery, and pledgets of lint steeped in creasote were applied, and with entire success. The lip was then brought back to its original position, and cold water dressing applied to the face; a perfect cure, *without the slightest deformity*, was accomplished in two weeks.

I have repeatedly employed this method in similar cases, and in all have been delighted with the result. My excellent friend, Dr. J. Rhea Barton, one of the best surgeons of this or any other country, is entitled to the merit of the invention; at least he was certainly the first in this country to publish a case relieved by its employment; leaving a rim of bone prevents the falling in of the chin and cheek, and the cavity made by the removal of the alveola and teeth, is readily filled up by the introduction of false gums and teeth.

T. D. M.]

LECTURE XI.

OTHER DISEASES OF THE JAWS.—REMOVAL OF SEQUESTRUM.—INFLAMMATION OF THE MEATUS AUDITORIUS.—DEAFNESS FROM VARIOUS CAUSES.—TREATMENT.—DISEASES OF THE NECK.—ABSCCESS.—TUMOUR.—BRONCHOCELE.

I HAVE described to you the mode of performing the operations about the upper and the lower jaw. You may meet with cases where the tumours have attained an enormous bulk, yet the patient can, by a bold yet perfectly safe operation, be entirely and permanently freed from disease. In this instance [*presenting a specimen*], the tumour was of enormous size; it pushed up and nearly concealed the nose, and the mouth was quite filled. The disease had affected the cheek-bone on one side, one superior maxillary bone, and a portion of the other. The velum palati was completely hidden. It is a curious fact, that in many of the very desperate-look-

ing cases of this kind in which I have had occasion to operate, attempts had been previously made to remove the disease by incisions, and portions of the tumour, of greater or less bulk, had been taken away. Here are drawings of persons after the operation had been effectually performed, but the worst scars were on the face before I saw the patients. If, as I have endeavoured to show you, the incisions are well planned, the deformity will be trifling indeed.

I have advised you to guard, as far as possible, against breaking through the ramus of the lower jaw, in your attempts to disarticulate this bone. I once had occasion to cut out the ramus of the jaw alone, and I do not know that I ever encountered a more difficult proceeding. It was a case in which I had, about a year before, removed a firm cartilaginous tumour, extending from the lateral incisor on one side, to near the corresponding angle of the bone. I did not see any occasion for taking out the ramus at the time. The bone, where it was cut, was quite sound, but the *semina morbi*, it is to be presumed, existed in that portion of the ramus which was left. There was no appreciable change of structure, but some few months afterwards the patient applied for a swelling of the ramus. This went on increasing; it caused a great deal of pain; and I was under the necessity of removing the part. There was nothing to lay hold of so as to enable one to manage the disarticulation; nothing had opposed the action of the temporal muscle, and the tumour consequently was firmly impacted under the zygomatic arch; and it was no easy task, I can assure you, to dislodge it.

I need not say anything respecting the removal of a sequestrum from the jaws. This operation must be managed according to the circumstances of the case. In some instances, you can at once, and without difficulty, take away the dead portion of bone; but, in others, there are several openings under the jaws, discharging matter; you find that there is a great deposit of new bone, and you are under the necessity of making an incision along the jaws, dividing the substitute bone to some extent, and then pulling the sequestrum out of the case in which it has been confined. You may thus be obliged to take away a large portion of the jaw; but generally your object may be effected by making an incision inside the mouth, seizing hold of the bone with good strong forceps, and withdrawing it: perhaps a number of teeth may be attached to it. Here is a bottle containing some dozens of sequestra, from the jaws, of various sizes, many of them from individuals who have been "saturated" with mercury.

AFFECTIONS OF THE EAR.

FOREIGN BODIES IN THE EAR.

With regard to the ear, I have already spoken of foreign bodies in the meatus, and I stated that they were to be removed in much the same way that you would extract foreign bodies from the nostril. You must not attempt their removal by forceps, but put a fine bent probe, or a scoop, behind them, and, with a slight motion of the wrist, you turn them out of their place. Before you make the attempt, you be very sure that there is a foreign body in the ear. This you can ascertain by using a speculum, which enables you to see perfectly into the bottom of the external meatus. The patient must be placed in a proper light, or the part may be illuminated by a good lamp. The rays of light may be brought to a point, and thrown into the bottom of the tube, as ingeniously devised by my friend, Dr. Warden, through the medium of a small prism, adapted to the speculum.

INFLAMMATION OF THE EAR.

You meet with cases of inflammation of the meatus from various causes—cold, &c. These inflammatory affections often end in abscess; you endeavour to prevent it by the application of leeches to the part; but when matter is formed, its escape is to be favoured, and for that purpose fomentations should be applied. You may meet with cases where the abscess is apparent, and then you can puncture it. These abscesses are always attended with very great suffering; the parts are highly sensible when in a state of health, but still more so when diseased; the abscesses, however, generally burst spontaneously in the course of a very short time, and then the patient is relieved.

DEAFNESS.

Deafness, of course, will arise from the presence of foreign bodies, or from the swelling of the meatus or parts around it. It frequently takes place in consequence of the accumulation of cerumen, and, indeed, this is the most common cause of deafness, and nearly the only one that you can with any certainty count upon removing. Old people are often relieved from deafness of long standing, by having foreign matters washed out from the external meatus. There has been a discussion as to what is the best solu-

tion to employ for dissolving the accumulated secretion. You will, in one of the volumes of the "Edinburgh Medical Essays," find a very good paper on the subject, in which are detailed trials with various alkaline and other solutions, and the conclusion arrived at is, that tepid water will answer as well as anything else. You use for the purpose a tolerably large and well-valved syringe, with a properly-fashioned nozzle; now and then you use a scoop, and pull out portions that would not otherwise come away. You often find large plugs of cerumen, mixed with cotton and wool, which patients have put into their ears to prevent cold air getting in, as they say. It is also said, that deafness arises from there being too little wax, from the ear being dry, and in these cases all sorts of stimulating oils have been dropped into the ear, with, I believe, but little advantage. Then you find deafness arising from obtuseness or paralysis of the nerve, and that is thought sometimes to be remediable. You may endeavour to rouse the sensibility of the parts by blistering over the mastoid process, and sprinkling the raw surface with strychnine in minute quantities.

Deafness also occurs, to a greater or less extent, (and this is irremediable,) where suppuration has taken place in the internal ear, and where the bones of the tympanum have been destroyed. You cannot restore these parts, and you cannot expect the functions to be restored, for there is great change of the structure of the organ. Patients often continue to have a discharge from the ear for a long period; there has been an attack of inflammation and suppuration during some inflammatory affection or fever of childhood, as scarlatina; it goes on for a long time, and parents desire to have it dried up; but beyond having the part kept clean, I advise you not to interfere. If you employ a strong injection, you may give rise to disease in deeper seated parts, and endanger life.

There are discharges from the external ear now and then, connected with abscess situated deep in the temporal bone. I have seen two or three cases where the matter which had formed within the cranium was discharged by the ear. There may be abscess of the brain, or abscess between the dura mater and the anterior aspect of the temporal bone; and this certainly cannot be remedied by any external application. I have seen the discharge checked by long exposure to cold and wet, fever has ensued, and the patient has speedily perished.

The functions of the ear are sometimes interrupted in consequence of affections of the throat. Common people know that when the "almonds of the ears," as they say, come down, they are deaf. If the tonsils remain enlarged and swollen, the hearing is obtuse. The same thing occurs from polypi and other tumours of the throat. In cases in which I have removed them, the patient had been deaf for years. I have mentioned in one of my books the case of an old gentleman who had been deaf for very many years; he went regu-

larly to church, for form and example's sake, it would appear; for after a great many polypous tumours had been extracted, he declared that he never, till then, heard one word of the service. The tonsils have been removed now and then with great advantage in cases of deafness, but though relief has been thus afforded, I would not by any means advise you to resort to it in all cases. You are not warranted in cutting away the tonsils or uvula under the assumption that they are the cause of the deafness, more especially when there is but little, if any, abnormal change in them.

After all, there is not a great deal to be done for the cure of deafness. There are many cases easily remedied, but a great many others are quite irremediable. The deafness which ensues in consequence of the deficiency or destruction of parts cannot be remedied; in many cases where the nerve is affected, no relief can be afforded; but where it arises in consequence of obstruction of the Eustachian tube, or the presence of tumours, the surgeon may sometimes afford considerable relief. It has been said that deafness arises from the Eustachian tube being closed up by mucus, and in order to remove it, all sorts of quacks have been in the habit of injecting air and fluids into this passage; but the only effect of this process, so far as I can see, would be, to drive the vitiated secretions further into the passages, and impact them there.

[It appears to me that Mr. Liston is a little too severe in reference to these operations upon the Eustachian tube. Krahmer, Deleau, Itard, Pilcher, and many others could be mentioned, equally trustworthy, who are certainly very far removed from "quacks," and they all declare their confidence in the measure. I myself have repeatedly derived benefit from the operation, and perform it frequently with the most gratifying results. Like everything else it has been most shamefully abused, but it certainly deserves the attention of the profession.

An interesting fact has recently been observed by Mr. G. Gilliams, one of the most intelligent dentists of our city, in reference to the influence the introduction of a complete set of teeth exerts in certain cases of deafness in *old people*, in whom the angles of the inferior maxillary bone have undergone the alteration usually produced by great age.

Probably in such persons the orifices of the Eustachian tubes are compressed by the condyles of the jaw being advanced beyond their normal position, and as the introduction of teeth opens the mouth and carries the condyle backwards, the compression may thus be removed. Whatever explanation we give, the fact, according to Mr. Gilliams, is certain. T. D. M.]

In some cases of permanent obstruction of the Eustachian tube, in cases of thickening and induration of the membrane of the tympanum, and in collections of blood in the cavity, the drum of the ear has been perforated. This is an operation not attended with difficulty. The only trouble is in keeping the opening from closing

again. The operation may require repetition unless it is performed in such a way that a portion of the membrane is wholly removed. This may be accomplished by means of a sort of punch dextrously applied. The instrument must be so guided as to avoid the attachment of the handle of the malleus. I have, in a few instances, seen patients thus slightly benefited, but great success cannot be anticipated from the proceeding.

DISEASES OF THE NECK.

ABSCESS.

The side of the face and neck is very often the seat of disease requiring surgical proceedings.

You meet with inflammation by the side of the neck, which is very often followed by abscess. I do not mean the common, trifling swelling of the glands in delicate children, followed by abscess, and often ending in destruction of the skin, though even there some little attention is required, on the part of the surgeon, to prevent puckering and deformity. It is a sad thing, more especially for a young woman, to have her neck scarred all over in consequence of the giving way of abscesses. These "cruels" (*ecrouelles*), as they are called in the north, these swellings of the glands, very often depend on local irritation; and by removing this, paying some attention to the general health, and using local applications, they can be got rid of, and prevented from suppurating. These glandular swellings very often arise from an eruption behind the ear, from chapped lips, from cracks about the nose, from irritation in the mouth, all again dependent on disorder of the digestive organs, and on removing them, the swellings will frequently subside. You very often see in young persons a considerable swelling of the glands, dependent on the decay of the first set of teeth. In many of the cases here alluded to, the digestive organs are to be freed from any source of irritation—worms, or sordes, and the treatment is often very advantageously commenced by the exhibition of a few largish doses of the balsam of copaiba.

If afterwards there be any chaps or ulcerations about the face, you will endeavour to improve the health by sarsaparilla, and some preparation of iodine. You are often enabled to cause the dispersion of the glandular swellings by local applications, by rubbing them over with iodine, or painting the surface over with a strong solution of iodine in alcohol. You put that on from time to time, and exceedingly beneficial effects arise from it. You may have seen at the hospital, lately, many cases of large swellings of the neck that have been dispersed in this way. If an abscess should

form, you must watch it, and let the matter out before the skin threatens to ulcerate. You foment the part, wait to see if it disperses; but if there is any danger of the skin giving way, the surgeon should make an opening. The matter will escape spontaneously, but then the integument will be destroyed, and there will be a puckered or depressed scar. You may avoid this by making a small opening in the proper direction. There is an exception here to the general rule of making the incision in the direction of the fibres; you cut them across. There are wrinkles in the neck, not such as occur in old people's faces, but little wrinkles, white transverse lines, and it is in these that you make the puncture, in the direction of the fold, and of sufficient size to allow the matter to escape.

But you find in the neck much more serious abscesses—abscesses formed in deeper-seated glands, or in the cellular tissue. These sometimes give rise to very unpleasant consequences; they form under the cutaneous muscle, and the fascia, and do not come to the surface for some time. The abscess may be of a chronic nature; it extends under the strong sheaths, and passes away down by the side of the windpipe to the top of the chest. These abscesses must be looked to very carefully, for if they are not, the matter may burrow and open some of the canals, into the œsophagus, for instance. I have seen cases in which, through the openings of abscess in the neck, tea taken by the mouth, and even portions of food have come out. This is rather an awkward circumstance, for notwithstanding all the means you adopt, you cannot easily get the fistulous opening connected with the œsophagus to heal up. If you trust solely to nature for a cure, in some of these very deep-seated collections, the matter may get into the windpipe, or into the anterior mediastinum, and on the patient inspiring and expiring, the air rushes in and out through the sinuses. That is to be avoided by early attention to the case. Various blood-vessels may be involved, the veins may be opened, and you will find in some books, and even in the "*Medico-Chirurgical Transactions*," cases related, where, from pressure of an abscess, the large veins of the neck, even the internal jugular, have been perforated, and a great quantity of blood has been lost. A case of this kind has been furnished by Mr. Bloxam, and a very interesting one by Mr. Crowfoot, of Beccles, where the pulmonary artery was thus opened. There are various cases on record where an abscess of the throat has made its way into the internal maxillary, and others, where the lingual artery has been opened. There are cases related where the large branches of the carotid, the internal carotid, have thus been affected. There is a case given by Breschet, and one published by myself, in which ulceration took place through the parietes of the arterial trunk. There was a large swelling bulging behind the ear, which had been coming on gradually, but in the course of a few days it increased very rapidly.

There was some pulsation in the vessel, and also in the course of the tumour. The swelling was opened behind the sterno-mastoid muscle, and a quantity of blood escaped. The patient unfortunately died, not from hemorrhage arising from the puncture which had been made, but in consequence of ulceration of the carotid, where it was secured near its origin; and this would have happened though no puncture had been made. A very minute dissection of the parts was made by Mr. Matthew, my late house-surgeon, and Mr. Marshall, both excellent anatomists; and it was found that there had been, not a perforation of the internal coat from within and a separation from the external, but that the whole of the three coats were perforated, and it could be traced to this abscess. Bleeding to an alarming extent has even occurred from the cavities of abscesses which have been opened for a long period, where the opening has not been so contrived as to allow of the perfect evacuation of the contents, and where from time to time accumulations have taken place in the cavity.

These unpleasant consequences—perforation of the larynx, the œsophagus, the veins, and the arteries, would lead one to look with anxiety upon deep-seated abscesses of the neck, and induce us to open them at a sufficiently early period to prevent these bad consequences.

TUMOURS OF THE NECK.

In the neck you meet with tumours of all varieties, some benign, some malignant; but even the former require attention on the part of the surgeon. You must recollect that there are important parts situated in the neck,—blood-vessels, and the nerves accompanying them,—the division of which may ultimately be attended with serious consequences, though they may not be shown at the time. You may remove enlargements of original tissue by deobstruents and attention to health; but new formations, morbid growths, heterologous formations, as they have been called, cannot be made thus to disappear. After a tumour, properly so called, has been formed, it will go on increasing in spite of all the applications you can make, and even harm is done by attempting to disperse tumours of this kind. Fatty tumours may be made to form such connections, that it is with the utmost difficulty they can be removed. I think I have mentioned the case of a fatty tumour which I examined on the back of the neck of an old gentleman many years ago. It was loosely connected, was on the increase, and I advised its removal without much delay. He declined submitting to the operation, and I lost sight of him for some time. On meeting him one day, four or five months afterwards, in the street, he expressed his anxiety to be freed of his annoyance at once. He stated that he could not have it

done at home, that his family would get alarmed, and would, probably, not allow it, but that he would walk home with me. It was a tumour about the size of one's hand, and I should not, from what I had seen of it before, have had the least hesitation in removing it alone, but I met, fortunately, a medical friend, and he accompanied us. When he had undressed himself sufficiently, and sat down, I observed that the features of the tumour were entirely changed, and that there was a large and deep scar on its surface. On inquiring the cause, he said that he had applied to some one, who had used sulphuric acid, with a view of dispersing the swelling. It had, consequently, become firmly fixed, not only to the integuments, but to the parts below. He was determined to have it out at all hazards, and I cut down upon it; but the dissection was a difficult one. It was attached to the periosteum covering the occipital bone, and part of the occipital artery was removed with the tumour. He had an attack of erysipelas, and at one time his life was in danger. This would all have possibly been avoided if he had had the operation performed before this stupid practice had been adopted. It is well, when you see a tumour of this kind, to advise in a decided manner that no application should be made to it; the patient need not trouble himself, and run the risk of injuring his health by taking internal medicine, with the view of getting it dispersed; but when it attains an inconvenient size, and the patient wishes it, you may take it out easily. Very often there is no necessity for hurrying the proceeding.

The tumours of this region occur in different aspects and corners of it; you meet with them at the upper part of the neck, at the angle of the jaws. They sometimes arise from degeneration of the salivary gland, but that is not a common occurrence. I doubt if these glands are often diseased in this way, but new formations take place there, or the lymphatic glands are affected, and are bound down by the fascia, and the platysma-myoides. They are thus not allowed to bulge out. The tumour dips deeply down into the fossa, between the ramus of the jaw and the mastoid process, and displaces the salivary gland; it may even pass down by the lobe of the ear, and the pterygoid process. These tumours are sometimes firmly fixed, and they are met with of all sizes, projecting over the face, and occupying the lateral part of the neck. Sometimes they are very firmly fixed, but after all, they come out easily enough. Some of them are of stony hardness, and so fixed, that nobody would attempt to take them out. There are, however, a great many of them that may be removed, but this is to be done with some degree of caution. You have, first of all, to consider how the incisions are to be made, so that the appearance of the patient—improved by the removal of the growth—may be as little injured as possible by the scars and seams of your incisions. You will cut down upon the tumour; and it is always advisable to make your incisions so

that you can expose it thoroughly. You may be obliged to make a cross-cut away behind the lobe of the ear: this is always necessary when the tumour is of considerable size. Well, then you make a long, straight incision down the face, of greater or less length, according to the size of the tumour, and, as I have already said, you ought to make it of sufficient length to expose the disease thoroughly, so that you may not be hampered at all in the after dissection. Having made the cross-cut, also you dissect back the flaps; have them held aside, and then begin to dissect the tumour from below, taking hold of it and raising it up. Care must be taken, in these deep dissections, not to direct the point or edge of the knife away from the swelling; you, on the contrary, dissect always upon it. You must endeavour, if possible, to avoid the nerves, and the branches of the portio dura. Then you come to the deeper part—the tube of the ear, the pterygoid process, and there you must avoid the common trunk of the internal maxillary, and the still deeper internal carotid. You endeavour all in your power to avoid the nerves, but in some cases you find the tumour dip so deeply that you cannot help endangering them. If a portion of the tumour be left, however small, it will, as you know, be reproduced, and you have the choice between partially paralyzing the face and having the tumour grow again. It is, however, only in very desperate cases that these risks are run. You then secure the vessels, and lay down the flaps.

Fig. 126.



The following case occurred the other day in the hospital :—

M. K——, aged 28, admitted under Mr. Liston, May 31, 1844, married, and has generally enjoyed good health; dates the origin of the tumour eight years back; attributes it to a strain in endeavouring to lift a heavy weight, when she experienced a sudden and sharp pain close under the lobe of the left ear; pain and stiffness followed, and were relieved by embrocations. It recurred at intervals, till, some months after, it grew to the size of a walnut, in the same situation, being painful, and movable under the fingers. The case was treated by the late Mr. Tyrrell, of St. Thomas's Hospital; was leeches, and, at intervals, three times opened with the knife; poultices being applied, but little or no matter evacuated. The black wash and other unguents were topically used, and mercurials internally exhibited, to salivation, but without any relief to the patient.

From that day to the present time, the tumour has been allowed to increase in size gradually, and the patient's health appears to have suffered from it. The shape of the tumour is irregular and lobulated, about five inches long to three in depth. The anterior part seated under the lobe of the ear, which is pushed up and overlaps the tumour. Forwards, it extends an inch and a half beyond the posterior margin of the jaw, and backwards, about eight inches and a half. The integument is natural over a greater part of it, though posteriorly, it is rather reddish, and enlarged blood-vessels run over its surface. To the sensation of touch, anteriorly, it is firm, as if fibrous; posteriorly, and where it projects, elastic as if it contained fluid. It is movable over the subjacent textures, and the skin is loose, except posteriorly, and around the cicatrix in front, the remains of former incisions. It does not give the patient much pain, except it is injudiciously handled, but the pain remains for some time, when it has once set in. It causes a great deal of disfigurement, from its bulk and position on the face.

Mr. Liston considered it benign, taking all things into consideration, and, with the patient in good health, he deemed it advisable to remove the tumour. On the 5th June, an incision was made across the transverse diameter of the tumour from below upwards, extending from a little below the posterior border to about one inch above and anterior to the tragus of the ear; a second elliptical incision, extending from the middle of the first, and passing backwards beyond the posterior border of the tumour, so as to include the adherent and discoloured skin, was next made, and the flaps were dissected back, laying bare the tumour, which was grasped in the hand, lifted from its bed, and quickly removed by a few strokes of the scalpel. The hemorrhage from the divided vessels was restrained by the fingers of the assistant during the operation, and after the removal of the tumour, three vessels were secured by ligature. The wound was dressed with lint steeped in cold water,

and five hours after, the flaps were brought together with isinglass plaster, aided by two interrupted sutures, and an anodyne administered.

June 6th.—Patient slept well; some slight fever is present. Ordered saline effervescing draughts every six hours.

7th.—Patient passed a good night. The sutures and first isinglass dressings removed, and the wound to be dressed with the water dressing. The anterior incision seems to have united, by the first intention, in nearly the whole of its extent; not so the posterior, from which there is more discharge, the wound not having been so well brought together, on account of the greater portion of skin there removed with the tumour.

13th.—Patient doing exceedingly well; has discontinued the use of salines. The anterior incision united well.

21st.—Water dressing to be left off; the wound to be dressed with the red wash, and a compress and bandage applied. The anterior incision is now a healthy cicatrix, the posterior granulating in a healthy manner.

29th.—There is some tenderness, with a little swelling and redness just behind the anterior incision, as if matter were forming. The wound is still dressed with the red wash.

July 1st.—Matter has formed, and it was evacuated this morning, but to no considerable amount. Water dressing applied.

7th.—The opening made for the exit of the matter entirely healed; the granulating wound behind has now contracted. Patient's health is much improved. Permitted to leave the hospital, and to return and show herself in a week.

15th.—Patient looking well; posterior wound not yet quite healed; she dresses it with the red wash, as usual.

24th.—Wound now contracted: there is no apparent disfiguration. Patient discontinued treatment, being now restored.

[The removal of tumours occupying the parotid space, or of the parotid gland itself, has given rise to much controversy, both abroad and at home. During my recent visit to Europe, being anxious to ascertain the estimate placed upon the measure by the best authorities there, I made the subject one of diligent inquiry. I discovered that much difference of opinion existed as to the *utility* of the operation, but I found *none who doubted the possibility of its execution*. Indeed, the question seemed to bear almost exclusively upon the first proposition, and while all acknowledge that it is sometimes productive of benefit, yet in the main it appeared to me that the best authorities are rather disposed to abandon its general introduction into practice, but *solely on the grounds that in scirrhus disease, that which most frequently calls for the performance of an operation, the patient is not radically cured, the complaint returning sooner or later, and ultimately is the cause of death*.

It may not be uninteresting to append a list of those who have

reported cases of extirpation of the parotid gland. It is more than probable, however, that some of the cases thus reported were in reality not *parotid*, but *lymphatic* or *encysted* tumours, occupying the parotid fossa.—Acril, Alix, Ansiaux, Beclard, Berndt, Bouyer, Braambergh, Burgard, Carmichael, Chelius, Cordes, Degland, Eulinberg, Fonthein, Gensoul, Goodlad, Goyraud, Hecher, Hesel, Hosack, Kaltschmèid, Kirbi, Kleim, Lacoste, Lisfranc, Mott, McClellan, Magrié, Moulini, Nægele, Pamard, Palfin, Prieger, Raymond, Ramdolf, Randolph, Roux, Siebold, Soucrampes, N. R. Smith, Sedtmann, Warren, J. M. Warren, Weindhold and Smith, and Widmer. T. D. M.]

You meet with tumours low down, lying under the platysma-myoides, or the sterno-mastoideus muscles, and it requires no small amount of anatomical knowledge, and no small dexterity to remove them. They are met with of all sorts; but it is only with the more simple, as tumours of slow growth, and tolerably movable, such as fibrous tumours, that you would interfere. I have taken out a great many tumours under the jaws, in the situation of the submaxillary gland. Here is a representation of a very large one. During the same season, I took out another tumour from the same place, of a similar character. This tumour is deep-seated, but still it is unconnected with the bones; it is always covered with the facial vein. You may be obliged to cut it through and compress this vessel or even secure it by a ligature, but you may sometimes avoid it. Having overcome this difficulty, you are frequently able to turn the tumour out of its place with very little annoyance, and with but little hemorrhage.

I have had to deal with some cystic tumours in this situation—congenital tumours, which dip among the muscles and vessels, and I have had to perform some difficult dissections for their removal. I took out a tumour of this kind two years ago from a child; there was a great deal of bleeding: luckily, the tumour was got entirely out, but there was a long syncope, from which the child recovered with difficulty.

You meet now and then with encysted tumours at the side of the neck, lying superficially; they are common atheromatous tumours, and are easily got rid of; but here you require to cut down upon the cyst, and dissect it clean out.

Occasionally we see watery tumours of the neck, what have been called hydroceles of the neck; they sometimes lie in the middle of the region, and may depend on an enlargement of the bursa, between the thyroid cartilage and the os hyoides. Acute inflammation of this bursa occasionally takes place. An old fellow pupil, Mr. Mackenzie, the demonstrator of anatomy in the Edinburgh University, used to suffer from this affection, and very troublesome it was to him now and then. It was he who pointed out to me this synovial pouch. These tumours sometimes increase slowly, and

bulge out on the lower part of the neck. There is a very good specimen of this disease in the museum of the College of Surgeons; there is a large sac attached to the hyoid bone.

Adventitious formations are sometimes met with on the side of the neck; large swellings, causing no pain, but from their size giving rise to deformity. These tumours fluctuate distinctly, and you may ascertain their contents by inserting a small trocar. You will, perhaps, draw off from six to ten ounces of a serous or of a more limpid and colourless fluid. The patient may be relieved for a time by this practice; but if he wishes for a permanent cure, you may be under the necessity of passing a seton through the cyst; for that purpose you employ Pott's needle for hydrocele—a long canula with a stilette. You introduce it in the most dependent part of the tumour, withdraw the stilette, and allow the fluid to escape. You then pass in the canula to the upper part of the cavity, carry the stilette onwards, perforate the skin, and draw through a small skein of silk. This may remain till suppuration has taken place inside. You provide for the free escape of the matter by the enlargement of the lower aperture, and gradually withdraw the seton as the cavity contracts.

Sometimes malignant tumours take place in the neck, tumours of the glands, arising from previous disease of the neighbouring parts or not. These tumours increase gradually and very rapidly, and involve all the neighbouring tissues; at last they perhaps break and throw out a fungus, furnish a fetid discharge, and often bleed profusely; but they frequently prove fatal long before the skin gives way. They interrupt breathing and swallowing; are productive of

Fig. 127.



great pain and suffering, and the patient dies very miserably. Here is a sketch of one of very rapid growth, not preceded by any malignant disease of the lips, tongue, or parts in the mouth.

Tumours occur, though rarely, in the back of the neck. Here is a sketch of a very formidable one; yet a surgeon, at one time connected with a metropolitan hospital, proposed to cut it out. The young woman, a very interesting lady-like person, came to show me the swelling, which was then of a large size; she had,

Fig. 128.



when living on the other side of the water, been under the care of Mr. Callaway, who had punctured it with a small trocar, and drawn off a quantity of fluid. It was plainly of a malignant character, and in this Mr. Callaway and I had fully agreed. She came to me repeatedly, during a series of months, the tumour gaining ground with great rapidity. I think I also drew off some fluid from one part of it, with slight relief. She had everything done to palliate her sufferings. She came at last to me to ask my concurrence in the proposed removal of the disease by operation. To this I gave a most decided negative, and used all the arguments I could to dissuade her from submitting to so monstrous a proposal. I afterwards admitted the poor girl into the hospital for a short time, and there are several wax casts in the collection, of the disease in different stages, and of the appearances presented on dissection. I show you here the disease in the condition it was when the operation was proposed. She suf-

ferred much in the hospital, the tumour increased rapidly in size, the skin at last gave way, a large fungus was thrown out, and in some months she perished. In the earlier stage of disease, as here represented, the whole of the back of the neck was occupied, and there was every reason to believe that all the muscles, the cervical vertebræ, and the occipital bone, were involved; yet it was proposed to remove the swelling!—to dissect it out!—Had the poor girl died at this time, I am convinced that the morbid structure of the soft parts could not have been removed but by the long maceration of the bones of the head and neck. This case shows the sort of rage which some people now and then exhibit for performing what they would perhaps call surgical operations.

There is a tumour that occurs in the neck from enlargement of the thyroid body. It prevails very much in some districts of this country, and also in Switzerland. It is there frequently accompanied by dementia; the patients are idiotic, and the head is of curious formation; but, in some districts, these symptoms are absent, and the patients enjoy perfect health, both of body and of mind. It occurs principally in mountainous districts—in Cumberland and Derbyshire; but it also sometimes takes place in the plains in the country, and you will meet with this enlargement in individuals who have never been out of London. It attacks all ranks of life, and comes on gradually on one side of the neck, in the middle, or on both sides simultaneously. It enlarges outwardly, and is the source of great deformity, but at the same time, when the lobes only are affected, and they are enormously hypertrophied and enlarged, it seldom interferes with the functions of the parts. The patient can breathe with ease, and swallow perfectly well; sometimes, however, the tumour burrows deeply; it gets under the sterno-mastoideus muscle; the parts then become displaced; the larynx may be pushed on one side, and there is considerable interruption to the breathing. The tumour sometimes forms in the middle of the neck, and when it attains the size perhaps of a hen's egg, it often becomes exceedingly inconvenient; the patient will be unable to take violent exertion, to ascend an acclivity with comfort, and then you may be under the necessity of interfering actively.

These tumours are not all of the same character; some are simple enlargements of the thyroid body: others again are cellular, and some consist of several cysts, containing glairy fluid, while others contain a bloody fluid. You will now and then meet with cases of this kind—a tumour resembling the common bronchocele—and on examining it, you find that, instead of being a solid mass, it fluctuates. On introducing a trocar, the whole disappears; it vanishes immediately. This is by no means an uncommon occurrence. Here, from the books of the hospital, is a case in point.

"CYSTIC ENLARGEMENT OF THE THYROID BODY.

"S. B——, admitted under Mr. Liston, July 29th, 1844.—Stout, healthy, and of florid complexion, of a mixed sanguineous and lymphatic temperament. Has resided at Penrith, Cumberland, around the Ulleswater district, where bronchocele is not uncommon. Can trace no hereditary predisposition to the complaint, without it be on her mother's side, whose sister is affected with it. Never had any severe illness; but at the age of fourteen, perceived a small tumour exactly in the middle line of her neck, opposite the thyroid body, of part of which it was doubtless an enlargement. This lump was about the size of a hazelnut, and she described it as moving up and down when she swallowed.

"Iodine was given her, and the lump disappeared. When twenty years of age, this swelling re-appeared in the same situation as her first one, but it was softer and grew faster, soon getting as large as a goose's egg. She again had recourse to iodine, which she took internally, and applied over the tumour in the form of ointment.

"This only partially reduced the tumour, and the iodine was discontinued, as her health seemed to suffer from its continued exhibition. At this time the tumour was smaller, but denser, about the size of a hen's egg, and it remained stationary and of this character for some months. It again enlarged, and extended to both sides of the neck, becoming softer to the touch; but it gave no pain, though, as it increased in size, it became inconvenient, by interfering with respiration.

"When about the magnitude of a cocoa-nut, it was punctured by a surgeon in Birmingham, and half a pint of fluid resembling coffee grounds was drawn off, but the puncture being made at the left side, the swelling of that side only was reduced. The right side, however, in time gradually sank to the median line.

"Three years have elapsed, and the right half of the swelling has been gradually increasing—the left portion has now re-filled, and the present aspect of the tumour maintains large dimensions, being tense, and in a degree movable, fluctuation being felt.

"Mr. Liston, on his visit, passed his long narrow bistoury from below upwards, through the tumour, and having drawn off a considerable quantity of dark and extremely offensive matter with a canula, drew a seton through the tumour, which was now much reduced in size.

"The tumour has decreased in size, and much matter continues to drain off.

"The patient has now been in the hospital some weeks, continuing gradually to improve in appearance from the decrease of the tumour. She has, however, been troubled with rather a sharp attack of rheumatism, that has thrown her back. Suitable remedies

were administered. Patient convalescent, tumour nearly disappeared. The seton has been withdrawn.

"A few days since, the patient showed herself to Mr. Liston, having left the hospital some weeks ago; swelling entirely disappeared."

Sometimes one portion of the tumour fluctuates; you attack that portion; a great quantity of fluid is evacuated; the walls of the cyst come together, but the tumour is frequently reproduced. You can do no permanent good in cases of this kind by the palliative operation.

Now the solid tumours cannot be interfered with but with great care and precaution. All sorts of plans have been proposed, with a view of causing a diminution of the swelling. It was at one time thought that the tumour could be dispersed under the use of burnt sponge; and I have seen many cases in which great benefit occurred from its exhibition. Since the discovery of iodine, that medicine has been more trusted to, as it was believed that the virtues of the "spongia usta" of the old pharmacopœias depended upon the iodine supposed to exist in it. Sometimes the preparation of iodine has been given with advantage; but I believe the success of the former medicine was as great, if not greater, than the latter, and, indeed, some practitioners still prefer it. Iodine may be given in considerable doses, two, three, or four times a day, and may also be used locally; but sometimes the tumours resist its action. Surgical operations have been proposed, and some people have been so bold as

Fig. 129.



to cut down and tie the thyroid arteries, one after another ; but this is a hazardous proceeding. It has not been beneficial ; the tumours have not been diminished, as might have been expected. It was proposed, a good many years ago, by Dr. Quadri, of Naples, to pass a seton through the solid tumours, and the plan has been adopted a few times in this country. I tried it once, but I should be almost afraid to do it again, although the swelling was thereby diminished. I drew a thick cord through it, and every time it was moved there was a gush of blood ; it was only stopped by drawing in a thicker and a thicker seton. At last, free suppuration took place, and the swelling wasted away considerably ; but the proceeding was not unattended by danger. It has been proposed, again, to cut these tumours out, and some surgeons have ventured upon that, but the result has not been at all satisfactory. You could not cut the thyroid gland out of the living body in its sound condition without risking the death of the patient from hemorrhage ; and when the body has become hypertrophied to an immense extent, and all the veins and arteries are enormously enlarged, you can easily understand what dangers may arise from any attempt of the kind. Look at the foregoing sketch, and think of the dangers that must encompass you on all sides, and you will pause before undertaking such a task as the extirpation of the thyroid body. It is a proceeding by no means to be thought of. I think the operation was long ago performed by Mr. Gooch, of Norwich, and by others, but the patients have generally died under it—died on the table, some of them. I have heard of such cases even since I began to attend to the study of surgery. The tumour, however, can sometimes be taken away, partially or wholly, and with great relief to the patient. You are not to interfere rashly with tumours of the thyroid body ; but if there is great difficulty of breathing, and that is increasing, you may be warranted in taking away an enlarged portion of the gland, and you may do it with safety by exposing the tumour, dissecting off the integument, and then passing strong needles with ligatures and tying them. I have done this over and over again. I had recourse to this plan in the case of an old rat-catcher, who came to the Edinburgh Hospital, suffering dreadfully with a swelling in the middle of the neck—the isthmus of the gland ; it was as large as his fist. He had always difficulty of breathing, but rather less in expiration than in inspiration ; it was increasing, and he was daily and hourly threatened with suffocation. He was afraid to go to sleep at night, and when he did so, he started up, under great apprehension of being suffocated. Under the circumstances, I thought it well to make an attempt to relieve him. I knew what I had to encounter. I turned the integument back on each side freely ; the veins were large, but these were studiously avoided. The ligatures were passed close to the windpipe perpendicularly and across, and they were separated and tied under the swelling. There was still venous

bleeding to a considerable and alarming extent ; a long strip of lint was wrapped tightly round the root of the tumour, and it came away entirely after some six or eight days. I afterwards fell in with the man by chance, some hundred miles in the north, and he was in perfect health, breathing freely under all circumstances, and without the least appearance of any return of the tumour. I have had occasion to repeat this operation a few times with success, with much relief to the patients. It is only in this way that you can, with safety, attempt the removal of any portion of the thyroid body, and it should only be resorted to in very extreme cases.

I have stated, that in those cases of even very great enlargement of the lobes of the thyroid body, the breathing is almost quite unaffected ; but that if the tumour bulges much laterally, and gets under one of the sterno-mastoid muscles, that then the trachea becomes bent and displaced, and from this cause difficulty of breathing ensues. In such cases, I have more than once divided the sterno-mastoid muscle by subcutaneous incision, with temporary benefit, and without any risk of unpleasant consequences.

LECTURE XII.

OPENING OF THE EXTERNAL JUGULAR VEIN.—TRACHEOTOMY; CIRCUMSTANCES UNDER WHICH IT IS REQUIRED.—EXTRACTION OF FOREIGN BODIES FROM THE ŒSOPHAGUS AND PHARYNX.—WRY-NECK.

At the conclusion of the lecture yesterday, I spoke of bronchocele, and exhibited a drawing of one of these tumours, with great enlargement of the veins over the whole neck and chest, and also a dissection of the same tumour. The great distention of the superficial veins shows the vascular character of these swellings, and the danger of any operation not well considered and devised. You recollect that there are four arterial trunks, very large, in the natural state of the body, entering into it. These and their ramifications are of course immensely enlarged when the gland is in a state of hypertrophy : even the veins pour out a great and alarming quantity of blood very rapidly, though not with great force.

Now, it is desirable that you should be able to distinguish the swellings of the thyroid body from the other tumours that occur in the neck. An old gentleman presented himself at the hospital yesterday with a tumour on one side of the neck. To any surgeon over-fond of operating, it was very inviting ; the skin was loose over it, and it moved very easily ; but on examining it carefully, you could per-

TUMOURS OF THE FACE.

A great variety of tumours of the face are met with, and it is by no means uncommon to meet with erectile tumour here, and that in a situation where the treatment of the disease is most difficult. The tumour is sometimes extensive, and its removal may occasion deformity. It requires great care and nicety to manage these cases with propriety. I have before explained the nature of erectile tumours. The disease is admirably described by John Bell under the name of aneurism by anastomosis; but these tumours have not all thrill or pulsation, they are not all active, and are sometimes more allied to varix than to aneurism. The term *erectile* tumour is, perhaps, the best.

You can scarcely be puzzled in forming a diagnosis in these cases; their appearance is sufficient to convince you of their nature. Some of them are entirely subcutaneous; they, perhaps, occupy a portion of the cheek, and there they require a more attentive examination that you may not confound them with any other. The tumour is soft and doughy, and has somewhat the feeling of a fatty tumour. These last are exceedingly soft, so that you might suppose there was fluctuation, but they become more firm after removal. The diagnostic mark of erectile tumour is, your being able to diminish its size by pressure; that you cannot do if it be a solid tumour. By continuing to press the tumour on the subjacent bone it almost disappears, and then, by taking off the pressure and causing an excitement of the circulation, the tumour suddenly increases. When the skin is involved the appearance of the external parts will at once convince you of the nature of the disease. Now and then, however, mistakes as to the character of the affection are made. I took a tumour out of the thigh the other day which had puzzled many surgeons both in London and the country. The patient had been under treatment two years for erectile tumour. One surgeon punctured it, and was frightened by the blood spirting out against the wall. He then tied it up with plasters and bandages, and the limb was, in consequence, rapidly wasting away. On taking off the bandage it swelled up suddenly, and, on examining it, I was satisfied that it contained fluid, and, very likely, blood. It was determined to remove it. Not to place my opinion against those who had seen it before, I was prepared, if there had been great hemorrhage, to have tied the tumour, and was even provided with a tourniquet to put on in the event of there being excessive bleeding. I made my incisions, but there was no particular bleeding; I dissected the mass from the fascia of the thigh, and found one or two bags containing blood. There was nothing medullary about it, and there is every probability of the patient doing well.

Having ascertained that the tumour is of an erectile character,

and is so situated that there is a reasonable prospect of everything going on well,—that it does not penetrate among the bones, as it sometimes does; then you must consider the best way of removing it. Very slight cases may be got rid of by excision, but the tumour may extend half over the face, and you would not remove that by operative proceeding. You can, by applying nitric acid, fairly destroy such enlargements of the vascular tissue as affect the surface merely. It has been proposed to attack tumours of large size by more powerful caustics. Here is a cast in the museum of an erectile tumour of the face which had been attacked by the potassa fusa, but was ultimately removed by other means, after the patient, a mere child, had been subjected to great suffering and no small amount of risk from repeated and profuse hemorrhages.

Fig. 89.



It has been proposed to deal with these tumours by simpler means than cutting them out or tying them. Dr. Marshall Hall, who has contributed to the advancement of surgical science, has suggested that they may be got rid of by introducing a fine needle from time to time, moving it about, and breaking up the tissue. I very much doubt the efficacy of this method; I have seen it tried, but I can scarcely say that I have employed it. It has been proposed to destroy these tumours by seton, so as to cause inflammatory action, but this does not answer the purpose either, and this I have tried over and over again in tumours so circumstanced that removal by other means would necessarily have caused some deformity. It has been suggested that the injection of stimulating fluids might be followed by obliteration of the vascular network,—to inject a solution of corrosive sublimate, for instance; but you can easily under-

enjoyed good health. From the birth has had an enlargement in front of the throat, which had been noticed by his parents gradually enlarging for five years before he was subjected to any medical treatment.

"Being five years old, by the advice of his friends he was taken to Sir Astley Cooper, who punctured the cyst, and intended further proceedings for radical cure, which, however, were prevented by that eminent surgeon's decease very shortly afterwards.

"The patient then got into the hands of a practitioner, under whose treatment he was for three years; several setons were during this period passed through the tumour, and some fluid escaped, and it became for a time smaller, not to any purpose, however, for it soon collected.

"A second practitioner now being consulted, made an incision over the tumour, and turning aside the flaps, passed a seton through it; this reduced it for the time, but with as little ultimate success as the last.

"From that time to the present he has been a patient at an hospital, where several operations with cutting instruments and caustics have been performed. Latterly an attempt was made to cut out the cyst. Either before or during the operation, the contents were evacuated, but the mother was assured that it was entirely removed—in fact, that a radical cure would be the result.

"Notwithstanding this, four months have now elapsed, and the tumour is the same as ever; indeed, it has been observed to grow more rapidly, and cause more inconvenience to the motions of the throat.

"In the present state the tumour is about the size of a small hen's egg, the longest diameter lying transversely across the thyroid body, on which it is perfectly movable above, less so, however, below, where the tumour is scarred and irregular—the mementoes of the previous unsuccessful practice.

"With the motions of deglutition the tumour rises and falls. It is elastic under the fingers, and transparent; the skin covering it is rather redder than that surrounding, and in its lower part is less free than above, being a good deal scarred there. No pain or impediment to respiration on deglutition is experienced, and the health has not suffered from it, though the child is delicate.

"November 11th.—Mr. Liston, on the child being placed on the table and the neck stretched, the chin drawn backwards, proceeded to pinch up a fold of the integument across the tumour, and pass in the scalpel, cutting from within outwards. The flaps were then drawn aside, and the cyst carefully dissected out. More obstacles than usual presented themselves, on account of the former handling of the tumour. The bleeding, which was rather copious during the operation, ceased on the patient's head being raised. No vessels required ligature when the child was taken to bed, and the edges of

the wound in the course of the evening were dressed with the isinglass plaster, and brought together. Patient now doing well."

The dissection of cysts from this region is not so simple a matter as might at first be imagined. The motions of the chest, of the larynx, and of the jaw, embarrass an operator much; and besides, when the connections of the skin to the tumour, and of the cyst to the surrounding parts, have been rendered intimate and firm by inflammatory action—the result of repeated operations—it is no easy matter to dissect the cyst clean without injuring it. The certainty of removing the whole morbid secretory surface, however, will depend very much upon the cyst being taken out entire.

What is to be done with those malignant tumours that are met with in this situation? I should say, the less the better; but it will not always do to give the patient over at once, to refuse to prescribe, to tell him that it is impossible he can recover—that he is labouring under malignant disease for which there is no remedy. You must give a guarded prognosis, a cautious answer to inquiries about the case, or the probability is, that the patient will fly off, incontinently, to some practitioner less scrupulous than politic, who will encourage his hopes of a cure even up to the very termination of the disease. The consequence of speaking quite conscientiously to a patient may be, that he will fall into the hands of some one who will humbug him, hold out hopes to him, and, what is worse still, may possibly, by some foolish interference, hurry on the disease. He will perhaps promise a cure under the most desperate circumstances, and give medicines which may sometimes by chance have had a good effect in other cases, but certainly not in those of malignant disease. There is no doubt whatever that tumours of all kinds are now and then hurried on by the imprudent exhibition of deobstruent medicines and applications. Common scrofulous swellings of the neck, instead of going back under this treatment, often come forward with greater rapidity; and this will be more especially the case if they are puffed and heated, showing that there is some considerable degree of vascular action going on in them. You often find these tumours increase rapidly under the exhibition of the iodide of potassium, or the exhibition of iodine in the form of tincture; and the same happens in malignant diseases. No doubt numbers of patients have died many months sooner than they would otherwise have done, in consequence of the treatment pursued. It has often been my misfortune to see malignant tumours, many of which have been greatly aggravated by being treated actively.

There was a gentleman under my care some time since, from whom I removed a small warty excrescence on the cheek, at the side of the nose, by the application of nitric acid. It came away quite clean, and the cicatrix looked smooth and healthy, but he returned to me afterwards with a small glandular swelling in the neck. I forget whether it was on the same or on the opposite side. I advised

him to leave it alone; I treated it lightly, and did nothing for it. He was not content; but went, it appears, forthwith to another surgeon, who set to work to treat him actively with internal and external means. I saw him again, in a couple of months, in consultation, and then the disease had taken on all the characters of cancer; it was a firm, stony tumour, closely adherent, not at all movable: the treatment was gone on with, but there was no advantage resulting from it. I did not see him again till some months afterwards, when I was called in, in consequence of the patient bleeding from a tremendous cancerous cavern in the neck. The hemorrhage was stopped by stuffing the cavity with lint; but he died in a day or two, from the loss of blood and constitutional disturbance. If the small lump had been left alone, and palliative means only had been used, in all probability the patient would have lived much longer. Perhaps I was wrong in not prescribing conium, or something else, to amuse him, instead of telling him not to interfere with it. Sometimes practitioners are not content, in these cases, with local applications, and giving what are called deobstruents, but they puncture swellings of this kind with needles, and even push trocars into them; they are not, perhaps, satisfied with drawing off only a small quantity of bloody fluid once, but repeat this proceeding from time to time. This I have known to be done in many cases, which must have been ascertained to be quite hopeless, when the proceeding could neither give any new light to the practitioner nor relief to the patient. This is all very wrong.

There are other operations to be performed in this neighbourhood.

OPENING THE EXTERNAL JUGULAR.

In the first place it is sometimes necessary to open the external jugular vein. This is not an operation very often practised now-a-days, but it is occasionally had recourse to in children where it is difficult to get blood from any other vein. The veins at the bend of the arm in very young children are not easily seen; the arm is often very much loaded with fat; you cannot make a puncture with any certainty of drawing blood, but you can always make the jugular vein swell up, and get blood from it. You do not require to be provided with a ring tourniquet, a "*jugum colli*," as it was called, such as the old surgeons used to apply, to make the vein rise. You have the child held securely; you put your finger above the clavicle, at the place where the vein is dipping down to enter the subclavian, and thus you make it swell; then with a common lancet, you make an opening in the same way as at the bend of the arm. You introduce the little instrument into the vein, through the skin and the platysma, carrying its blade forwards, and making an opening of

sufficient size to allow the blood to escape. You can, by pressure on the lower part of the vein, keep it full till you have taken away a sufficient quantity of blood. On removing the pressure, and applying a compress, the flow of blood generally stops easily enough, but where there is occasion for it, you may, as a last resort, introduce a small pin, as the veterinary surgeons do.

LARYNGOTOMY.

The larynx requires to be opened for the extraction of foreign bodies, as I stated, in treating fully of the injuries and diseases of this canal, a few days ago. As soon as you are convinced that a foreign body is lodged in the windpipe, there should be no delay in removing it, whether it is fixed or loose. You cannot tell how soon fatal symptoms may occur, and the patient be destroyed; but at whatever period you are called in, it is your duty to open the larynx. Generally, loose bodies, on the opening being made, will tumble out of themselves, as seen in the following case:—

“*Tracheotomy for foreign body in the trachea.*—W. D—, aged five years, brought to the hospital about eleven A. M., Nov. 2, with a foreign body in the trachea. About half an hour ago, whilst laughing, a small glass seal he had in his mouth suddenly slipped into his throat, and threatened immediate suffocation. His mother instantly pushed her finger into his throat, and felt the glass bead; it advanced before her finger, and the violent struggles for breath were succeeded by very quick breathing, and a rapid spasmodic cough that has lasted till now. The face is swollen and livid, the lips purple, the eyes suffused, the countenance expressive of extreme distress and anxiety, the coughing almost continuous, in short, rapid expirations. Now and then he appears exhausted for a moment, and takes three or four inspirations comparatively quietly, but directly he takes rather a fuller inspiration, the cough returns with renewed violence. Nothing is seen or felt in the fauces, but on applying the stethoscope over the trachea, the noise of a moving body may be distinctly heard rattling up and striking apparently against the glottis at each forced expiration, &c.

“Mr. Liston, on arriving, proceeded to perform tracheotomy. The patient, first securely fastened in a large sheet wrapped several times round the body and arms, and closely pinned, was held by an assistant horizontally, with his face upwards, and his head between the operator's knees. In making the preliminary incisions, blood gushed freely out from the veins, which were greatly distended by the efforts of the child, together with the distressing difficulty of breathing. None of these were attempted to be tied. Mr. Liston waited a few seconds, till the first rush of blood had

somewhat abated, and then proceeded at once to open the wind-pipe. The trachea, which was never still for a moment, rising and falling rapidly with the hurried movement of respiration, was seized by means of a small dissecting hook, in a fixed handle, and drawn forwards towards the mouth of the wound. The scalpel was entered at the external extremity of the incision, its point directed upwards, and its back towards the vertebral column; the hand kept low, and with a light hold of the instrument, so as to avoid injuring the œsophagus, &c., by any sudden movement of the patient. Two or three of the cartilaginous rings were divided, and the assistant immediately directed to turn the child over, with his face downwards. For an instant, the little patient seemed on the point of suffocation, as the first inspiration drew in a certain quantity of the blood, which could not be prevented from flowing; but the next moment, by the change in position, the blood trickled on the floor, a deeper inspiration was taken, the foreign body was expelled with force, and, as if by magic, the breathing became quiet, and the venous hemorrhage ceased spontaneously. Warm water dressing was applied over the wound, the child was put to bed, and almost immediately fell into a sound sleep, breathing almost entirely through the mouth and nose.

"The glass seal was about the size of the little finger-nail.

"In the evening, being a little feverish, and complaining of a little pain and uneasiness in the throat, near the sternum, he was ordered to take two grains of calomel every two hours, and six leeches were applied over the trachea.

"The next day, (Nov. 3d,) the leeches were repeated, and the breath having become fœtid, the calomel was changed for antim. tart. gr. $\frac{1}{8}$ with pulv. ipecac. gr. $\frac{1}{4}$ every two hours. In the evening, the breathing having become much more hurried, and the feverish symptoms decidedly worse, (pulse 180,) he was bled to $\text{ʒ}ix$. Continue antim. tart. After the bleeding, the child vomited, and appeared rather faint for some time.

"Nov. 4th.—He remained decidedly better, and more comfortable.

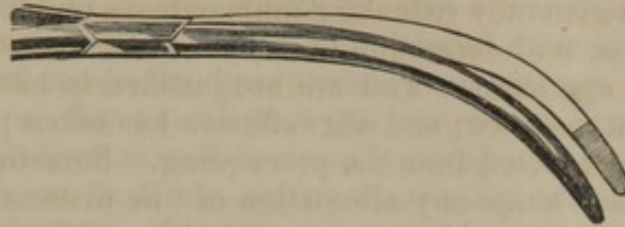
"Nov. 5th.—The symptoms having again become rather more active, he was cupped at the back of the chest to $\text{ʒ}iv.$, and a small blister applied over the sternum. The wound is granulating healthily; no attempt is made to bring it together; it is dressed with water dressing.

"After this nothing untoward happened. The patient soon began to regain his strength, and was discharged, cured, December 5th."

But sometimes foreign substances have not come away for a day or two after the operation; this you will find to have happened in some of the recorded cases. You keep the opening pervious, perhaps you retain a tube in the wound till the foreign body is got

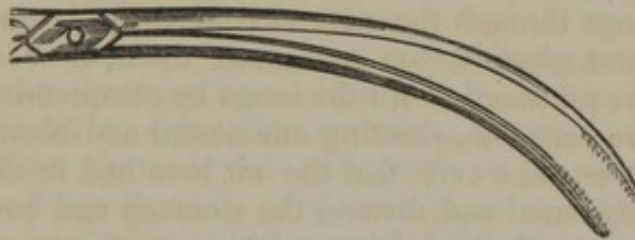
away. It may be found above the wound, and you may disentangle and extract it by introducing a bent probe. It is usually below,

Fig. 130.



and you must then endeavour to discover its situation: if it be a metallic body, you employ a steel probe to search for it. You must also be furnished with forceps of various forms and lengths, in order to lay hold of it. Certainly, if you have some dexterity, or any luck, the foreign body will be got out without any unpleasant symptom.

Fig. 131.



You may be called on to open the windpipe, on account of acute disease. Sometimes, in cases of scalded glottis, the symptoms become alarming, and you are under the necessity of performing this operation. It is occasionally necessary, in consequence of wounds of the neck, where extravasation takes place in the tissue, giving rise to suffocation. In some cases of transverse wounds, swelling takes place below it; or, in consequence of the edges not coming together well, interfering with the passages of the air, you may be obliged to make a wound lower down, but in a different direction from the one originally inflicted. You will also be imperatively called upon to perform this operation in cases of œdema of the glottis. In cases such as those I have enumerated, you are not to look on from hour to hour and day to day, seeing the symptoms gradually getting worse and worse, and allowing the patient to run the danger of sudden suffocation every moment, but you must interfere immediately; you must not wait till he is in articulo mortis, but operate while the lungs and head are still unaffected. In some instances of ulceration of the larynx, you open it, with the view of enabling the patient to breathe more freely, to get rid of the vitiated secretions more readily, and to afford time for the ulcers to heal. The latter indication may be promoted by carrying a bit of lint,

dipped in a solution of nitrate of silver, on a bent probe, from the wound upwards, so as to come in contact with the diseased surface.

In acute laryngitis, if the disease is confined to the larynx, you may be obliged to open the windpipe. In croup of young subjects, where there is generally extensive inflammation of the trachea and its ramifications, with formation of false membrane, no benefit will arise from the operation. You are not justified in having recourse to it in the first instance; and after effusion has taken place there is no good to be expected from the proceeding. Sometimes the little patient has some temporary alleviation of the distressing difficulty of breathing after coughing up some shreds, portions of tubes of false membranes. This could not take place were an opening made in the windpipe, and thus the fatal termination might be accelerated by this proceeding.

You must consider whether you will cut into the larynx or into the trachea; under some circumstances, opening the crico-thyroid membrane may answer the purpose. It has been proposed to open the larynx in cases of suspended animation from drowning, exposure to noxious gases, and so on; but this is not required. You can expand the lungs through the natural passages; by putting a tube through the rima glottidis you can inflate them, if it is necessary. It has been also proposed to fill the lungs by compressing the windpipe against the vertebræ, shutting one nostril and blowing into the other. You must take care that the air breathed in does not pass down the wrong canal and distend the stomach and bowels. This is a part of surgery of which I know little or nothing. I never had occasion to attempt to resuscitate an individual that was supposed to be drowned, or hanged, or exposed to noxious vapours. Such cases might occur, and it is right that you should be prepared to interfere with them, but it is not by tracheotomy that any good is to be done, so far as I understand.

In cases where there is obstruction at the rima glottidis, as where swelling has followed a scald of the glottis, the high operation might answer, and in cases where a foreign body, not of large size, is lodged in the ventricle of the larynx, an opening in the crico-thyroid membrane might suffice, and it is much simpler than tracheotomy. It can be done at once with any pointed instrument that comes readiest to hand, as a penknife, and without any great incision. You feel for the space between the cricoid and thyroid cartilages, and there make a longitudinal incision, right into the tube. This might be resorted to where a person is suffering from the lodgment of a foreign body in the œsophagus, and in such cases it has been done successfully too. A patient may labour under serious and alarming obstruction of breathing in consequence of some large body pressing on the back of the trachea, and you may have nothing at hand to displace or extract it, but you save the patient in the meantime by performing laryngotomy, and allowing him to breathe,

until you can examine what the foreign body is, and take proper means for its removal. In the majority of cases the operation of tracheotomy is to be preferred, as for the extraction of loose foreign bodies, or of those lodged in the lower part of the canal. In all diseases of the larynx and glottis you will also act more wisely in opening the windpipe. You thus get a large opening, and in cases of disease you make the opening far removed from the affection, and in a part of the canal which you are certain is quite pervious and clear: you thus ensure the free breathing of the patient.

This operation, as I said before, is one not attended with great difficulty or danger. The wound can be made down upon the windpipe without involving any vessel of importance. There are sometimes arterial branches running across the windpipe; but this is very rare. The thyroid arteries are sometimes wanting on one side, and their place is supplied by branches going from the opposite side. This is an uncommon occurrence: on looking over all the anatomical collections in the kingdom you will not find many preparations showing this variety. There is no muscular substance to divide; but there are a few veins, lying over the windpipe and the thyroid body, to be avoided. The wound heals immediately; everything is in favour of it; and it is therefore very different from a wound across the windpipe. The action of the sterno-mastoid muscles will tend to bring the superficial parts of the wound together; and the sterno-hyoids will produce the same effect with regard to the deeper parts. If you make an opening to extract a foreign body, and succeed, the wound will heal as fast as you wish it to do; you must in fact try to keep it open for some time; you must not dream of sewing it up, because blood, even in a small quantity, might insinuate itself into the windpipe, or become infiltrated in the cellular tissue, or collect in the cavity of the wound, and cause injurious or fatal pressure: you put a bit of lint betwixt its edges, and cover the surface of the wound with a pledget dipped in cold water, which is to be frequently renewed. After the incision has been made six or eight hours, you may then bring it together, or apply some strips of plaster: it will generally heal with great rapidity. You find, in cases where a foreign body has been lodged in the wound for many days or for many weeks, or even months, that upon its withdrawal the parts contract so much that, in twenty-four hours, if it were necessary to introduce an instrument again, you will find it very difficult to accomplish.

There is no difficulty in getting down to the windpipe in the adult patient, if he is at all steady, and willing, as most patients who have suffered from difficult breathing are, to submit to the operation. You place the patient on a chair, (this is better than the recumbent position,) turn his head back, and have an assistant to support it. You make an incision from the top of the sternum upwards towards the cricoid cartilage, fully an inch in length,

through the skin and the subjacent tissue. You expose, at once, the sterno-hyoid muscles, and cut between them, push the veins out of their place downwards, clear the windpipe upwards, by pushing the isthmus of the thyroid body out of the way, if it is there, and then you are quite prepared to cut into the passage. You desire the patient to swallow his saliva, and taking advantage of the windpipe being pulled upwards, you push the knife into it at once, with the back towards the top of the sternum, and by a little sawing motion, divide three or four of the rings. There is generally no difficulty in doing this, and no bleeding; but if any vessel be wounded, you may tie it, or wait a little before you open the windpipe. If you operate for the extraction of a foreign body, the probability is that it will slip out of itself, at once; by the relief to the respiration, and the cessation of struggling and exertion on the part of the patient, the bleeding, principally venous, will cease immediately. If there is any arterial bleeding, you take care to arrest it; you then dress the wound, and allow it to come together in due time. If you operate for an obstruction at the top of the windpipe, you must keep the opening in the tube pervious; and for this purpose you introduce a properly-formed canula. Veterinary surgeons do not hesitate to cut a large square hole in the trachea, and some surgeons practising on the human body have proposed to cut out an oval piece of the rings and their connecting membrane; but that is, at the least, quite unnecessary, and, indeed, it may be hurtful, by leading to an after contraction of the windpipe. It has been recommended to keep the wound open by a spring, like the dissecting forceps; but this instrument cannot be well or long retained. There is no sound objection whatever to the introduction of a proper canula. I have had as much experience as most people in these cases, for I must have performed the operation at least twenty times, and I have used this tube in all those where it was necessary to provide for the free breathing of the patient. You might suppose that it would cause irritation; but you will recollect that the lower part of the air passage is by no means very sensible. By introducing a foreign body upwards, great irritation is produced, but downwards, there is little or no inconvenience caused. Pass the point of the tube, then, into the opening you have made, and slip it home at once. There is a little coughing from the cold air passing down; it gives the patient some alarm; but that passes off, and the breathing goes on without interruption. Then there is a discharge of mucus, and you instruct the patient how to get quit of it. He puts his finger upon the tube and narrows it, and then he can cough nearly as well as through the natural passage. By narrowing the opening through which the air is passed, the mucus is ejected with the air. The tube is taken out from time to time, and replaced; and after a few days the patient can do this himself. There is no occasion for putting in a tube as large as this throughout the cure; you introduce

a smaller one, and through this he can perhaps breathe more freely than at first. It has been proposed to thrust a trocar and a canula into the windpipe: here is the instrument—a small, straight, lancet-shaped trocar, with double tube—that used to be sold for that purpose. But the man who invented this must have tried it only on the dead body; he could have known nothing of disease, nor of the function of respiration. The patient could not breathe, nor could you get a foreign body through an opening so made. If any air passed through it, it could compensate but little for any narrowing at the top of the windpipe. A large sharp-pointed stilet has been adapted to the curved canula, but it is not very surgical to attempt to plunge this into the windpipe; the probability is, that you would go on one side, instead of into it—more especially in children. You may, if you choose, have a double canula—one to put in, while the other is taken out and cleaned.

In children you may sometimes find difficulty in performing the operation. The neck is short, and often very fat. The space in which you cut is very limited; the windpipe also is exceedingly small, and in all cases where the operation is required, the breathing is embarrassed, and the parts are in constant motion. You must have the patient well secured; you cut down the fore part of the neck, right in the median line, expose the sterno-hyoid muscles, separate the connecting cellular tissue, and clear the trachea. You cannot make a young subject elevate the windpipe well or certainly by swallowing his saliva; you must therefore stretch and fix the tube before cutting into it; you do this by putting a sharp hook in it. You then pull the larynx upwards thus, push in your knife, and make a sufficient opening.

Fig. 132.



In some individuals, when the operation is performed for disease at the rima glottidis, the canula may soon be removed safely, and the wound permitted to heal; but sometimes it must be worn for

several weeks. In many cases the box of the larynx may have fallen in so much, from extensive ulceration, that the patient must wear the canula for some time; and if you prevent cold air getting in he goes on very well.

The same precautions are to be observed here as in wounds after the patient has attempted suicide; the wound must have a covering of loose texture to prevent cold air getting into the passages.

FOREIGN BODIES IN THE GULLET.

How are foreign bodies in the gullet to be got out? It will depend very much on their sort and size and situation. You will not set about taking out needles or pins in the same way that you would large lumps of gristly meat, bone, coins, or any other hard body that may have lodged in the passage.

Foreign bodies in the œsophagus and pharynx cause a great deal of pain when the part is put in motion. If it be a hard and sharp body, there is a pricking sensation; if the body be of large size, the passage may be obstructed, the breathing may even be affected, as I have said; at all events, the patient will be unable to swallow anything. A very small solid substance will obstruct the passage completely when the patient is naturally very nervous, or the part is at all diseased. Patients who have a difficulty of swallowing become nervous; hysterical women are choked with very small substances, and patients who are labouring under stricture or organic disease of the œsophagus may have the passage closed from the lodgment of a very small portion of food. I have repeatedly seen cases of this kind. I recollect a woman who came to me three or four times within two years, complaining that the passage to the stomach was completely closed. By introducing a small probang, the obstruction was discovered in the usual place; a piece of meat was pushed through the contracted portion of the canal, and she was relieved. She would not suffer the introduction of instruments for any other purpose.

Suppose that a large piece of gristly meat, or a large piece of tripe,—oh! indeed, you need not smile at this, for you will find in surgical books many accounts of persons who have been choked with tripe,—gets entangled in the narrow part of the canal, immediately behind the cricoid cartilage, you must consider how you are to remove it. By introducing a probang you may, it is true, push it down to the stomach. A piece of whalebone, with a sponge at the end of it, will do very well. In introducing an instrument for any purpose into the pharynx or œsophagus, you must look to the position of the head, and bring all the tube, fauces, pharynx, and œsophagus, as far as possible into a line with the mouth. For this

purpose you throw the head very well back, depress the tongue with the finger of the right hand, and push the instrument back to the fore-part of the vertebræ, where you guide and bend it suitably with the finger. Just as you get it behind the velum, and into the top of the pharynx, you desire the patient to swallow his saliva. By this action the instrument is drawn back into the throat, the rima glottidis is closed, and you then, with the greatest security, push the instrument downwards, certain that it will go in the right passage. You continue to push it onwards till you meet with some obstruction. But there are foreign bodies which it would be very unsafe to push down, such as a piece of rough bone or cartilage, or hard gristly meat. You might tear the passage, or cause a rupture of it, and this would be attended with very serious consequences. Infiltration in the loose cellular membrane, putrid abscess and death have not unfrequently followed rash operations of this kind. If the foreign body is of such a nature that you cannot push it down safely, you must bring it up if you can. For this purpose you must be provided with instruments of various forms. Here is a pair of forceps well suited for removing hard meat. You feel that there is something obstructing the canal; you open the instrument on the foreign body, seize, and extract it. I have taken out many lumps of meat in that way. If the foreign body is hard—a piece of bone or a piece of metal—you seize it with such forceps as these. The blades are made to open in different ways, according to the position in which the body lies. If a piece of metal—generally a coin—is fixed in the œsophagus, you may ascertain its position correctly, though you may well guess whereabouts it is to be found, by passing down a *steel* probe. This is the way to deal with large foreign bodies; but you very often find small sharp bodies lodged in the pharynx—sticking deeply in the tissues composing it—pins, pieces of fishbone and portions of the beards of barley. I have seen a great deal of irritation produced by a small husk of oatmeal stuck in the fauces or pharynx. These things will sometimes stick in the membrane for a long time; but you must recollect also that patients will often complain of a foreign body lodging in some portion of the passages long after it has got into the alimentary canal. The feeling of pain and uneasiness often remains a considerable time after the foreign body is gone away. The same takes place in the eye. A small fly gets betwixt the lid, for instance,—no uncommon occurrence in riding or walking out into the country in summer,—it causes intense pain; you get a friend to raise the eyelid and pick the fly out, but the feeling still continues, and does not go off, perhaps, for many hours. You must be quite sure that the foreign body is really lodged in the throat before you attempt to take it out. You bring the patient opposite a strong light, hold the tongue down, and then, perhaps, you see the substance; and by taking hold of it with

strong forceps, pull it out. Or, if it be low down, you hold the patient's head back, and with your finger feel down by the epiglottis, by the root of the tongue on each side, and if your nail is a little long you may entangle and bring up the foreign body between the finger and the nail. I have even taken pins and needles out in this way. But you may not be able to reach the foreign body in this manner, and you must then use the forceps. You will find a difficulty in disentangling needles; you are obliged to humour them, moving them first in one way and then in another, and at last you will succeed in extracting them. Pieces of wire, nails, &c., are sometimes lodged here, and great caution is required on the part of the surgeon in handling them.

I should have stated that coins are sometimes extracted by means of forceps, and sometimes they are removed by a blunt bent hook.

[The best forceps I have seen for removing foreign bodies in the gullet, are those of Dr. Bond, of this city. They are longer, and more curved than those usually sold, and are furnished with teeth along the entire length of the blades. T. D. M.]

Occasionally you find very curious foreign bodies lodged in the throat. The following case came under my notice years ago, though the patient was not under my care. A boy engaged in herding cattle was preparing his fishing-tackle. He had a hook for catching jack, which he put in his mouth in order to repair it in some way. The cattle, meanwhile, wandered amongst the corn; he shouted out on observing them, and in recovering his breath, filling his lungs again, the hook slipped back into the gullet, and there it stuck. You are aware that in fishing for jack, there are used three large hooks, tied back to back like a grappling-iron, by means of brass wire. There was much fuss made about this case; the boy was brought from a great distance to the hospital, and he was kept as a show for some time. Every one suggested some plan or other for getting out the foreign body. It was a case in which, had it been in the hands of a very energetic surgeon, œsophagotomy ought to have been at once performed. There appeared but little chance of the three hooks coming out again, and the only apparent way of getting the boy out of the scrape would have been to make an opening below, and extricate them by pulling them downwards. The lad had a long chain hanging out of his mouth for weeks together, and at last it was proposed to use a bone probang, a large ivory ball with a hole in it; and this was to be pushed down to disentangle the barbs. By this time, however, extensive ulceration of the pharynx had taken place, and the foreign body was gulped up, to the relief both of the patient and of the medical men. In cases of this kind, you frequently find that practitioners are as much indebted to chance as to good management. Sometimes foreign bodies can neither be got down nor

drawn out, and in these cases, as in the one I have just related, the œsophagus ought to be cut into. The incision should be made, not in the median line, but by the side of the wind-pipe. An incision ought to be made in the superior triangular space of the neck, of sufficient length to enable you to get cleverly to the obstruction. The larynx must be turned aside, and you will take care not to come in contact with the recurrent nerve, or to interfere with any of the other important organs in the neighbourhood. Guided by the foreign body, you cut through the parietes of the œsophagus, lay hold of it, and extract it with forceps, vulsellum, or hook, as may be. I think that Mr. Arnott had occasion to perform this operation in the Middlesex Hospital some years ago, but it is not had recourse to once in a quarter of a century.

STRICTURE OF THE ŒSOPHAGUS.

Where there is simple contraction of the gullet you endeavour to restore the passage to its natural size. For that purpose you introduce instruments, day after day, till the parts recover themselves, and you can pass an instrument of full size without difficulty. You must be sure that there is really contraction, and, from thickening of the walls of the tube, that it is not merely an hysterical affection; and you endeavour to ascertain, if there is organic disease, that it is not of a malignant character, before you propose a proceeding of this kind. You would not think of destroying the stricture by caustic, as proposed by Sir Everard Home; it is only by very gentle management that you can expect to succeed, or to benefit your patient.

INJURY OF ŒSOPHAGUS.

You may be required to introduce an instrument where persons have received injuries of the neck, but you would not put in a tube and retain it there. In bad cases, where the pharynx, or œsophagus, has been wounded, this may be done; but in the majority of cases all you have to do is, from time to time, perhaps two or three times a day, to introduce a common elastic catheter, such as is employed for the urethra. You pass it beyond the wound, and through it inject broths and jellies. Of all this I have already fully informed you.

POISONS IN THE STOMACH.

It is necessary to introduce an instrument into the stomach when you wish to dilute its contents, or to empty it of any deleterious fluid. You employ an instrument of full size and length, and take care that it enters the œsophagus. Without due care you might pass a very small tube into the trachea; and you can easily understand that it would be a serious matter to inject anything, however bland, into that canal. This has been done. Dessault mentions a case, and you will find cautions upon this subject given in surgical books. You are told how to pass the end of the tube through a sheet of paper and hold a candle to it; but you can never pass a full-sized tube anywhere except into the œsophagus. With the syringe, you inject a sufficient quantity of fluid into the stomach to dilute the poison, and then you pump it up again. A variety of syringes have been invented for this purpose, and other surgical purposes; but the best is that made by Mr. Read, a gentleman who directed his most anxious attention to the subject years ago. To him and to the late Sir Astley Cooper we are indebted for the introduction of this operation, by which many lives have been saved. There is very little caution required in employing this instrument, and it seems to answer the purpose very well.

DISTORTIONS OF THE NECK.

It is time to say something about distortions of the neck. I have long ago told you of the bending forward of the neck as arising from diseases of the cervical vertebræ. I spoke of disease between the upper bones of the neck—the base of the cranium, the Atlas and vertebra dentata—the position of the head, and the difficulty of swallowing which the patient experienced. The head becomes bent down on the sternum; it can then hardly be moved, and in the later stages of the disease, if any rash attempts are made to remove it, it may fall suddenly forwards, the whole body will become paralyzed, and the patient will die very speedily.

But the head is often bent to one side, and this arises sometimes from bad habit; sometimes it takes place in consequence of some spasmodic affection of the muscles of the neck, attributable to one source of irritation or another; in young subjects it may arise from derangement of the digestive organs, from worms, from irritation of the mouth, and a thousand other things. Sometimes it arises in consequence of painful glandular swellings, abscess, or ulcerations at the side of the neck. You had an opportunity of seeing a well-

marked case of this kind very lately under treatment. Upon the evacuation by several openings of very deep-seated matter, the position of the head was at last righted. You often see a patient who, in order to relieve himself of the pain of an inflammatory tumour, will keep his head to one side for a considerable time, and by habit the muscles get so accommodated to it, that he is unable to put his head straight again. The muscles on one side become so contracted that it is only with great trouble that the head can be brought into the middle line. If the head is kept in one position from spasm of the muscles, or from bad habit pursued for a considerable time, one sterno-mastoid becomes shorter than the other, and there is no possibility, by any mechanism, of getting the head put in its right position. The spasmodic action will continue for a long period, and ultimately one muscle is, perhaps, so far wasted away. The disease is what is termed torticollis, or wry-neck.

LECTURE XIII.

WRY NECK.—APPLICATION OF LIGATURE TO THE VESSELS OF THE NECK.—ANEURISM.—DISEASES OF THE BREAST.

I STATED, yesterday, how the head came to be twisted on one side, and I spoke of the condition in which you find the sterno-mastoid muscle in these cases.

Wry-neck can sometimes be remedied by the application of mechanical support—from stays fitted to the chest: the rod from the stays is so contrived, that the head can gradually be twisted round, and brought into a straight position. Many cases have been successfully treated in this way; but in confirmed cases, where the muscle has really become permanently altered in length, it is impossible thus to effect a cure. You require, then, in order to get the head straight, to divide the muscle which is in fault—the muscle opposite to that side on which the face is turned. This operation was practised by Tulpius and Job a Mekreen, is described in all the old systems of surgery—by Heister, Benjamin Bell, &c.—and is not to be altogether neglected.

The operation consisted, as described by the old writers, in laying bare one or both the origins of the muscle, and then passing underneath it what was called the *probe-razor*—not the instrument for dividing the fistula in ano, but one something like it, with a little shorter probe. The blunt end being passed underneath, the muscle was laid hold of, the superimposed muscle was then divided, and

the head thus allowed to come so far into its proper position. We do not perform this operation after that fashion, now-a-days: it is done without any external wound beyond a mere puncture. A small knife, like a needle, is inserted at some distance from the part which you propose to divide, and straight under it. By turning the edge against the tendon, which is in a rigid state, you can with great ease, separate the muscle, without cutting the integument. It may be necessary to divide both heads of the muscle, or only one. Considering the parts underneath, you require to be somewhat careful in performing the operation. In cutting the clavicular portion of the muscle, more especially, caution is required, and it is not amiss to be provided with a blunt-pointed knife, which you can insinuate under the fibres to be cut, without the risk of puncturing any vessel. It is necessary, however, after this operation, to secure the head in a proper position. It is well not to trust always to a simple bandage, but to have some sort of collar, such as already spoken of, to keep the head steady, till the muscle shall have reunited at its natural length. The division of the muscle alone was all but sufficient to effect a cure in the case you saw treated, the other day, in the hospital.

"E. L—, aged 16, admitted under Mr. Liston; of delicate sickly appearance; enjoyed, however, tolerably good health, but has never menstruated. When only three months old, an abscess formed in the neck, over the right sterno-mastoid muscle—the one now affected. But recovering from this, it was not until she was eight years of age, that her mother perceived an inclination of the

Fig. 133.



head to the right side : and no fresh cause was assigned. The contraction of the muscle has been increasing ever since, especially within the last year, causing, however, no suffering, except slight fatigue after long sitting in the same position. The characteristics of the deformity are the following:—

“The right sterno-mastoid muscle is greatly contracted, thus causing an inclination of the head to the right side, and the chin to point to the left, with a torsion of the face : it is out of drawing, both the left eye and ear being higher than the level of the right.

“The girl is high-shouldered, and the right scapular juts upwards and backwards ; added to this, is a slight curvature of the spine to the right, observed in the dorsal region. Near its sternal articulation, the right clavicle is elevated at the clavicular attachment of the sterno-mastoid muscle, the posterior border of which stands out an inch. The patient has a contracted chest, and is slightly pigeon-breasted.

“July 19th.—Mr. Liston remedied the deformity in the following manner:—On the patient being laid on the table, supine, the head was turned to the left side, and pressed upon, so as to make as tense as possible the affected muscle, and the tendon knife was introduced at the posterior border of the muscle, an inch from the clavicle, and passed forwards and inwards beneath the muscle. Upon reaching the anterior border, the edge was turned towards the cutaneous surface, and thus divided, upon being drawn back, the fibres of the muscle, the fingers of the left hand being placed, at the same time, over the part, to detect the yielding of the structure. After the operation, the neck was found to return almost quite straight, the head being much less confined. A piece of adhesive plaster was placed over the aperture, which was very delicate, with scarcely a drop of blood issuing. A pad of lint was also made, to cover it, and a bandage that passed under the opposite axilla. In the evening, an apparatus was applied, which consisted of one of the long thigh splints, placed along the left side of the back, so as to project against the corresponding part of the head, reaching above the top. Being padded as usual, it was bandaged round the body firmly, making thus a lever for its action on the head above. Between the upper end of it and the head, a larger pad was placed, to which the head was fixed by the notches of the splint, thus rendering the head and neck erect.

“July 22d.—The apparatus has remained on since the operation, and the head seems decidedly to be improved as to position.

“26th.—Patient desires to leave the hospital. She is much improved, and has free motion of her neck, and the face, though a little out of the straight line, is yet vastly improved.

OPERATIONS ON THE ARTERIES OF THE NECK.

The vessels of the neck require, now and then, to be interfered with in our operations. The external carotid has sometimes, though rarely, been tied; the temporal and maxillary have been also tied, previous to the removal of tumours from the face, and also the lingual. I had occasion, once, to tie both linguals, on account of enlargement of the tongue—an operation that is attended with some little difficulty. You get hold of the vessel between the os hyoides and the nerve. It is one of the irregular operations of surgery which you will seldom be called to practise. The external carotid has been recommended to be tied, but I should think it is an operation very seldom called for. Although the vessel is called external, it is deeply seated, and you will find it exceedingly difficult to get at it and secure it, even in the dead body. The common carotid requires to be tied, on account of various affections. It has been tied previous to the removal of large tumours of the face. Mr. Goodlad has published a case of this kind. I mentioned a case, in one of these lectures, where, previous to the removal of a malignant tumour of the upper jaw, this proceeding was resorted to without any benefit. This operation is recommended by Mr. Pattison, who published an edition of Burne's "Anatomy of the Head and Neck." He says, the progress of malignant disease is thereby arrested. He could not have considered very well what he was talking about when he made this announcement. Had all the vessels going to a malignant growth been tied, the disease would not have been arrested. This vessel may require to be tied, on account of hemorrhage from the mouth, the nostrils, and the throat. The common carotid has also been secured in cases of bleeding from the gums and sockets of the teeth. I think Sir B. C. Brodie tied it, in one instance, for hemorrhage after the extraction of a tooth, but in a patient of hemorrhagic diathesis, the proceeding was unavailing; the oozing went on from the mouth with fatal result. You may be called on to tie the vessel for aneurism by anastomosis, and this has been done successfully, in two or three instances, by Mr. Dalrymple, of Norwich. I think he was the first to do it for aneurism by anastomosis of the orbit pushing the eye forward. The operation has been performed by Mr. Travers, and also by Mr. Bush, of the Dreadnought Hospital-ship. It has also been practised in aneurism by anastomosis of the scalp. Dr. Mussy, an American surgeon, tied both carotids, with very little interval betwixt the two operations, in a case of this kind. I assisted my friend Dr. Paul, of Elgin, in tying the carotid, in a case very similar—the operation turned out successful.

The operation requires to be performed in cases such as those

from which the preparation before you was obtained—where an abscess has made its way into the carotid. Though these instances of perforation of arterial tubes do not occur every day, still you may, possibly, meet with puzzling cases of hemorrhage from deep abscess, more especially in this region. The perforation of the internal jugular vein, however, is by no means uncommon, more especially in children, and I know of several instances, when this followed upon abscess supervening in scarlet fever.

Cases are occasionally met with of great enlargement of the arterial branches, ramifying in the scalp, without any interposed erectile tissue. The tumour so caused looks more like that occasioned by an "arterial varix"—no more appropriate name can be given to it. Mr. Crowfoot, of Beccles, a most intelligent surgeon, consulted me about a case of the kind lately. The patient was a woman twenty-five years of age.

"The disease," he says, "is what I should call a varix of the temporal artery of the right side. As the artery passes in from the ear, it gradually enlarges; on the forehead it is joined by the supra-orbital artery, also enlarged, and almost immediately afterwards it dilates to nearly the size of the little finger, and pursues a most tortuous course, for about seven inches, backwards over the vertex, receiving branches from the left temporal artery, and is gradually lost behind the occiput; with the exception of the pulsation, it exactly resembles a large varicose vein, and is lodged in a groove in the bone, occasioned by the absorption of the outer table.

"Pressure on the right temporal artery has but little influence on the pulsation of the varix, but if firm pressure be made on the right carotid, the pulsation nearly ceases. The whole course of the diseased vessel is exquisitely sensible, and even the right carotid is very much more so than the left.

"I do not remember ever to have seen a precisely similar disease—it is quite unlike common aneurism, or aneurism by anastomosis; I call it an arterial varix, from its great resemblance to a varicose vein, but you may give it a more appropriate appellation.

"The woman tells us that the disease began about fourteen years since, and for a time occasioned no great inconvenience, but for the last few months she has suffered severely from pain in the ear, eye, and head, and from a distressing, whizzing sound at each pulsation, much increased on lying down. Under all the circumstances, what will be the best mode of treatment? To tie the right temporal artery, even if it were sound, would not be to cut off the supply of blood; and we are not quite sure that the right carotid is free from disease; or that, in the event of its obliteration, there would not be a sufficient communication with the left temporal to continue the disease;—perhaps the best chance of a cure for the poor woman

would be afforded by tying the right carotid and the left temporal arteries."

In this case, I was induced to advise non-interference, unless the disease seemed to gain ground, and in this I was so far influenced by the result of a case which occurred not long before in this hospital. The patient, a young lad, about twenty, laboured under a precisely similar affection of the vessels of the scalp, and I here show you a sketch of the appearance presented.

The coats of the carotid, which I cut down upon and tied, seemed to be thin, and although the ligature was put on with great care, without the slightest disturbance of its cellular connections, the vessel gave way ten days afterwards, and the patient died in consequence of secondary hemorrhage.

Fig. 134.



Mr. Crowfoot's patient, he states, suffers much less now than she formerly did, and the affection seems quite stationary.

In aneurism on the side of the neck, and wounds of the carotid itself, it will be necessary to have recourse to this proceeding. It is upwards of thirty years, now, since this operation was first performed by Mr. Lynn, by Sir Astley Cooper, and various other surgeons. You must be quite sure that the disease you are treating is an aneurism. You must not mistake a solid tumour, or, indeed, a tumour of any kind pressing on a vessel, for an aneurismal tumour. There must be pulsation in all parts of the swelling; you must ascertain, by pressure on the carotid, that the tumour shrinks somewhat in size, that the pulsation is arrested, and that it is communicated to the whole mass of the swelling immediately on the pressure being

relaxed. The operation is also performed in aneurism about the root of the neck, with the view of favouring the coagulation of the contents of the tumour. This proceeding was very much cried up some years ago; it was practised repeatedly in this city, and also by surgeons in the country and abroad, but the results were not very satisfactory. I believe the fact was, that in many cases the operation was not completed; that in some instances, after the patients died, the carotid was found quite pervious—the artery had never, in fact, been reached—and surrounded by the ligature, yet wonderful success was advertised from this proceeding. The patients on whom the imperfect operation was performed were, strange to say, believed, and said to have been benefited by it. I think that my colleague, Mr. Quain, dissected one subject in whom the artery had never been reached; if any vessel at all had been tied, in that case it must have been the inferior thyroid. It is a proceeding which, in desperate cases, and where death was otherwise inevitable, you might have recourse to, as a last chance, but I should not expect any very great benefit from it. Those who advised the proceeding do not seem to have been quite aware, that, very generally, the principal trunk beyond an aneurismal tumour of any standing is all but obliterated, sometimes altogether closed.

When you are called upon to tie the carotid, you will be guided a good deal by the situation of the swelling, and the condition of the neck, as to the place where the operation is to be performed. If you can tie the vessel in the middle of the neck, where it is crossed by the omohyoid muscle, all the better. You tie it above or below where it is covered by the small tendon. Sometimes you will not have room to get near the spot; the tumour may pass so far down the neck, that you may have a difficulty in getting to any sound part of the vessel. In the case I spoke of the other day, the vessel was tied close to its separation from the *arteria innominata*. There the dissection was difficult, in consequence of the infiltrated state of the neck, and the immense size of the swelling. You have sometimes difficulty in getting to it, from its depth, and also, though rarely, from the position of the vein in relation to it. In the lad, whose case I have just alluded to, with arterial varix of the scalp, it was with the greatest possible difficulty that I could reach the trunk of the common carotid. The neck was short, and the internal jugular vein lay right in front of the artery, and it was of course distended every time the patient emptied his lungs. He made a great noise; his breathing was accordingly very rapid; he was, besides, exceedingly restless, and in all respects what you would call a bad patient. I was scarcely prepared for this difficulty; I have performed and witnessed the operation over and over again, but I was never before embarrassed with the vein; the difficulty, however, arose in this case, and arose to perfection.

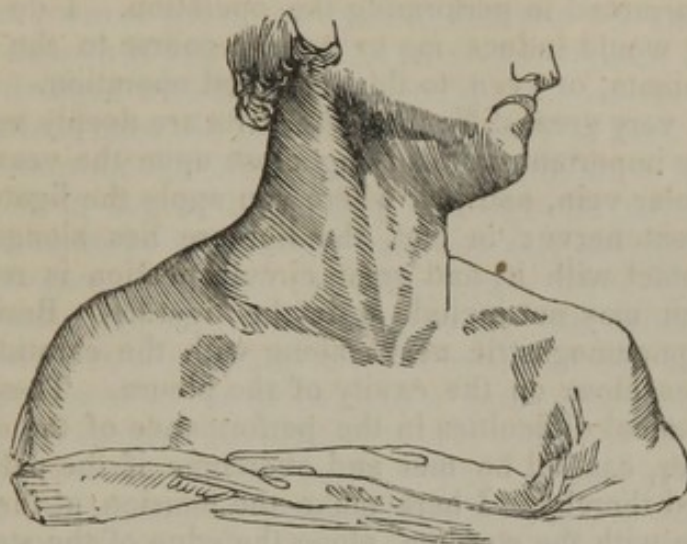
Having determined on tying the carotid, you will do so in the

most exposed place; as high as you can with safety and propriety. You will provide yourself with a good knife, a pair of dissecting forceps, a copper spatula or two, and some instrument to pass the ligature round the vessel. Your object will be to denude the vessel as little as possible, to make a clean incision down upon it, to disturb it scarcely, if at all, to denude it by a clean dissection, and to pass your ligature, without separating the cellular connection of the vessel, on any side, and this with a view to the permanent obliteration of the vessel at the deligated point, and preventing any destruction of the coats, which would certainly end in secondary hemorrhage. You place the patient for this operation in a recumbent position, with the head pretty low and turned on the opposite side to that on which you intend to operate. You must try to set to work in cutting on the living body as coolly and exactly as you do on the dead. You mark out the situation of the sterno-mastoid muscle, and the prominence of the larynx. Supposing that at the angle of the jaw there is an ulcer or abscess which bleeds very profusely, or a small and circumscribed aneurism for which you intend to tie the vessel, there is then no obstacle to your going to the middle portion of it; you make an incision in its course, and of sufficient length; you make that pass at once through the skin and the platysma-myoides, and you thus get into the angle between the sterno-mastoideus muscle and the muscles covering the larynx. You expose the omohyoid and get down on the sheath of the vessel, taking care not to tear the cellular tissue; you take the sheath up with the forceps, cut upon it, and you need not be under any apprehension that the point of the knife will dip into the vessel. Many people have recommended that after you have cut into the superior triangular space, you should tear through the cellular tissue, and they advise you to have a silver knife provided for the purpose. That was the way in which some operations beyond the tumour were performed. For surrounding the artery, you use a plain aneurismal needle, such as this with a blunt point. Care must be taken that it is not at all sharp in its edges, because in passing it through the cellular tissue you might injure the vessel itself, or the vein. This instrument is passed from the outward to the inner side; in that way you guard against including anything but the artery; you take care to enter it between the pneumogastric nerve and the vessel. Having passed the needle, you divide the loop of the ligature, and draw out one-half of it; you have then a single ligature under the vessel, which is sufficient to arrest the flow of blood in it. With the points of the forefingers the knot is run down and tied, and you will distinctly feel the inner coats give way under the ligature; the assistant puts his finger on the first noose till the other has been made and secured. If you are operating for aneurism, you will ascertain that it pulsates no longer, and you do that before tying the vessel. You may leave

both ends of the ligature hanging out, or one end may be cut away after you have put on a third knot, and at the proper time you put the edges carefully together.

You meet with affections at the root of the neck requiring the ligature of the vessels. You have before you casts of aneurisms, situated, not as those we have been considering, in the upper tri-

Fig. 135.



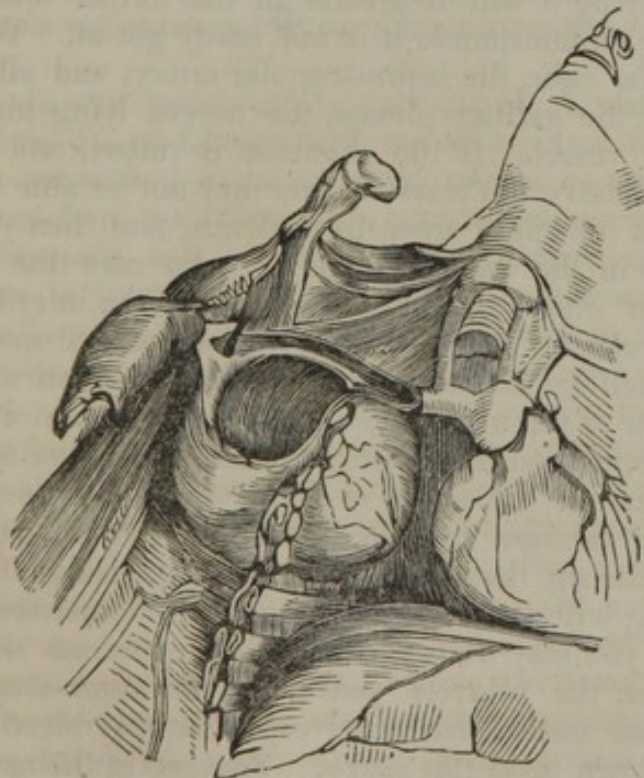
angular space of the neck, but in the inferior one. These tumours had been going on for two or three months before the patients applied, and had gradually increased in size. Some attempts had been made to stop the progress of one of them by passing a galvanic current through the tumour, putting in needles, and galvanizing the tumour, on the supposition that the blood might coagulate. In both of these cases of aneurism of the subclavian, an operation was performed inside the scalenus. This is a disease for which it has been proposed to tie the arteria innominata, and this has been carried into effect by several surgeons, Professors Græfe, Mott, Lizars, &c., but the result has not been favourable. The patients have lived for a certain time, but in the end all have died from secondary hemorrhage—some of them a considerable time after the separation of the ligatures. It can be scarcely expected, that in a vessel the size of the arteria innominata, and so near the heart, with such a current of blood passing through it, and such an impulse communicated to any part obstructed, the healthy process should be established and completed in the closure of the vessel. Instead of tying the innominata in this case, on the suggestion of Mr. Quain the carotid and the subclavian were tied. The latter, you might suppose, as it comes from the innominata, would be sufficient, but considering that if the carotid were left pervious, the current of blood passing through it, close to where the ligature was tied, would

effectually prevent the formation of any clot, with the view of preventing this current of blood, the carotid was also secured, and for some time everything promised well, but both of these patients died of secondary hemorrhage. The vessel had closed next the heart, and the bleeding had been all from the recurrent vessels. This is a proceeding which, looking at the result of these cases, I should scarcely have recourse to again. It is the only chance the patient has, but still the chance is so slight, that I do not think the surgeon is warranted in performing the operation. I do not think that anything would induce me to have recourse to the operation on the innominate, or even to this modified operation. It is one attended with very great difficulty; the parts are deeply seated, and there are very important organs lying close upon the vessel. You have the jugular vein, and just where you apply the ligature there is the recurrent nerve; in fact, the ligature lies alongside, and almost in contact with it, and great circumspection is required in order that you may not include it in the ligature. Besides this, there is the pneumogastric nerve along with the carotid, and the innominate lies close on the cavity of the pleura. These are all serious anatomical difficulties in the performance of the operation. They, however, can all be met and overcome if the patient were to be benefited thereby. I here make the incision at the junction of the clavicle with the sternum, along the edge of the sterno-mastoideus of the opposite side. That was the course I pursued on the living body. Then another incision was made along the upper edge of the clavicle, and a flap in this way formed was turned up. The carotid was then cut down upon, the origin of the sterno-mastoideus was divided, and then we got down upon the sterno-hyoideus and thyroideus muscles; by dividing these cautiously, the carotid was exposed and traced down to the innominate, and then, by a careful dissection, the origin of the two vessels was exposed, and a ligature passed without any difficulty. After the vessels were sufficiently separated, the ligatures were passed round, first the one and then the other. In the above case there was considerable difficulty in consequence of the vessel passing off from behind the innominate, as it were, and in that case only the subclavian was tied, under an impression that possibly it came off last from the arch of the aorta, and traversed the fore part of the vertebræ, to get into its proper place. You must recollect that in these cases the parts are much displaced and removed from the surface. They are deep enough, even in the healthy state of the parts, so that even in a thin person you have great difficulty in getting down upon them; you were obliged to dig, as it were, in a deep pit; there are very important parts all around you, and you must accordingly proceed with the greatest possible caution. I sincerely hope that I never shall be called upon or be obliged to perform any of these operations again.

In cases of aneurism at the lower space of the neck it has been proposed to tie the vessel inside and close to the scalenus, near to the thyroid axis. But you can understand that there is no chance of a vessel with such a current of blood around, as in that situation, becoming closed. It has been proposed to tie the vessel outside the scalenus, and immediately in contact with that muscle, for aneurismal tumours outside of it, above the clavicle; but the tumour, if of any size, encroaches so much on the sterno-mastoideus, that there is not room to get down upon it, and you will easily conceive what will happen if you wound the sac in the slightest degree. You would be deluged with blood; you could not arrest the hemorrhage, and the patient must die in a very short space of time. You might by chance stop the bleeding, and prolong life for a few days, but depend upon it, that in these cases, although the patient's life must almost to a certainty be a short one, you will abridge it much by your interference; you had, therefore, better leave the case alone.

The vessel going to the upper extremity, the axillary portion of the brachial, is now and then affected by aneurism. You meet with a pulsating tumour in the axilla, and it must necessarily follow the same progress as other aneurisms; it will gradually fill up the space between the borders of the axilla. The patient, in order to get relief, will be disposed to raise the shoulder, and it will thus in the end become very much fixed. The disease is met with both on the

Fig. 136.



right and the left side, and on account of it you may, with great propriety, and with some prospect of success, cut down and tie the subclavian portion of the brachial, or tie the vessel above the clavicle, thus, at some little distance from the tumour. I have seen the disease attain a large size, occupying the whole of the axillary space, and even extending, in the sheath of the biceps, down to the bend of the arm. These tumours from time to time extend, by the giving way of the original sac, the parts around again becoming condensed. But, occasionally, the effusion is so rapid and extensive, that the patient perhaps sinks in a few hours. From the rupture of such an aneurismal sac as the one I here show you, I have seen many pounds of blood effused into the cellular tissue, under the latissimus dorsi and pectoral muscles. The shoulder is much displaced; it is pushed upwards, and accordingly the space above the neck is very much diminished in size, and very much deepened. You see here how the parts must have been displaced, and how the ribs even have given way before the continued pressure. Even in the dead body you find that, if the shoulder be pushed up in this way, there is a difficulty in getting down upon the vessel. Great are the facilities afforded in the dead body by pushing the shoulder well down, but unfortunately, in many cases where you are obliged to operate on the living body, there is no possibility of accomplishing this, there is no way of exposing the triangular space, so as to make the operation at all comfortable or easy. The vessel is a little more deeply seated on the left side than on the right; the difficulty, therefore, of tying it will be greater in the former than the latter; but under any circumstances it is not easily got at. You have the external jugular vein, the supra-scapular artery, and all the nerves going to form the axillary plexus, the nerves lying higher up the neck than the vessel. If the shoulder is raised, and the tumour extends at all above the clavicle, you may not be able to get at the vessel without trenching upon the scalenus, and then you have the phrenic nerve in the way. Above all, take care that you do not, in this or your other operations in this region, interfere with the cavity of the chest. Suppose that you are called upon to tie the subclavian itself for aneurism in the axilla, then you will cut down and endeavour to put a ligature on a sound portion of the subclavian. This operation has been performed a number of times, and with some success. You cut, as I now do, along the clavicle, and make another incision outside the sterno-mastoid muscle, on its edge; you raise up these two flaps of skin, taking the platysma-myoides along with it. The jugular vein is sometimes a good deal in the way; you may detach that a little upon one side, and then exactly under the clavicle you have the supra-scapular artery. There are some small branches of veins that may bleed a little when you dissect down upon this space. You get at the nerves and expose them distinctly enough, and a little lower down on the same

plane you at last reach the vessel, and then, in general, you will be able to pass a ligature with a small and simple aneurism needle. I should have told you, that for the purpose of carrying a ligature round an artery in deep wounds, tying the root of the carotid, this vessel, the innominata, and so on, a great variety of needles have been contrived. Here is Weiss's needle—a common coarse sort of aneurism needle to look at. This is to be passed underneath the vessel, and when its point is brought up, so as to be seen or felt, here is a sort of catch, which is used to lay hold of it, detach it, and bring it to the surface. Here, again, is an instrument invented by Mr. Gibson, of Philadelphia; but it is only a modification of some of the old contrivances. Here again is Mott's needle; it is passed underneath the vessel, the handle is screwed off, and the point in that way brought out. In operations of this kind, I am always provided with these tools, but I never yet saw the necessity for using any of them. There is no difficulty, that I can see, in turning a plain aneurismal needle under any vessel. With this small and simple needle I have put a ligature upon all the vessels of the neck, and upon all the vessels of the extremities of the living body, and often under puzzling circumstances enough. If you know only how to manage a small instrument of that kind, there is no difficulty in accomplishing your object; it is better than any of these complicated contrivances.

[We are frequently called upon to treat deformities of the neck resulting from severe burns or scalds. The following report explains a new method of treatment in such cases. I have operated now upon *nine* patients, and so far have no cause to find fault with the results.

CASE I.—In the month of January, 1841, I was requested to attend Miss A. T., of Chesterfield township, New Jersey, who for *twenty-three years* had endured much mental as well as physical inconvenience from the effects of a burn which occurred when she was five years old, and involved the face, throat, and upper part of the thorax in front. The following extract from her history of the case, will explain the nature of the accident, as well as the treatment to which she had been subjected before I saw her:—"I received a burn when five years old by my clothes taking fire. My grandmother being a great doctress nursed me, until prevented by indisposition; and as they wished me to remain in as comfortable a position as possible, my life being entirely despaired of by the family, medical aid was not called in. Dr. Burns, a neighbouring physician, hearing of the circumstances, could not refrain from calling to see me; he called twice as a friend, and was then forbidden to come again until sent for, which was never done. When about eleven years of age, an attempt was made by Dr. Cook, of Bordentown, to afford some relief. Being young, I was much alarmed, and opposed him. My near relations, being unwilling to

see me suffer, united with me; and he was obliged to desist before completing his design. I therefore did not experience any relief, and have been unable to *throw my head to the left side, or backwards, or to close my mouth for more than a few seconds at a time for twenty-three years. My right eye was also drawn down some distance below the other, and when I endeavoured to turn my head it was entirely closed.* My condition has been most humiliating, and made life a burthen; but having good health, I strove to reconcile myself to my hard lot!" In addition to the symptoms so vividly described, I found the angles of the lower jaw altered, and the incisor teeth nearly *horizontal* (as is seen in cases of chronic hypertrophy of the tongue) by the pressure of the tongue, which organ, in consequence of the inability of the patient to close the mouth, was always visible, and indeed *protruded*, when she was silent. The clavicle on the right side was also so completely imbedded in the cicatrix, that it could scarcely be felt, and there was no external indication of its location. The chin, from the shortness of the bands, was drawn down to within *one inch and a half* of the top of the sternum, and the head consequently inclined very much. The space between the chin and sternum was also filled up by the cicatrix, so that no depression existed in front of her neck. Fig. 137, which represents her full face, affords a very correct idea of her

Fig. 137.



appearance. After carefully examining the case, and fully explaining to the patient and her friends the inutility of any of the usual operations for such deformities, I proposed to them one entirely

different in its principle, which, although severe, as well as somewhat hazardous, promised partial, if not entire relief. To this my patient readily assented, declaring that death were preferable to a life of such misery as hers. In conformity with her wishes, I at once placed her on a preparatory treatment, and on the 12th of January, performed the operation to be described, assisted by Drs. Noble and Pierce, and in the presence of Messrs. Ward, Ducachet, Mason and Egan, medical students.

The patient being placed in a strong light, and seated on a low chair, her head was thrown back as far as possible, and sustained in this position by an assistant.

Seating myself in front, I began the operation by making an incision which commenced on the outside of the cicatrix in *sound skin*, and passed across the throat into *sound skin* on the opposite side. This penetrated merely through the integuments, and was made as near the centre of the cicatrix as possible. It was therefore about three-quarters of an inch above the top of the sternum, and of course in the most vital part of the neck. My object in making it so low down was to get at the attachments of the sternocleido-mastoid muscles, which, in consequence of the long flexion of the head, were not more than three inches in length, and required on one side *complete*, and on the other *partial* division, before the head could be raised. The integuments having been thus divided, I next carefully dissected through the cicatrix until I

Fig. 138.



reached the fascia superficialis collî, which I could readily detect, and then going on still deeper, I exposed the sterno-cleido-mastoid muscle of the right side, and passing a director under it, as low down as possible, divided both its attachments. This enabled me to raise the head an inch or two; but finding that it was still kept down by the sterno-cleido-mastoid of the *left* side, I divided the sternal attachment of this muscle, and was much gratified to find that the head could at once be placed in its proper position, the clavicular attachment of the muscle offering little or no resistance. A most shocking wound, *six inches in length by five and a half in width*, was thus made, and yet there was scarcely any hemorrhage; three or four vessels only requiring the ligature. (See fig. 138.)

The next step in the operation consisted in the detachment of a flap of *sound skin* with which this chasm could be filled; for I knew very well, that if permitted to heal by granulation only, the patient, so far from being benefited would be made worse than before. To obtain this flap I commenced at the terminal extremity of the first incision, and carrying the scalpel *downwards and outwards* over the deltoid muscle, dissected up an oval piece of integument *six inches and a half in length*, by *six in width*, leaving it attached at the upper part of the neck, (see fig. 138.) This dissection was painful, but not bloody, only one small vessel being opened. The flap thus detached was next brought round by making a half turn in its pedicle, placed in the gap it was destined to fill,

Fig. 139.



and carefully attached by several twisted sutures, to the edges of the wound, (see fig. 139.) Several straps were then applied to support the sutures, but no other dressing was deemed advisable. The edges of the wound on the shoulder from which the flap had been removed, were next brought together by straps and sutures, and with the exception of its upper third, was completely covered in. A pledget of lint, moistened with warm water, was laid upon this raw surface, a bandage applied by which the head was carried backwards and maintained in this position, and the patient put to bed. The fortitude with which this truly severe operation was borne excited the admiration of all present. Scarcely a groan escaped the patient, nor was it necessary to give her more than a mouthful or two of wine and water during the whole period of its duration.

Rest and quietude were enjoined, and the patient prohibited from taking any kind of nourishment, in order that adhesion or union by the first intention might be accomplished.

Jan. 13th.—Patient has passed a good night; slight acceleration of the pulse, but no fever; not much thirst; complains of *stiffness* in the neck, and pain in the back from lying in one position so long. Slight headache from the anodyne which it was deemed advisable to administer *before* the operation.

14th.—Much as yesterday; a little nervous, but no fever; no swelling or pain in the wound; some thirst and hunger, but willing to go another day without sustenance.

15th.—A little feverish; wound painful at one point; thirst intense; bowels not opened; restless and anxious; ordered an enema to be administered at once; and spoonfuls of cool barley-water to be taken every hour or two.

16th.—Much better; enema operated well; fever gone; thirst less, skin moist; cheerful and in hope.

17th.—The same; took off straps and found the wound united along the edges, with the exception of here and there a point; a small pouch of pus at the most dependent part of the flap; patient rather restless under the dressing.

Evacuated the pus through a small opening in its vicinity; took out some of the pins, reapplied the straps; dressed the shoulder with poultice of slippery elm; ordered a little mutton broth, and an enema of salt and water.

It would be worse than needless to detail the daily symptoms and treatment from this time to the period at which the patient was enabled to move about, and enjoy the full benefit of the operation.

It will be sufficient to state that no unfavourable symptom made its appearance, that *union by the first intention* took place throughout the entire wound, with the exception of one small point which united by granulation; that the wound in the shoulder, except just over the acromion process, healed kindly: and that the patient, as her own words will testify, has been relieved of all or nearly all in-

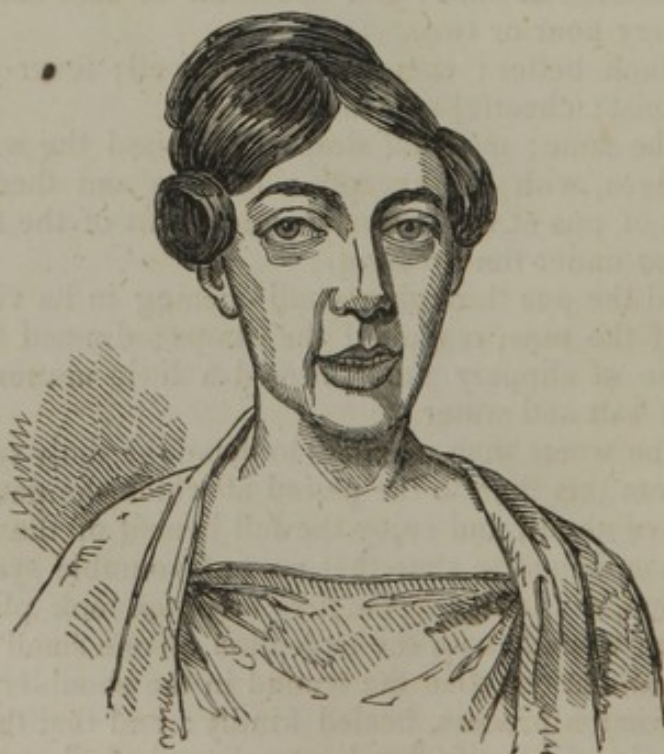
convenience. The following extract is from a letter received some time since.

"The comfort and satisfaction I feel, cannot be expressed; your exertions in my behalf have been blessed far beyond my most sanguine expectations. You have *set my head at liberty, so that I can turn it any way, at pleasure, and without pain*; you have relieved the drawing of my eye; and I am also enabled to close my mouth with comfort, a blessing that cannot be described!"

In order to accomplish the closure of the mouth, the lower incisor teeth were straightened, and one of them extracted by a dentist. The angles of the lower jaw have, in consequence of the change in the condition of the throat, regained in a great measure their proper shape, and the whole appearance of the patient is so much altered that persons who saw her before the operation, scarcely recognize her as the same individual. I should have mentioned that one troublesome circumstance occurred which will serve as a lesson in all subsequent operations of a similar character. Although very careful to extend my incisions from beyond what I supposed was the extent of the cicatrix, I yet left a band of this tissue, certainly not thicker or wider than a small wire. This band contracted, and before the patient could be entirely relieved I was obliged to loosen it by making an incision in the sound skin below on the neck.

To support the neck after the incision had healed, I gave the patient a *stiff stock* on which her chin rested, and this instrument also

Fig. 140.



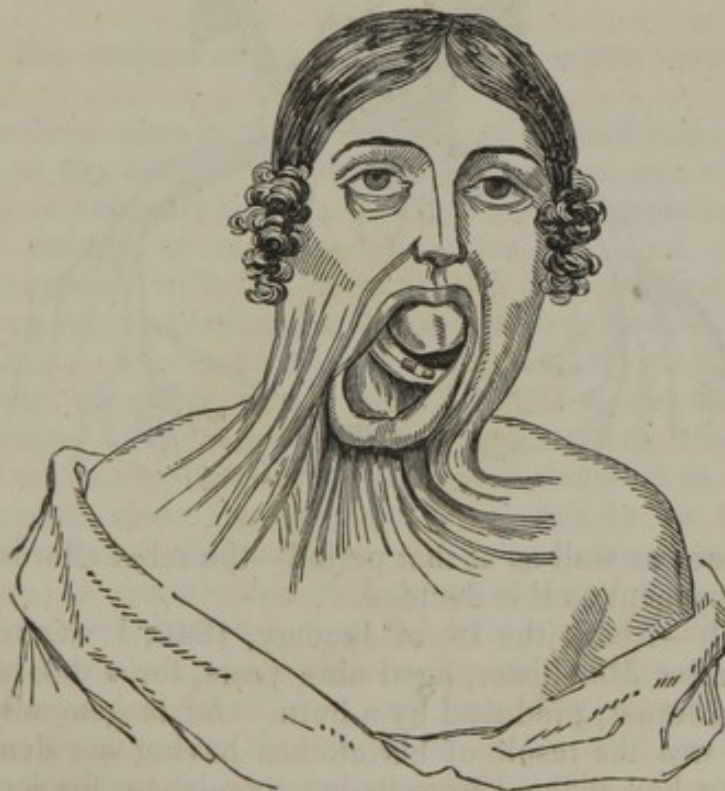
served to press the integuments back, by which the natural excavation or depth of the neck in front was readily effected. This stock is of course no longer in use, and the motions of the head are perfect; although it was predicted that the antagonism between the muscles on the front and back of the neck having been in a great degree destroyed by the section of the mastoids, these motions would necessarily never be acquired. (Fig. 140 represents her as cured.)

More than a twelvemonth has elapsed since the operation was performed, and yet there is no contraction in the flap, and the relief of the patient is complete.

CASE II.—In the month of June, 1841, I was requested to visit Margaret Ann Henderson, aged 12 years, who when four years old had received a severe burn of the chest, throat, and lower part of the cheek, from her clothes having taken fire.

For nearly eight years she had been unable to turn her head to the left side, the lower lip was everted, and the chin drawn down nearly in contact with the sternum, while the front of the throat presented the rough, reddish cicatrix represented in fig. 141.

Fig. 141



This case was even more unfavourable than that of Miss A. T.; but still, with the view of rendering her condition somewhat more bearable, I determined to perform the operation which had proved so successful in the latter case, but a few weeks before; and, ac-

cordingly on the 20th instant, assisted by Drs. Knox, Davis, E. Smith and Marston, it was carried into execution. The operations were almost identical, with the exception that in the case of Miss Henderson, the section of the tendon of the sterno-cleido-mastoid on the right side only, was sufficient to allow the head to assume its natural position.

The after treatment was also the same, nor did any symptom calling for energetic measures make its appearance; all speaking, swallowing, or motions of the neck of any kind, were carefully avoided until the fourth day, when the pins were taken out, and the patient allowed animal broths. Fig. 142 represents her appearance five weeks after the operation, and up to the present date, March 21st,

Fig. 142.



she continues as well as at that period—the relief afforded is therefore as permanent as it is decided.

CASE III.—About the 1st of January, 1842, I was requested to attend Charles McAllister, aged nine years, for a deformity of the mouth and throat, produced by a burn. As is generally the case, the injury was the result of his clothes having accidentally taken fire, and he had suffered from its inconveniences for several years.

The appearance presented by this boy is well shown in fig. 143. His mouth was kept permanently open, his incisor teeth were losing their perpendicular position, his chin was drawn to within an inch or two of the sternum, and a strong band of the “tissue of the cicatrix” passed along the centre of the throat from the chin to the

Fig. 143.



sternum. The motions of his head were of course very much impaired.

The operation already described was performed before the medical class on the second Wednesday in January, and on the first Wednesday in February he was brought into the amphitheatre with scarcely a vestige of the deformity remaining, and the wound healed throughout with the exception of a small spot near the shoulder from which the flap had been removed, and which united by granulation. It was found unnecessary to divide the sternocleido-mastoid on either side. Here, in *three weeks'* time, a cure of a deformity hitherto considered hopeless, was effected, and during the whole treatment not a symptom calculated to excite the slightest anxiety, made its appearance. It may be as well to remark that I had seen this boy several months before I had devised my operation, in consultation with a professional friend, and we both agreed in the opinion that the best operation was that in which an attempt is made to loosen the cicatrix by making incisions in the adjacent sound skin, and then dissecting up the cicatrix itself and separating the edges of the wound in the sound part, allow the latter to heal by granulation. In other words, the operation in which the tissue of the cicatrix is displaced from its natural position and made to form adhesions with new parts.

Although performed with the usual skill and accuracy of the accomplished surgeon under whose care the boy was placed, the

Fig. 144.



operation failed ; producing, it is true, some little relief, but leaving him in the condition described.

Remarks.—Few subjects in surgery have excited more interest than the peculiarities of cicatrices resulting from burns, and the plans of treatment by which the deformities they occasion may be either alleviated or entirely removed. Much of the controversy, originating in the different views promulgated, may be traced to the fact that few have studied the subject in a proper manner ; and great credit is due to Dupuytren, Delpech, Velpeau, and Cooper for the highly interesting, simple, and practical matter recently furnished by them—by the aid of which the confusion hitherto enveloping the pathology of this important lesion has been removed. In the investigation of this subject, with the view of determining the propriety of operations such as those reported, it is important to direct our attention to several points.

1. *The nature of the tissue to be divided or removed.*—Although the “*tissue of the cicatrix*,” as it is termed by Dupuytren, however produced, always presents certain characteristic peculiarities by which it may be distinguished from any healthy or natural structure, it yet exhibits *modifications* induced either by the *cause* or the *tissue* involved. The cicatrix of a *burn*, for example, can always be readily distinguished from that caused by sharp instruments ; and again, both these from those resulting from cancers, ulcers, herpetic

diseases, syphilis or scrofula. The cicatrix of an ulcer in mucous membrane differs, too, from one taking place in the skin.

Nearly all formations of this tissue, however, when dissected, present pretty much the same structure. We have, in the first place, a *delicate cuticle*, which may be detached by *vesication* or *maceration*. Beneath this inorganic tissue is a dense stratum composed of strong fibres, which cross each other at different angles, and are firmly bound together. This is the true "tissue of the cicatrix" of Dupuytren, and the "inodular tissue" of Delpech, between which and the cuticle there is no deposit, as a general rule, of rete mucosum; hence the whiteness of cicatrices in the African. It contains no hair bulbs, nor sebaceous follicles, at least when the lesion is profound; and although furnished with both nerves and blood-vessels, is usually less perfectly organized than the parts whose loss it supplies.

Lying under this tissue, we find a dense laminated substance, composed of the original cellular substance, which binds the cicatrix down, and offers, in many cases, the chief obstacle to the success of our operations. This is especially the case in severe burns; and whenever such adhesions exist, we must anticipate and be prepared for most extensive dissection if an operation be attempted.

Another difficulty occasionally, though very rarely, presents itself in cases dependent upon burns—namely, the *vascularity* of the cicatrix. Whenever this tissue is red, sensitive, soft, and movable, we may fear hemorrhage; and this condition will therefore always render our prognosis, so far as loss of blood is concerned, more unfavourable than when the parts are pale, firm, inelastic, and adherent.

2. *The thickness or profundity of the cicatrix.*—The depth to which the ulcer upon which the formation of the cicatrix is dependent extends, should always be considered in our investigation of the case; for the prognosis as well as the treatment turns chiefly upon this point.

When the integument merely is involved, the cicatrix is, for the most part, elevated, thrown into bands, movable, and soft, the fascia beneath not being contracted. The motions of the subjacent parts are also normal; and hence, although the deformity may be considerable, yet the positive inconvenience is comparatively slight. In such a case the prognosis is favourable, and the operation required much less severe than under other circumstances. When, on the other hand, not only the integument, but the superficial fascia, cellular tissue, and muscles are attached, the inodular tissue is irregular, dense, thrown into hard ridges, immovable, or nearly so, and the parts which it unites are disturbed, displaced, or, as in the case of openings and cavities, obliterated, the prognosis is very unfavourable, and the operations indicated extensive and severe. This condition must not be confounded with that contraction of the fascia

superficialis sometimes accompanying cutaneous burns, but often the result of other causes, many of which are inappreciable. For example, I have known the fascia of the palm of the hand gradually harden, contract, become thicker, and eventually inelastic, thus causing a permanent closure of the hand, the skin covering it being perfectly soft and pliable, while the cause of this change of structure was too subtle to admit of detection. Certain varieties of club foot are produced in the same way.

This contraction is also frequently brought about by keeping a part too long in one position, and it may result from chronic inflammation of parts either above or below the fascia.

3. *Location of cicatrix.*—The *location* of the cicatrices will also modify the prognosis and treatment. When vital or highly organized regions are involved, great caution must be exercised in the delivery of an opinion favourable to any attempt at relief by an operation; and when such a procedure is deemed advisable, we should always warn our patient, as well as his friends, of the probable risk. In deep cicatrices of such parts, there is less danger of hemorrhage than one would imagine, and for the reason that during the inflammation which accompanied or preceded the healing of the ulcer, the blood-vessels, especially the veins in the vicinity, were obliterated and converted into fibrous cords; but we should always be prepared for some bleeding, as all the vessels are not included in this obliteration.

4. *Extent of cicatrix.*—The *extent*, too, of the cicatrix is a point deserving attention. The wider and more extensive it is, the more difficult will it be to effect its removal. And we are hardly justified in the performance of an operation, unless there is an almost positive certainty of our obtaining a less deformed cicatrix than the one we wish to remove.

Dupuytren gives some very excellent advice relative to extensive operating on cicatrices: when, for instance, adhesions between the arm and thorax, or thigh and pelvis are to be divided, he cautions us not to complete the operation at once, but to proceed by fractions, and let the wound of one operation heal before we undertake another. In this way we avoid the dangerous consequences which may follow so large a wound as would be requisite to separate the parts at once. The same rule is applicable to extensive callous prominences.

Another good rule is, to be certain, before any operation is attempted, that the limb retained in a faulty position is not incapable of being brought into a better one; if ankylosis, alterations of articular surfaces, or atrophy of the member is present, no operation should be attempted.

5. *Age of cicatrix.*—The *duration* or *age* of this inodular tissue must also be taken into account. The advice of Dupuytren is, "that no operation should be attempted until several *months* or even

years have elapsed since the healing of the wound!" He believes that we run great risk of exciting inflammation and ulceration in the part, and, moreover, that inasmuch as the *disposition of the cicatrix to contract* is not lost for a long period after its complete formation, we do no good by an operation, which may indeed excite in this disposition a new energy. The *older* the cicatrix, then, according to him, the better, so far as an operation is concerned. This advice is at variance with that of some other surgeons, but it is, nevertheless, as a general rule, the safest to adopt. Especially is it the case where the inodular tissue is superficial, and curable by simple incisions, followed by extension and pressure sufficient to keep the edges of the wound separate from each other. There are instances, as, for example, where the cicatrix is so situated as materially to interfere with the comfort and convenience of the patient, where it would be proper to deviate from this rule, and operate as soon as possible: but these are rare exceptions, and do not militate against the correctness of the general proposition.

6. *Peculiar deformity of cicatrix.*—The power with which these cicatrices sometimes contract is well known to every surgeon, but is sometimes overlooked in the desire for an operation. Mr. Earle has known it sufficient to bring the shoulders towards one another by a partial absorption of the clavicles. He mentions another case, in which not only the whole head was bowed down towards the sternum, but the lower jaw curved downwards, so as only to admit of the last molar teeth coming in contact; the mouth being kept permanently open, and the direction of the incisor teeth so altered that they projected nearly in a horizontal line. (This resembles very much the deformity in my own case, No. 1.) Cruveilhier mentions a case, in which the carpus was luxated from the radius by a cicatrix on the back of the hand; and I have in my possession a similar specimen, and another has been deposited in the museum of Jefferson College, by Professor Pancoast.

An almost endless list of deformities of this kind might be cited, but the examples given are sufficient; and I need hardly add, that in all such no ordinary operation will prove of the slightest benefit.

When, therefore, the original shape and function of a part have been destroyed, we should never operate unless there is a prospect of relieving at least the *deformity*. There are cases in which we must be content with this, while the loss of the function is an evil for which there is no remedy.

Diversified as are the deformities from burns, Dupuytren is of the opinion that they may all be referred to five classes:—

1. Those in which the cicatrix is too narrow.
2. Those in which it is too prominent.
3. Those in which it has formed extensive adhesions.
4. Those in which a cavity has been obliterated.
5. Those in which organs or an organ has been destroyed.

This classification has not been adopted by all, although to a certain extent it is correct.

Operations.—It must be obvious that as the cicatrices present a great variety of shapes, occupy different positions, and penetrate to different depths, the operations for their removal must be modified to suit the case.

I. *Narrow cicatrix.*—*Incision.*—Suppose, for instance, the deformity consists in the formation of a narrow band of inodular tissue, which either causes inconvenience from the motion of the parts being interfered with, or from its unsightliness—what operation is most likely to relieve it? Surgeons are divided on this point. While some recommend *incision of the band*, as performed by the ancients, others tell us that such attempts are almost, if not always useless, and what is worse, that they even increase the difficulty, each incision in cicatrizing shortening the band more and more. The latter view, though in the main correct, is rather too exclusive, for there are many examples of entire relief having been obtained by incision and pressure, reported by Dupuytren, Velpeau, Hourmann, Bérard and others. Much depends on the duration of the case, and the depth to which the cicatrix extends. If of long standing, and sufficiently deep to involve the fascia superficialis, the probability is, that the operation will fail, owing, as Mr. Earle has clearly shown, to the contraction of the muscles, which thus acquire a new sphere of action, and to the adhesions of the fascia. In recent and superficial cicatrices, however, the plan will answer, and in its execution there are *three indications* to be observed.

1. The incisions are to be made at several points, and completely through the tissue; a scalpel or bistoury is the instrument to be employed.

2. The parts are then to be separated from each other, and placed at once, if supple and yielding, in their natural position; if rigid, a slow and gradual extension is to be kept up by splints and bandages until our end is accomplished.

3. Extension is to be kept up some time after the completion of the cicatrix, and if new fræna or bands form, they must be divided.

II. *Prominent cicatrix.*—*Excision.*—When the cicatrix is too *prominent*, forming, as it sometimes does, a most shocking deformity, and often causing neuralgic pains, there are several plans employed for its removal; and as there is rarely any unnatural contraction of the parts beneath, the elevation being almost entirely confined to the skin, all the operations in use are limited in their extent to this tissue. The one most to be relied on is that proposed by Dupuytren, in which there are three things to be observed.

1. The projecting point is to be sliced off on a level with the skin.

2. The edges of the wound are to be kept apart by appropriate machinery.

3. The surface of the wound is to be frequently cauterized with argent. nit., so as to keep it rather below the level of the integuments.

Instead of slicing off the cicatrix, others, as Higginbottom, Cleg-horn, &c., prefer the application of a caustic, by which the prominence is *sloughed out*. The nit. of silver, the chloride of zinc, nitric acid, and arsenical paste have all been employed; but it is obvious that this process is more painful, more tedious, and more likely to leave a bad scar, than that recommended by Dupuytren, and should consequently be rejected.

III. *Extensive adhesions*.—When the deformity consists in adhesions by which parts are approximated that should remain separated, or others separated that should remain in contact, numerous operations have been proposed.

Dupuytren's practice was as follows:—

1. After having divided the adhesions, he dissected them freely to beyond their origin.

2. Then he drew the parts asunder.

3. Methodical and constant pressure was maintained on the point whence the cicatrix must proceed, which is always at the angle of union of the parts.—(*Clin. Chir.*, tom. ii. p. 69.)

This plan succeeds in some cases, but very often fails.

In consequence of this operation so frequently failing in the accomplishment of a cure, Sir James Earle, and Delpech of Montpellier, revived the operation of Hildanus, which consists in—

1. Cutting out the cicatrix.

2. In bringing the edges of the wound together, so as to cover the raw surface from which the cicatrix was removed.

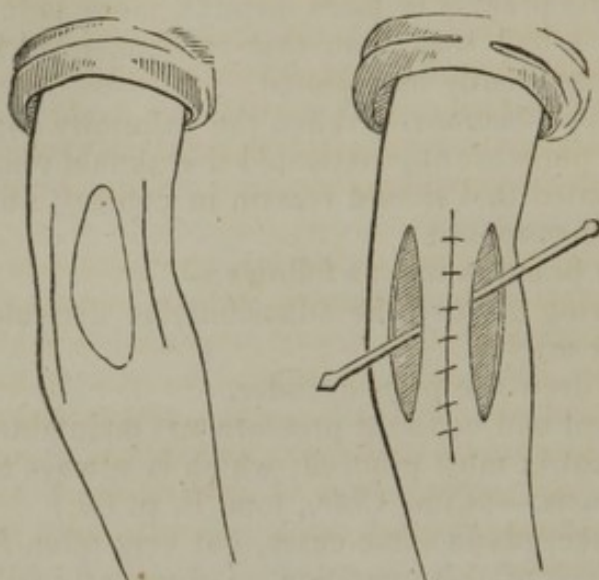
3. In extending the part by splints and bandages, and keeping them in this condition while cicatrization was going on, and for some weeks afterwards.

By this plan the contraction takes place in a lateral direction, and not in the long axis of the part upon which it is performed, and the cicatrix is soft, linear, movable, and as extensible as natural integument. This is a favourite operation with Brodie, James of Exeter, Hodgson, and many others, and whenever practicable is probably as good as any that can be devised; but where the cicatrix is broad, irregular, situated on the neck, or different parts of the face, it is obviously a method altogether improper.

I have succeeded, by slightly modifying this operation, in curing a very extensive cicatrix, involving the arm and forearm, by which the whole member was rendered useless. After cutting out the cicatrix, as advised by Hildanus, I found it impossible to draw the edges of the wound over the raw surface, and it at once occurred to me that the only method by which I could secure success would be that which I have frequently resorted to in the operation for cleft palate, when there was difficulty in approximating the edges of the

cleft, and which consists in making *lateral incisions* at some distance from the edges of the tissue to be displaced.* Doing this, and then drawing the wound together, I covered the raw surface perfectly; and then dressing the two lateral wounds with warm water dressing, made them unite by granulation. The operation

Fig. 145.



succeeded most beautifully, and may be resorted to in many similar cases.

A plan, the principle of which was clearly recognized by Celsus, has been put into execution by my friends, Drs. J. Rhea Barton, and G. W. Norris, and also by myself, in extensive cicatrices about the neck, without, however, deriving much benefit from its employment. The operation consists in—

1. Making an incision through the integuments at some distance from the origin of the cicatrix; in other words, in perfectly sound skin.

2. In dissecting up the skin and cicatrix as far as possible, without making any new incisions in the skin itself.

3. In the separation of the divided parts, so that the cicatrix slides from its original position, leaving a raw surface to heal by granulation. The operation is severe, and though sometimes useful, is not much to be relied on in cases of extensive contraction.

The operation which of all others is most entitled to our confidence, especially in cicatrices of the neck, cheek, eyelids, nose, lip, is that in which "*autoplasty*" is brought into service. In all

* This is the same as the urethro-plastic operation practised by Dieffenbach; and of which there is a description and figure in the British and Foreign Medical Review for April, 1839, p. 413.

such operations we are governed by the same principles, and pretty much the same mechanical details. They consist in—

1. Dividing the cicatrix so as to produce a raw surface in some part of its extent; or, cutting it out entirely, as proposed by Hildanus.

2. In applying to this raw surface a piece of healthy skin taken from the neighbouring parts.

3. In attaching this skin by suture to the margins of the wound in which it is inserted.

4. In approximating the edges of the wound, from which the skin has been removed.

5. In separating, by appropriate agents, the parts too closely approximated, and keeping them in this condition some time after the flap has united.

6. In applying oleaginous frictions, and motion to the new-made parts to give them flexibility and softness.

Many shocking deformities from burns have been relieved by the performance of operations conducted on these principles; for example, the eyelid, the cheek, the nose, and the lip have all been restored: but I believe I may claim the merit (if merit there be in adapting an old principle to a new operation), of having first performed an operation of the kind for the relief of extensive cicatrices of the throat.

Mr. Liston, whose surgical acumen and boldness no one will deny, distinctly states, in his last edition of the "Elements of Surgery," p. 263, "that such defects are beyond the reach of surgery," and gives a drawing illustrative of the appearance of a person so afflicted—which drawing is almost a fac simile of my case No. 1. I have also carefully examined nearly all the modern works on the subject, and find no mention of such an operation having ever been performed. Velpeau, in his "Médecine Opératoire," article "Cicatrices Vicieuses," merely hints at the possibility of such an operation, but this is all.

In very extensive cicatrices of the neck, it may be well to modify the operation so as to take a *flap from each side*, by which means we shall avoid the risk of a very large single flap.

4. *Cicatrices complicated with obliteration of cavities.*—Where the cicatrix produces partial or complete obliteration of a natural opening, as the mouth, &c., incision of the angles, and the introduction of tents *larger* than the *natural* opening, will occasionally do good; but, for the most part, all such attempts fail, and it becomes necessary to perform the operation of Dieffenbach, an account of which I published in the 18th No. of the American Journal of Medical Sciences for 1836.

5. *Cicatrices complicated with loss of organs.*—Where organs are entirely destroyed, nothing short of a "plastic operation," the aim of which will be the construction of an organ as much like the ori-

ginal as possible, offers the slightest prospect of benefit to the patient. T. D. M.]

The next subject I shall speak upon is disease of the mamma.

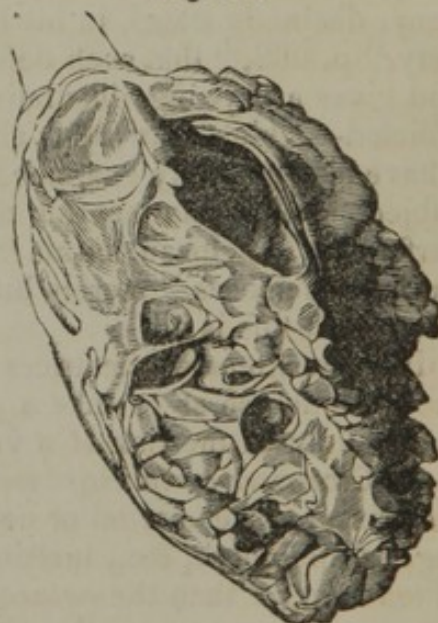
AFFECTIONS OF THE MAMMA.

I have already, in treating of tumours, described to you the diseases of the female breast, and alluded to the progress of the various forms and modifications of tumour which occur in this texture. You know that the mamma in the female is, at what is called the critical period of life, very subject to malignant degeneration; but you find disease, and even malignant disease, occurring very early in life, though not frequently. All the diseases, however, that occur here are not of the same character. You are prepared to meet with simple enlargement—hypertrophy of the gland. In young females you will find both the mammae increase enormously, become heavy and pendulous, and attain a very inconvenient size. Sometimes one only is so affected, and it will become, perhaps, five or six times larger than the other. Then you meet with fibrous tumours growing in the cellular tissue under the mamma, or in the

Fig. 146.



Fig. 147.



neighbourhood of it, and pushing the gland before them; the gland lies expanded over the front of the swelling. Here is a tumour so situated, but not quite of a simple character. Then you meet with all sorts of cystic tumours of the mamma, what are called *hydatid* breasts; under this name they have been described by the late Sir Astley Cooper. They are developed in the substance of the gland;

the gland is enlarged and pulpy, having an elastic feel at some parts, and at others distinct fluctuation. These cysts contain all sorts of fluid—sometimes serosity, sometimes a dark fluid. I have taken out, more than once, a cystic tumour from the mamma containing fluid like printer's ink; some contain bloody fluid. Upon puncturing these, the tumour entirely disappears for a time.

[The disease to which Mr. Liston refers, is by no means a common affection, in this country at least. I have seen a few examples, and the following report from my excellent friend, Dr. Isaac Parrish, enables me to offer a most graphic description of the complaint, as illustrated by one of his cases.

Case of Jane Williams.—Hydatid Tumour of the Mamma.—J. W., a healthy-looking, robust woman, from Chester County, Pennsylvania, aged about 30 years, applied for advice on account of a tumour of the mamma, which had existed for more than a year, and was gradually increasing in size. She had suffered but little pain in the breast, until recently, and her general health did not appear to be impaired. This was in the latter period of the summer of 1837, and as the weather was very hot, and no urgent necessity existed for an immediate operation, she was advised to return home, pursue a milk and vegetable diet, keep the bowels opened with cooling medicines, and return when the weather was cooler. In about two months she returned to Philadelphia. The tumour had evidently increased since her first visit, although she had been free of pain since the change in her mode of life. Several prominent points, or rounded eminences, presented on the surface of the tumour, which, on being pressed, communicated the sense of fluctuation. The skin covering the tumour was for the most part healthy, except at two or three points over the prominences; there was a tendency to thinning and lividity, and at one spot near the nipple, ulceration had occurred, from which a pale, fungous mass projected about the size of half a dollar in circumference. The nipple appeared to be perfectly sound, and occupied its usual position. The affected breast was nearly three times the size of its fellow; it was perfectly loose and movable, and some portions of the gland appeared to be unaffected. The axillary glands were natural. The patient had borne one child, several years before the appearance of the tumour. No apparent disease about the uterus or ovaries.

The case was seen by my father and Dr. J. Rhea Barton, who, after a careful examination, were of opinion that it was non-malignant, and that an operation would probably result in a permanent cure.

Oct. 5th, 1837. I proceeded to remove the tumour, assisted by Dr. Barton, and in the presence of my father, Dr. Warrington, and several other medical friends. Incisions were made in the usual manner, and the skin dissected until the whole mass was removed

from its connections. The external mammary artery, and several smaller vessels were secured. Adhesive strips, compress and bandages were applied, and the patient put to bed. Union by the first intention took place, although the cure was prolonged by the formation of an abscess under the upper flap of the wound, which was discharged through the newly-formed cicatrix. The patient recovered, and returned home in about three weeks. In a year after the operation, I heard that she continued perfectly well, but since that period I have not been able to obtain any definite information in regard to her.

The tumour weighed $4\frac{3}{4}$ pounds, contained several large cysts filled with small hydatids hanging in clusters from their parietes, and bathed in a fluid not unlike bile in colour and consistence. In one of the cysts, a fungous mass, resembling that which appeared externally, appeared to be forming. The wax preparations of J. Brano present an excellent figure or model of the disease, as taken from nature a few hours after the removal of the tumour. The surface and base of the tumour, as exhibited in wax, are almost perfect, while the curious structure of the interior is as near to nature as it could be made, without the fluid, and considering the fragile nature of the little hydatids, or seed-like particles which fill the cysts.

This specimen is, in fact, one of the best illustrations of hydatid tumour, as described by Sir A. Cooper in his work on Diseases of the Breast, which could be presented. T. D. M.]

These swellings of the breast, however, are not by any means so common as the carcinomatous malignant disease. I have stated that this is met with, now and then, in patients under thirty, whilst they still enjoy perfect health, and the functions of the uterus are going on without interruption; but it is much more commonly met with between the ages of forty and fifty, and sometimes later. You find it affecting various portions of the gland; sometimes commencing as a tubercle between the nipple and axilla, and very often in the centre of the gland, attacking the middle of the lactiferous tubes. In the first instance, the nipple becomes retracted, and there is, perhaps, a discharge of bloody-looking fluid oozing from it. Gradually the nipple is drawn in and disappears, and the skin is puckered around the spot where the disease commences; the fatty matter is absorbed, and the tumour forms a connection with the skin. While it forms adhesion externally, it also forms, sooner or later, a connection with the fascia of the pectoral muscle, and becomes more and more fixed. Then, as the disease makes progress, it extends along the lymphatics towards the axilla; and the glands become, by-and-by, contaminated, and swell. The tumour here is also of stony hardness, and tumours, after a time, form upon the intercostal spaces, and above the clavicle.

This disease, in general, makes very rapid progress. Here is a

drawing showing the appearance of the swelling, the discoloration of the skin, the adhesion of the tubercles to it, and the retraction of the nipple. These tubercles gradually increase in size; the skin all around becomes indurated; the tumour adheres firmly to the parts underneath; the axilla is occupied with the tumour; the upper extremity becomes œdematous, and the patient, with a troublesome cough, becomes hectic, and dies exhausted.

Before death, the diseased part often ulcerates. The skin is distended; being in an unsound condition, it gives way; there is thus a large cavity formed, and very often there are discharges of blood. The characters of the disease, in its very advanced stage, are here well delineated.

Fig. 148.



Then, again, the tumour, instead of presenting a firm and stony feel, enlarges in size, and is soft and pulpy. Other parts present the appearance of a medullary tumour; it ulcerates and throws out a fungus, and the fungus may or may not bleed profusely. This depends upon the state of the patient's constitution. On making a section of one of these tumours, it presents every variety of diseased structure. It may be fibrous-looking, with white bands running to the cellular tissue; it may present the appearance of a gelatinous cancer, or it may be pultaceous or medullary. There are sometimes all these heterogeneous or heterologous tissues in the same tumour. You find portions hard, and others again softened down. The vessels may give way, and extravasation of blood occur. Here are several specimens illustrating various forms of the disease.

In some cases of disease of the mamma you can give relief. In

hypertrophy, by giving support to the tumour, and causing moderate pressure, you can frequently bring it to a natural size. Pressure may be applied in various ways, by plasters, by wrapping round the chest a bandage, or you may have recourse to pressure, by the very ingenious mode recommended by Dr. N. Arnott—that is to say, a sort of wooden cup or bowl is made, of the size of the tumour, into which is put a small air-cushion, made of very fine texture. The cushion is inflated with air so far as not to be hard; that is put in the cup, and is supported by a spring like that of a common truss. This will answer very well in many cases of simple tumour of the breast.

There are some enlargements of the mamma where the structure is altered—not a simple hypertrophy, where there are masses of fibrin agglutinated together, and where the tumour will go on increasing, in spite of all that can be done. The cystic tumours cannot be made to disappear by local application or pressure. Sir B. C. Brodie has described some tumours which he says seem to diminish by the constant application of camphorated spirits with a proportion of liquor plumbi. This is kept on till the surface becomes inflamed; then it is omitted and re-applied. But when the gland is enlarged, is altered in structure, and contains a great number of these cysts, you cannot expect to get quit of them but by recourse to the knife. The disease is not of a malignant character; and if you take away the whole of the morbid mass, there is every chance of the patient remaining free afterwards. There is no contamination of the lymphatics, and the removal of the breast in these cases may be had recourse to with great propriety.

In some of these malignant diseases, if the patient applies at an early period, the surgeon may be warranted in giving her a chance, by taking away the disease. If a patient comes with a small tubercle in the breast, with some puckering and adhesion to the integument, if it feels exceedingly hard and unyielding, and has all the characters of carcinoma, but is of recent origin, and you cannot trace disease to the lymphatic system, you may be sometimes justified in taking the tumour out, but you must take the whole of the mamma with it. When the disease is at all advanced, and there is reason to think that the constitution is affected with it, it is far better to abstain from the proceeding. At one time this was the most common operation in surgery. I recollect the period when a week seldom passed over without the operation being performed two or three times in our hospitals; but now it is seldom had recourse to, and properly, too, except in cases of non-malignant disease.

LECTURE XIV.

EXTIRPATION OF THE BREAST.—NECROSIS OF THE CLAVICLE.—REMOVAL.—WOUNDS IN THE AXILLA.—ANEURISM AT THE BEND OF THE ARM.—SPONTANEOUS ANEURISM.

WHEN we last met here, I pointed out some of the fibrous and other tumours of the mamma, and contrasted their appearance with that of true cancer. There are here before you some very good specimens of these diseases. Here is a tumour under the mammary gland, and it is surrounded by a dense cellular cyst. It looks almost like tubercular matter; it is a sort of nondescript tumour: one could not, before its removal, tell exactly what it was made of, for the gland of the mamma was spread completely over it. There are also before you some of these cystic tumours. Here is a very good one, containing a number of cells, some of large size. Here is one, again, composed entirely of an interlacement of fibres, these forming a vast number of compartments. This contained a quantity of very dark fluid, and lay underneath the mamma. I have before shown you the appearance of the malignant disease in its commencement, and also in its more advanced stages.

True cancer, then, generally commences in the centre of the gland, and involves the lactiferous tubes; or it may, as you have seen, develop itself in a part removed from the centre of the gland, perhaps towards the axilla; in the end, it generally involves the rest of the structure. The disease often leads to the destruction of the nipple, comes to the surface, and tubercles begin to project externally, as represented in these casts and drawings. The tumour adheres to the deep-seated parts, then the glands become affected towards the axilla, also towards and above the clavicle. Ulceration commences in some of these tubercles, and at last a large cavity is formed, pouring out a bloody, fetid, sanious fluid. A fungus is now and then thrown out, and the edges of the sore become everted. The patient then begins to have a tickling cough; there is difficulty of breathing, effusion takes place into the chest, and she soon perishes. Perhaps the disease commences in the skin—this becomes discoloured, dark red, condensed, and tuberculated—and is, after a time, communicated to the gland; but it does not make such rapid progress in this case as when it commences under the surface. Cases are seen, where the skin, covering both sides of the chest, and all round the back, is affected. The parts are hard and unyielding, and are extensively pervaded by tubercles. I saw an instance of this the other day, in a woman under thirty years of age: the motions of the chest, and of the upper extremities, were

much impeded by the indurated state of the skin. The disease, whenever it commences, may advance so far before the patient sinks under it, that the internal organs become affected, the glands, the lungs, the liver, the uterus, and very frequently the bones, become diseased. The latter become exceedingly brittle, and now and then give way.

At a very early period, the lymphatics are disposed to take on disease. I made the same remark in speaking of cancerous affections of the lip; and here, also, although the primary disease may be early removed, and the patient apparently recovers, yet the disease is exceedingly apt to recur. It may do so in the cicatrix, or that may remain sound for some years; but then you find cancerous affection of the axillary glands, with œdematous swellings of the corresponding arm.

Some of the tumours of the mamma may be made to disappear by the application of pressure. Pressure, I told you, had been much recommended and employed by Dr. Neil Arnott. Even in malignant disease, where it is considered that it has advanced too far for the operation to be had recourse to, great relief has been afforded by pressure well applied, and the tumour has to a great extent disappeared. In many other cases, again, the pressure causes great suffering, and cannot be submitted to long. The diseased action in the part is, of course, not permanently arrested, nor can any reasonable person imagine that the patient can be freed from the constitutional tendency, that the cancerous action can be prevented from showing itself in the lymphatics around, or in organs far removed from the original seat of mischief. Although the fatty matter around the mamma is absorbed, and the tumour lies flat on the ribs, yet the disease goes on as if nothing had been done. I

have seen several cases treated in this way; and there have been some in the hospital under the care of Mr. Quain. On a post-mortem examination of patients so treated, I have found the cancerous degeneration extensive enough, both in the mamma and in other parts.

In all these cases of cystic and fibrous tumours, the operation of removing the mamma may be undertaken with a very fair prospect of success; but sometimes the disease returns, and it is sure to do so if the whole of the tumour is not taken away. I believe that the whole of this tumour was removed—the one I have already shown you as having been overspread by the mammary gland; there is every

Fig. 149.



appearance of it, from the preparation, but some twelve months afterwards, this patient returned with a fungous tumour in the cicatrix. That was taken out by a very free excision of the part, and, so far as I know, there was no return of the disease. I watched the case for a considerable time afterwards.

You meet with tumours which, upon careful examination, you scarcely think can be malignant, and are led to suppose that there will be no return of the disease. Here is a tumour of that description. I thought there was a great chance of the patient remaining free from the malady. She was a young woman, not much over thirty; the tumour was very loose, there was not the least trace of disease of the lymphatics, and she was in excellent health. It was excised: there was a great quantity of fatty matter about it: but on cutting into it it was very different in structure from what I had anticipated. It is a kind of tumour of which you will scarcely find a description in books. It was a strange, soft looking mass, and there was a great deal of coagulated blood in it, and a quantity of clot, without the colouring matter; but there was also some curious pultaceous stuff amongst it. I was therefore not very much astonished when the patient returned, some months afterwards, with a re-appearance of the disease. There were three or four fungous buds in the cicatrix. The patient was still anxious to submit to anything for a chance of cure; and looking to the state of her health, seeing that there was still no affection of the lym-

Fig. 150.



Fig. 151.



phatics, and that the glands were quite natural in the axilla, I determined on taking the diseased parts away a second time. The patient was a stout and corpulent woman, and I cut out an im-

mense quantity of the surrounding tissue—skin, fat, and even pectoral muscle,—for the tumour adhered firmly to the fascia of the pectoral muscle, and was incorporated with its fibres. Here are still some of the fibres adherent to the morbid mass. This operation was perfectly and permanently successful: it was performed, I think, nine years ago, and a twelve-month since there was not any trace of the disease whatever. This you cannot expect to be the case where the disease is decidedly carcinomatous. You do find, however, that in some few cases where, upon examining the tumour taken out, there is every trace of carcinoma, there is still no return of the mischief; but these are the exceptions to the rule.

In the non-malignant diseases, you will now and then have recourse to the operation for removing the mamma, and, in general, you will be obliged to take away the whole of the gland along with the tumour. There are, however, some cases in which you can cut below the mamma and take the tumour away, leaving the gland behind. I have had occasion to do this more than once; but if the tumour adheres to the gland, you cannot get it clean away, and it is better to remove that also; for you must not, in any instance, leave a trace of the disease behind. If you should ever operate for malignant disease, in order to insure, as far as possible, immunity from its recurrence, you take away the whole of the gland, and dissect out a large mass of fatty tissue, that may appear sound. You can remove the whole of the mammary gland, when involved in disease, much more easily than sound portions of it. In all cases, especial care must be taken to go very wide of the disease. There are, as you know, white bands spreading out from the central portion, here and there, into the fatty matter, and you must keep at a distance from these. After taking out the tumour, wash it, scrape the surface, and see that there is no indurated matter upon it; if there is, you must take out those parts which correspond with that portion of the tumour.

Suppose you have got a case of tumour of the breast, which you think you may, with propriety, remove; you must consider the way in which that operation can be done most effectively, and with the least suffering to the patient. It is, under any circumstances, a horrid-looking operation, and one which a surgeon would not undertake willingly, and certainly not unless he had very strong hopes indeed of ultimately freeing the patient entirely from disease, and saving her much misery. You must, of course, use a knife large enough to make an incision cleverly—a broad-bladed, full-sized bistoury; you must be provided with a small hook or two, blunt, and sharp-pointed; and you must provide, also, means to stop the bleeding—artery forceps and ligatures. Much of the old apparatus was sufficiently coarse. I have here the large clasp-knife with which old Boyer used to cut out breasts. In some of the old books there are represented the knives which were used, and also

the forks. The tumour is represented by Parmannus, an old Silesian surgeon, with a huge flat-pronged fork stuck through it, and there is a great knife, by the side of it, with which the breast was to be shaved off, integuments and all! Some used to transfix the tumour with a couple of coarse ligatures, by means of which it was pulled forcibly from the ribs, and then it was cut away with a large bladed knife,—the parts being thus left to heal by granulation, as they best might. Even in Heister's "Surgery," you will find some very strange apparatus described for holding and shaving off diseased mammæ—instruments upon the same principle as some of those of late so much in fashion for taking off enlarged tonsils. The examination of the plates alone is enough to make one's blood run cold. In those days they cut off tumours, instead of cutting them out, as we do now.

You must, as I have told you, take away the whole of the disease; but you can generally do that, and yet leave integument enough to cover the wound, or nearly so. Sometimes, however, this cannot be effected; but if you are to remove the affection at all, the whole must be removed, at whatever cost. When the disease involves the entire gland, and whenever you purpose to take the whole of the mamma away, you will be obliged to make two incisions, embracing the nipple and more or less of the integument around it. Having the arm carried out, and putting the parts on the stretch, you commence the wound, towards the axilla, and draw the knife right over the gland. Make the lower incision first, in order that the parts may not be obscured by blood. You then make the upper incision, which is by no means so long a one, in such a way as to surround the nipple. You then take hold of the skin with the fingers of the left hand, dissect it from the tumour, and detach it thoroughly. Having thus got the mass exposed, you will begin to dissect it from the pectoral muscle. It is always well to take away the fascia of the muscle. You very frequently find that the disease has some connection with it; and it very often seems to re-commence in this tissue. You have a good deal of bleeding, and you find that most of the vessels spring from immediately under the corner of the pectoral muscle. The assistant puts his finger there; and there may also be some branches from above, which must be stopped, in the same way, from pouring out their contents. You then go on detaching the tumour, taking care, as I have said, to keep wide of it. By proceeding thus, you may, with perfect safety, remove such tumours of the mamma as you see here, of seven, ten or twelve pounds, without being obliged to tie a single vessel till after the dissection is quite completed. Having got it out, you look at the tumour carefully, to see that the whole is removed, and being satisfied on that point, you commence tying the vessels, placing some ligatures upon them, and then cover the wound, for a time, with pieces of lint, dipped in cold water, and frequently

renewed. A bit of tissue, such as the goldbeater's skin is made of, may be laid over the raw surface, and the lint upon that; thus the lint is prevented, in the first instance, from adhering; after discharge has been established the dressings are easily enough changed, and without pain. It has been recommended to place the edges of the wound together at once, to keep them in apposition by sutures and strips of adhesive plaster, to put in dressings, and retain these by a bandage passed round the chest; it has been advised, also, that a second roller should be applied, very tightly, for some hours, to prevent hemorrhage. But if this be done, in nine cases out of ten the patient will be subjected to intense pain; the blood will ooze under the bandages in spite of all the pressure, and you will be under the necessity of pulling all off, turning out the coagula, and perhaps tying more vessels. If you should, after all, persevere in this plan, you will find, at the end of four or five days, that there is great distension of the wound; it is filled up with a putrid clot, and, for a considerable time, there is a frightful discharge of very fetid matter and slough; whereas, if you apply merely a pledget of wet lint for five or six hours, then put in one or two sutures, (these even may not be required,) and put the edges together with isinglass plaster, in all probability the greater part of the wound will heal by the first intention, and the cure will be thus much abridged; there will be very little discharge, and no pain to complain of. Of course, unless the parts come readily together, and without strain, no attempts should be made to hold them in apposition; anything but good will come of such practice.

You are obliged now and then to remove the male breast. It becomes affected, much less frequently, to be sure, but in the same way as the corresponding organ in the female. Here are specimens of the disease, and it runs exactly the same course—lymphatics become affected, ulceration takes place, and the patient will probably perish in the end, in consequence of internal malignant disease. You sometimes, by taking it early, prevent the disease following this course, but it is very apt to recur here or in other parts. In cases where the operation has been performed, on account of malignant disease, you scarcely ever have an opportunity of interfering again to advantage. If, in these cases, there is any reason to think that the lymphatics are affected, of course you cannot meddle with them.

AFFECTIONS OF THE CLAVICLE.

The clavicle is sometimes the seat of disease. Now and then, but not often, necrosis takes place, generally in consequence of violent injury. It may occur to a slight extent, or the whole of

the bone may be destroyed—mortified. You must wait till nature has completed the process, and then make an incision and take out the sequestrum. I have a specimen in my collection of the whole of this bone thus taken away. There was, in this instance, as you will easily understand, no reproduction: the arm fell forward, and the motions above the head were lost.

This bone is now and then the seat of osteo-sarcoma, and is affected by a sort of cartilaginous tumour. The disease commences in the bone, or in the medullary canal. Again: you meet with softish tumours affecting the clavicle, of a bad kind, what have been called "*tumores mali moris*." These cannot be interfered with, especially if the glands are affected; but where the disease is of the same nature as that I described as occurring in the upper jaw—fibro-cartilaginous—then you may remove that part of the bone which is affected, or even the whole bone. This has been done a very few times. I once took out the collar-bone affected by a very large soft sarcomatous tumour, very much against my will, for I was well satisfied that the disease was of a very bad kind. It had attained a large size in four months, yet the patient was in very good health. I at first declined the operation, but I was assailed with great importunity by the patient's friends, and by two medical men who had attended him. I refused over and over again to interfere, but at last they came back, fortified with the *written* opinions of two of the most experienced surgeons in town—both most deservedly respected and looked up to for advice in surgical matters—that the disease must be taken out, and I was told that I must do it. Like a great simpleton, I at last consented to perform the operation, on the condition that one of these gentlemen should be present to assist me. He did attend, and assisted most admirably; the whole of the disease was extirpated, but, as I suspected, in three or four months the patient returned with a tumour in the axilla, and tumours in other parts, which very soon made frightful progress, broke out, and carried him off. In other cases—those of fibrous or cartilaginous tumour—I should have no objection to remove the clavicle, because, although it is a formidable operation, it is not attended with immediate risk to life, and you are therefore justified in having recourse to it. It is attended with some little difficulty; there are very important parts under it; but by dissecting close upon the bone and tumour, you avoid the nerves and vessels.

You expose the tumour, and get hold of the external extremity of the bone; or if the tumour is towards the shoulder, you may cut it through, near the clavicular articulation. You first cut down upon the bone, and divide it with as little disturbance of the parts as possible, with the view of avoiding hemorrhage. Having cut the bone through by means of a small saw, you detach it thoroughly from the soft parts. Small copper spatulas are of immense

use in this operation; for part of the dissection requires to be made at some depth, and you must have the parts well held asunder, in order to get a proper view of the organs you are amongst. Here is an old-fashioned instrument, which I found exceedingly useful in this operation. You must be prepared for the difficulty of managing the clavicle, after you have cut it through; you therefore fix this screw into the bone, and cut in the way I now do. You see the advantage this proceeding gives you over the tumour; but for this the bone would have been slipping out of my fingers: it is a capital lever. So much for taking out the clavicle—an operation that you will not be called very often to perform. [This operation has been performed in America by several surgeons, among whom may be mentioned Mott, Warren and Mussey. I have also taken away the larger portion of the bone in three cases of tumour.

T. D. M.]

WOUNDS IN THE AXILLA.

Then you may meet with cases of wounds in the axilla, or under the clavicle, and in circumstances of this kind you will be called upon to cut down and tie the vessel where it is involved. If you are called in within a few days of the injury, and blood has been bursting out from time to time, it will be better at once to tie the vessel where it is wounded, above and below. You are well aware that were you to tie the vessel only at one point, and that close to the wound, you would almost certainly have profuse hemorrhage from the other. Instead of tying the subclavian, in cases of recent wounds in this region, you must cut down and tie the axillary portion of the artery. You can tie it immediately under the clavicle, in the first part of its course, or low down. In the middle it is difficult to get a ligature round it, in consequence of the nerves interlacing and covering it. You get down upon the vessel by dividing freely the fibres of the larger pectoral muscle; you divide them as much as possible in their course. When you have got into the space, you find the vein, which is rather troublesome in this neighbourhood; but you can avoid it easily enough, and pass a ligature round the artery. If the artery is wounded in the lower third of its course you would cut down under the border of the pectoral muscle, throwing the arm uncommonly well back. You can then trace the vessel up to the point where the blood issues. You may tie it easily enough in this way, pretty high in the axilla, without interfering at all with muscular fibres.

ANEURISM AT THE BEND OF THE ARM.

You require to expose this vessel lower down, and that on various accounts. You very seldom meet with spontaneous aneurism lower in the upper extremities than the axilla. It has been seen, although very rarely, indeed, at the bend of the arm; I refer to aneurism arising from the giving way of the internal coats, and the dilatation of the external ones—the true aneurism, as described by Scarpa. Scarpa mentions one case of it; one or two others are recorded. It has been my fortune to see one case: it occurred in a stout, middle-aged man, a ship-builder. He attributed it to the use of the arm in wielding a mallet in driving bolts. Formerly aneurism occurred at the bend of the arm, very often, indeed, as a consequence of incautious blood-letting, and it is still occasionally met with, resulting from this cause. When it has attained a large size you may be called upon to tie the humeral artery for it. Aneurism does not follow as a necessary consequence from the vessel being wounded during the attempt to bleed. If the person who bleeds knows what he is about he will not wound the vessel; but if the accident take place, and he knows something of his profession—and if he did, you will say he could not commit such a blunder,—or if any one who is properly informed interferes at the time, and adopts proper measures, the effusion of blood into the cellular tissue—in other words, the formation of a cyst—may be prevented. After the blood has escaped in any quantity into the cellular tissue, or has been suffered to gain access to the neighbouring vessels, and has caused a condensation of the cellular tissue, then it is impossible to prevent the formation of aneurism. If you are called in early enough, and bandage each finger separately, put a compress on the palm of the hand, and carry the bandage up to the wounded part, place over it a very small compress, and then three or four others, raising them to a sufficient height, and twist the bandage tightly over them in the form of the figure 8, in all probability you will prevent an aneurism. I have seen several cases treated in this way very successfully. You will easily ascertain that the vessel has been wounded by the position of the wound, and the exit of arterial florid blood in jets—it soon tells its own tale.

Supposing that an aneurism is formed, and it is astonishing how rapidly the condensation of the cellular tissue takes place, and a regular cyst is produced. I have a preparation of an aneurism of two or three days' growth, with as regular and beautiful a cyst as you would wish to see in any aneurism. The patient was brought to the hospital, and died, from an injury of the head and chest, in four days: on the first day of admission she was bled. It was ascertained that the vessel was wounded, but means were not taken promptly enough to prevent an effusion of blood around the wound.

If the tumour goes on increasing, and attains the size represented in this cast, a large pulsating tumour, which diminishes only on pressure at the upper part of the arm, on the trunk of the humeral, and from which the blood can be squeezed, in some measure, then you have to consider what treatment you would adopt. These aneurisms are, I believe, sometimes to be cured by pressure. By bandaging the lower part of the limb, pressure may be borne on the humeral artery, and maintained by a proper apparatus, a sort of ring tourniquet. This should be put so far under the patient's control that he may relax the pressure at pleasure. It is only necessary to retard the flow into the tumour, so as to favour coagulation of its contents; and this is to be effected by continued, but not violent compression. I have seen more than one aneurism disappear in consequence of the application of pressure. One of the first cases of any importance which we had in this hospital, when it was opened to the public, was a case of brachial aneurism. Pressure was made on the tumour itself; the patient had experienced considerable pain in consequence; the tumour began to be reduced, the pulsation became indistinct, and by letting it alone it dispersed. There is a preparation in the museum, presented by Mr. Oldknow, who had an extensive practice in Nottingham. It was obtained from a patient who had suffered a wound of the brachial. He had aneurism formed, but it was cured by pressure. There is no doubt that much is to be done for aneurism, in some situations, by pressure well applied. But suppose that the tumour still increases, and the patient cannot bear pressure, you may then be called upon to tie the humeral artery inside the arm. Sometimes this has not answered the purpose. This may have arisen in consequence of the proper vessel not being tied, in consequence of there being a high division of the humeral. This, as you are aware, is by no means uncommon.

Suppose that in opening a vein the radial artery has been wounded, the surgeon may, in taking the edge of the biceps as his guide, have gone down and tied the ulnar. A surgeon who has his wits about him would not do that, because he would take care, before

Fig. 152.



tightening the ligature, or even passing it under, to ascertain, by pressure against the needle, that it produced the desired effect. But it has happened, where the humeral has been tied, that the anastomosis has been so strong, that the tumour has not been permanently diminished, and there you may be called upon to cut down and tie the vessel above and below the wound. If you perform an operation for a recent aneurism, this is undoubtedly the best plan to pursue: at once make an incision at the bend of the arm, pass a probe into the opening in the artery, and separate the vessel a little above and below, and then put on ligatures. You would have recourse to this where pressure had been applied imperfectly, as I have seen every now and then; and where ulceration has taken place over the tumour, bleeding has occurred to an alarming extent, or has been threatened.

ACCIDENTS REQUIRING LIGATURE OF THE HUMERAL ARTERY.

You will be called upon to tie the humeral on other accounts—for instance, for accidental or intentional wounds, as in suicidal attempts, or where there is a wound about the hand, with secondary hemorrhage. You will very often meet with cases where persons have received punctured wounds in the forearm, or in the palm of the hand. A man falls down among a quantity of glass; or, in a state of intoxication, he may thrust his hand through a pane of glass. The parts are, perhaps, a good deal lacerated, and there is profuse bleeding at the time. It is checked, and the part bandaged up, but bleeding takes place from time to time, the parts become much swollen in consequence of inflammatory action, unhealthy abscesses form here and there, blood is extravasated in the cellular tissue and fills the cavities of the abscesses, and the hand becomes at last enormously distended. The fluid blood now and then bursts out impetuously from the ulcerated openings, in spite of all the pressure that can be applied. In cases of that kind, you will be warranted, in the first instance, in enlarging the wound and trying to secure the vessel where it is divided; the more so if it is a portion of the superficial palmar arch. It is from the deep parts that the most troublesome bleeding takes place. But when the hand has become greatly swollen, and is full of matter and blood, you cannot expect to discover the vessel, or, if you did, it would not hold a ligature long enough to arrest the bleeding permanently. In some cases I have dilated the wound, turned out the coagulated blood, put in a compress, retained it there four or five days, and this has proved effectual. This plan, however, may fail, and then you have no alternative but to tie the vessel at a distance from the wound. It will not do to tie either the radial or the ulnar, or both together,

because the blood may be furnished from the deep arch, by means of the interosseous, and after all you may be obliged to do what you ought to have done at first—tie the humeral, which is certainly the most effectual proceeding, and one which will not often disappoint you.

I have a good case here in the case book of Mr. Potter, one of my former house surgeons. The injury was produced by the explosion of a flask of gunpowder. This is an accident you are sometimes called to treat. Boys are fond of making a train of powder; one goes along with a powder-horn, and some one of his companions sets fire to the train before, perhaps, it is completed. It runs along, and away goes the powder-horn, and part of the boy's hand with it. Two or three fingers are pulled off, perhaps only the thumb. In some of these cases, the hand is taken clean away; I think I have somewhere a thumb which was blown over a house, with its flexor and extensor tendons. You often see these pulled out with the finger. Here is one which was torn off by a horse, also with the whole length of the tendons separated from the muscular fibres. You often meet with accidents where the thumb is pulled off, and the hand, with the blood-vessels and nerves, extensively torn. Now and then the articulation is exposed, but the thumb is not quite removed. You clean the wound as much as you can, take away the ends of the bones, if broken or bruised, and put them down in their place. Accidents of this kind are attended with all sorts of varieties. Sometimes only the soft parts are involved; sometimes the joints are injured. In this case, the man was holding a flask of gunpowder. "The flask was an old one, (copper,) and the patient believes that there was a small hole at one end, which allowed a few grains of powder to fall through on the fire, near which he was standing at the time of the accident. He states that he was holding the flask very lightly, in the hollow of his hand, at the time; that the pieces were blown backwards, without entering, as he supposes, the palm; and that the wound appeared to be produced by the forcible tearing asunder of the thumb and palm of the hand. The hand was much scorched and blackened by the explosion; the cuticle partly stripped from the cutis; the fleshy part of the ball of the thumb was deeply lacerated and the thumb almost thrown upon the forearm. The pain was very severe; the bleeding was comparatively slight, and soon ceased altogether. The whole hand and forearm ached violently and felt numb and heavy.

"On admission, some days after the occurrence, the patient was suffering from the violent inflammation which had already commenced in the injured parts. The whole hand, but more particularly over the outer and back part of the thumb, was very much swollen, hot, red, and excessively painful; the lower part of the forearm and wrist were also red and œdematous, pitting on pressure

and very tender. A deep, ragged laceration existed between the thumb and forefinger, which appeared to extend nearly down to the carpal end of the first metacarpal bone. The sides of this wound were blackened, and covered with foul fœtid sloughs. A small quantity of thin, bloody discharge, of a very offensive odour, escaped. A little behind this laceration, another larger but more superficial wound appeared, which extended from nearly the middle of the palm, round the root of the forefinger to the dorsum of the hand. The cuticle was partially separated from the palm, leaving the raw and tender cutis exposed. Pain, burning and throbbing; pulsations of radial artery full and quick; tongue dry and coated."

The case went on very well; it was treated carefully. The thumb was put in its place, the hand and arm were elevated, and fomentations employed. But ten days afterwards, Mr. Potter was called down to see the patient in the evening. The nurse said he was bleeding profusely. He found him pale and faint, lying in a quantity of half-coagulated blood, some of which had run over the floor. As near as he (Mr. Potter) could calculate, from the coagula which he afterwards took up, the patient had lost sixteen or eighteen ounces of blood, which appeared to be arterial. The hemorrhage had partially stopped; but the patient had become faint from the bleeding. Bandages were put on, and the patient went on very well for a day or two more. This occurred on the 23d; on the 27th, Mr. Potter was again sent for, hurriedly, on account of great pain, which had come on suddenly, about a quarter of an hour previously, and was rather increasing. The patient said that the pain was of a throbbing, bursting character, and complained of the bandage now feeling tight, though it did not feel so before. Mr. Potter continues:—"I gently removed the bandage and compress, but this did not lessen the feeling of tightness which the patient complained of. There was no bleeding. On examination, I found an elastic, rounded, pulsating swelling, on the outer aspect of the hand, between the first and second metacarpal bones. There was no redness of the skin of this part, although the back of the hand appeared somewhat inflamed. The finger could be pressed into the swelling, which was very elastic, but on removing the pressure the tumour instantly regained its rounded form. The pulsation could be felt over a space of about one and a half or two inches square, and was quite as evident when the finger and thumb were pressed laterally on the swelling, as when they were pressed directly on the most prominent part of it." All the characteristics of false aneurism. "On pressing over the course of the radial artery at the wrist, so as to stop the flow of blood through it, the pulsation in the tumour was considerably diminished, and the patient instantly exclaimed that the pain was relieved. It was evident that a diffused false aneurism of the termination of the

radial artery had occurred." Many people would, from this circumstance, have thought that tying the radial artery was sufficient.

"Mr. Liston arrived about half-past eight in the evening, and immediately proceeded to apply a ligature round the brachial artery." That was the right course to pursue; it saved the patient a great deal of trouble, and us a great deal of difficulty. The operation is now described. "The patient was brought down rather lower in the bed than usual, and the arm somewhat abducted and supported on a hard pillow. Mr. Liston sat on the outer side, and commenced by making an incision about three inches long on the inner edge of the biceps. This incision entered the muscular tissue, so that the skin and fascia were completely divided; the biceps was then held to the outer side by means of a silver retractor, and by this means the median nerve was exposed; the cellular membrane over this was divided with the scalpel, and the nerve drawn gently to the inner side with a flattened and blunt hook. On sponging out the wound, two parallel elevated blue lines, about a quarter of an inch apart, appeared, marking the situation of the *venæ comites* of the brachial. The cellular membrane between these two points was carefully pinched up with the forceps and divided by the scalpel, and the brachial artery—rather of a violet pink colour—was distinctly seen, somewhat tortuous, and forcibly straightening out at each pulsation of the heart. The sheath of the artery was separated slightly from its coats, and a strong silk ligature passed round it by means of an aneurism needle; this was tied in the usual manner, and the wound brought together by two points of interrupted suture and isinglass plaster. Immediately on tightening the ligature the pulsation in the tumour ceased altogether, and the patient was quite eased from the acute pain which he was the minute before suffering in the hand, and which he declared was much worse than that caused by the operation. The wound in the hand had burst out bleeding, but this also ceased when the brachial was secured."

The patient then went on very satisfactorily. This is one of many cases which I might detail to you. There is another case or two here, where there was laceration of the thumb, with less serious consequences. These are cases which you must be prepared to meet with, and to treat properly and scientifically. I believe that the rule of tying the brachial is the proper one in such cases.

LECTURE XV.

ANEURISMAL VARIX.—ACCIDENTS IN BLOOD-LETTING; THEIR BAD CONSEQUENCES.—WHITLOW.—DISEASES OF THE ARTICULATIONS.—AMPUTATION OF THE UPPER EXTREMITIES.—AMPUTATION OF THE PHALANGES OF THE FINGERS.

At our last meeting I spoke of affections of the arteries.

In recent wounds, and some small aneurisms of the radial artery arising from wounds, the simplest plan to pursue, instead of tying the humeral, is to cut down through the wound, or upon the tumour, and put a ligature on both ends of the wounded vessel. You may, in some cases, think it necessary to tie the humeral, but that is not the general rule. You then tie the vessel about the middle of the arm, and you have the edge of the biceps to guide you. Cut on the edge of this muscle through the skin and fascia, making an incision about two inches and a half long. You thus expose the vessel, with its accompanying veins, to a slight extent. You separate the cellular tissue *with the point of the knife*, have the median nerve gently held to the ulnar side, and then surround the vessel with a single ligature. The artery is very superficial, and a probe will answer the purpose of carrying the ligature. I have before cautioned you against using an aneurismal needle with too sharp a point, but it ought not to be too blunt. There was a needle known under the name of Sir Astley Cooper's, with a large bulbous end. This was a most improper instrument to use; by the use of it the vessel was necessarily detached from the parts underneath, and perhaps was thus deprived of the power of taking on healthy action. Where the operation is properly performed, and the vessel is not over-detached, you put on a single ligature. But if by any chance you should be concerned in any operation—say that you were called to assist another practitioner, and the vessel happened somehow to be very much detached from its connections, and this is apt to occur where there has been some scraping about, and tearing and finger-ing of parts to find the vessel,—it may be more wise to apply two ligatures, one close to the attachment of the vessel above, and another lower down, so that if any sloughing or ulceration of the coats should take place, it would be between the ligatures, and the patient would thus be safe.

ACCIDENTS FROM BLOOD-LETTING.

Aneurism of the humeral artery or its branches used long ago to take place very frequently, as a consequence of awkward and rash attempts to open the vein at the bend of the arm ; but at the present day you very rarely meet with this accident. The operation of blood-letting is not, perhaps, so frequently performed as it once was, and by better informed practitioners. Formerly, it was the practice to bleed every spring, and people did not think themselves safe unless recourse was had to it. Every person then thought himself capable of performing the operation—gardeners, barbers, and midwives. Aneurism at the bend of the arm was one of the most common cases presented to the practitioner of surgery ; I have not seen more than four or five cases in our hospital for the last ten years. When, however, the vessel is merely punctured, you may get quit of the effects by the application of a proper bandage : if it is more extensively opened, as sometimes happens accidentally, or in attempted suicide, ligatures must at once be applied above and below, and if aneurism should follow puncture, the ligature of the vessel at the bend of the arm, or in the middle of the upper arm, will generally suffice. You must be careful, as I have told you, that you tie the right vessel.

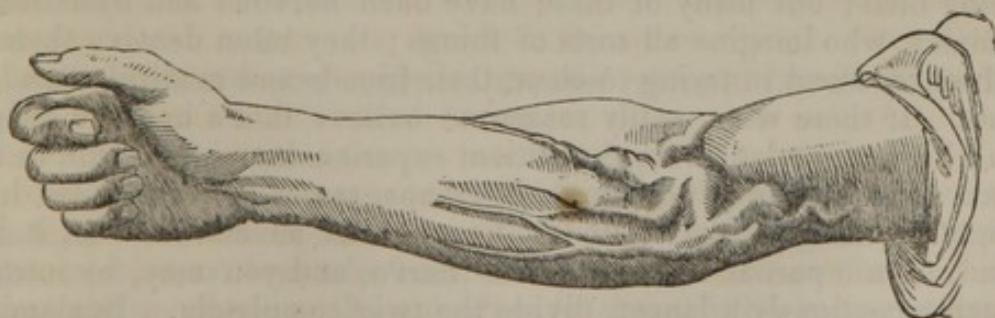
But there are some bad consequences arising from bleeding, besides these more serious ones. It is useless for me to tell you how to open a vein at the bend of the arm. It is the ambition of very young men to perform this operation, and I dare say you have all learned to do it as well as I can. In order to manage it well, you must have a properly-shaped lancet, an instrument in good order, clean and keen. There are instruments expressly for the purpose of opening veins. It will not do to open an abscess, or bubo, with a lancet, and then thrust it into the arm. From various circumstances, from using a blunt instrument, or a foul one, or not managing the wound properly, it sometimes does not heal by the first intention. Suppuration takes place about the wound, and if the opening in the vein does not close, there may be secondary hemorrhage. But a worse consequence is the absorption of pus. A small quantity of pus in the blood will produce dreadful mischief ; it will leaven the whole mass : the patient is attacked with shivering, fever, pains in his joints, difficulty of breathing, and so on, and often dies very quickly. The operation of blood-letting is not to be undertaken rashly, and when you perform it, it must be done in a proper manner. The wound must be made in the right direction, and you must manage it well afterwards, so as to procure healing by the first intention. I do not often bleed patients, but one of the last I bled died, in some measure from the effects of this supposed simple and trifling operation. He was a gentleman in a state of

furious delirium. The physicians attending him had thought it was right that he should lose blood from the arm. There was no apothecary at hand, so I borrowed a lancet from the doctor and opened a vein. The patient was himself very unwilling to be bled, but he was over-persuaded. The vein having been opened, the arm was put up carefully, but the poor gentleman took it in his head that the healing of the wound was to be much promoted by constant motion of the part, and there was no persuading him otherwise, or restraining him from bending and extending his arm without interruption. The consequence was, the wound did not heal, and he died in a few days, no doubt from the effects of pus being taken up into the circulation.

You may find that, from one cause or another, abscess forms after blood-letting; but this is not a common occurrence. It only arises where a bad instrument is used, and where the arm has not been kept quiet long enough. It is of great consequence to procure union by the first intention; but, independently of the operation itself, bad consequences may follow, such as inflammation of the vein. This will sometimes be found to prevail very much at particular seasons of the year, and is owing possibly, to the state of the atmosphere. The wound does not heal very well; the patient complains of fever; there is then pain along the course of the vein, and hardness. The veins become thickened and coated with lymph; pus is formed, which sometimes gets into the circulation; the constitution becomes broken up, and the patient is almost irrecoverably lost.

Now and then an artery is wounded slightly through the vein; but aneurism does not form. There is, as I have said, but a minute opening into the humeral, or one of its branches; the external wound is closed up, and the surgeon does not, perhaps, notice that mischief has happened. The arterial blood that escapes is mixed up with the venous: it does not come away with great force; the bandage is applied as usual; the vein is pressed against the artery, and they adhere: a permanent communication is thus formed between the vein and the artery. On putting the ear to the part which has been wounded, you distinctly hear the blood passing

Fig. 153.



through the small aperture with a peculiar thrilling noise, very like that produced by the wheel in a musical box. There is a sort of indistinct pulsation in the vein and its branches, and it is distended for a very considerable way above and below the wound. This case is known to surgeons under the name of *aneurismal varix*. Here is a drawing representing it. It is a sort of varicose state of the vein, in consequence of the access of arterial blood into it.

This is not an affection requiring active surgical interference, and the patient may go on in this condition till the end of his life. He has the full use of his arm, and there is no necessity for interfering with it. Surgeons have cut down and tied the vessel, but unpleasant consequences have sometimes followed, such as secondary hemorrhage, and so on. Let the case alone, or if you do anything, put on an elastic bandage or roller to prevent excessive distension of the veins.

There is another though very rare affection, described, I think, first by Dr. Physick, of Philadelphia. John Bell thinks it is an aneurism combined with varicose veins. The vein and artery are opened at the same time. In these cases extravasation may occur betwixt the two vessels and a sac be formed, and, at the same time, a communication may still exist between the sac and the vein. You have then a distinct tumour, together with a varicose state and thrilling in the veins. I have never met with such a case.

There are other consequences described as resulting from blood-letting, such as the effects arising from punctured tendons and puncture of the nerves. Our old surgeons, and some of those whom you might almost consider moderns, even those who wrote twenty or thirty years ago, confounded the effects of these wounds one with another. They talk of wounds of tendons and wounds of nerves in the same chapter. Bad consequences do not necessarily follow upon wounds of the fascia of the forearm. It must take place sometimes even when the artery is not opened, though few will be found so rash as to thrust a lancet sufficiently deep into the arm to cut the fascia to any extent. It may happen that some branches of the cutaneous nerves may be wounded. This cannot be avoided very well; and it is said that injurious consequences sometimes result from this accident. I have seen patients, certainly, complaining of great pain in the arm, and nervous twitching, from being bled; but many of these have been nervous and hysterical females, who imagine all sorts of things; they often deceive themselves, and end in trying to cheat their friends and medical attendants. If there were really reason to believe that a nervous twig had been wounded, from the patient experiencing violent pain in it soon after bleeding, you might, perhaps, remedy the mischief by slightly enlarging the wound. The painful affections arise, it is said, from a partial division of the nerve, and you may, by introducing cautiously a lancet, divide the twig completely. Benjamin

Bell recommended some desperate operations for affections of this kind. He advises his readers to divide all the parts down to the periosteum; he would almost have one cut the arm off. He was one of those writers I have alluded to, who had but a very indistinct acquaintance with parts and their functions, and gave, consequently, a very muddled account of many surgical matters. I need not caution you against such wholesale and unmeaning butchery.

I have spoken of affections of the bursæ, and inflammation of the fingers, and there is therefore no necessity for going over those subjects again. I shall be obliged to allude to whitlow by and by, as one of the causes which oblige us often, however unwillingly, to resort to removal of portions of the hand.

CONTRACTION OF THE FINGERS.

You meet now and then with a contraction of the fingers, which has been supposed remediable by operative procedure. It frequently occurs in the middle period of life, and one or more fingers are drawn towards the palm of the hand. They are often worse than useless, for they are very much in the way of the patient in laying hold of anything. What it arises from I cannot tell. It sometimes takes place in gouty subjects, and in those who have used their fingers very much. I have seen it occur in performers on stringed instruments, but it frequently takes place where you cannot account for it in any way. It is a very serious thing for the patient, for, unfortunately, little can be done in the case.

It has been proposed to divide the tendons, and I have done so, but I should be reluctant to repeat the experiment. It is not the tendons which are at fault, but the aponeurosis; it becomes thickened and contracted; the integument of the hand is puckered, and a strong adhesion takes place between the tendons and their sheaths. I have dissected specimens of this disease, where the adhesions were so strong that by no treatment could they have been got rid of. It has been proposed, in recent cases, to apply mercurial ointment, and other medicines supposed to dissolve indurations, but I do not think that any great good arises from them, nor does any advantage arise from subcutaneous incisions.

AFFECTIONS OF THE ARTICULATIONS OF THE UPPER EXTREMITIES.

You meet with diseases of all the articulations of the upper extremity; diseases in the large joints—the shoulder, the elbow and the wrist; scrofulous affections, commencing in the cartilage, or the synovial membrane. By attending to these in the incipient stage,

you may prevent a degeneration of the joint. You succeed in establishing a cure much more readily in the upper than in the lower extremities; for you can restrain their motions more thoroughly. It is true that diseased action goes on much more rapidly in the former than in the latter, but it is equally true that, under favourable circumstances, healthy action also proceeds more vigorously.

But you may be called upon to treat these diseases in their advanced stages. The shoulder may be involved in disease, large abscesses may be formed, and, if the patient can bear the parts to be moved, you find a grating of the bones upon each other. In some cases you may pass a probe completely into the osseous tissue, and, in order to remove the disease, it may be necessary to take out the ends of the bones forming the shoulder-joint. The same may be said with regard to the elbow-joint. These joints are very favourably circumstanced for the removal of the affected portions of bone, particularly the elbow-joint. Cases, however, are met with, where the disease involves so much of the bones and the soft parts, and the patient's health is in such a precarious state, that you would not be warranted in having recourse to this plan, and you must amputate the member. I mentioned, when speaking of the joints, cases in which this proceeding had been contemplated, but where it was thought more prudent to amputate, and where that course was quite justified by an examination of the parts. I mentioned one case where the ulna was the seat of abscess, the abscess extending almost the entire length of the bone. In another case the humerus was denuded an inch and a half above the articulation, and was perforated by ulceration to a great extent. These are cases in which, if you had attempted to excise the joint, you would have failed in bringing about a cure. You must then have had recourse to amputation, and probably the patient would not have been in a condition to bear up against the shock of a second severe operation.

You meet with diseases and injuries of the hand, which require amputations of the whole or portions of this most important organ. I need not tell you that it is of the utmost consequence, when you are obliged to operate, that you should take away as little as possible. The lopping off of a part of the body is a proceeding which one only has recourse to under the most pressing circumstances, and one which must be avoided by all possible means. It is one of the opprobria of surgery, that you are under the necessity of taking away portions of the body in order to effect a cure, but under many circumstances it is inevitable. You can now and then remove a limb, or great part of one, with a pair of scissors; I have often done so. This operation, however, as Hildanus says, is not accompanied with all the "grace and splendour" of an amputation in sound parts, and attended with effusion of blood, but, under many circumstances, it is the safest and the best mode of proceeding. You meet with cases of spontaneous mortification, or mortification arising from exposure to intense cold and then to sudden heat; a portion of the member

perishes, and the destructive process goes, perhaps, to one of the articulations. It is rare to meet with this occurrence in the upper extremities, but occasionally it does take place, and the mortification runs up to near the elbow or shoulder joint, and there it stops. In these cases, the wiser plan is, not to have recourse to a division of the sound parts, but to wait till a line of demarcation is formed, and the part is ready to drop off; a simple and painless amputation may then be followed by a good cure.

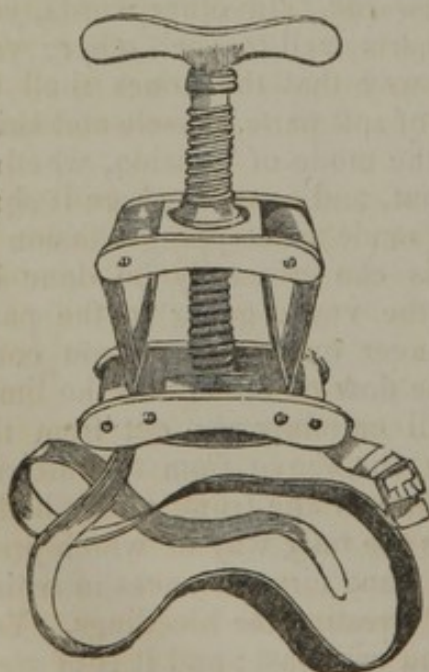
But much more frequently you are under the necessity of cutting sound parts in order to free the patient of severely injured or diseased parts, to save the system from contamination, and to preserve life. You will try to dispense with this as long as you can, but when you must resort to it, you will endeavour, by all means, to mutilate the patient as little as you can. There are many cases in which it is evident that the patient would perish unless the operation were performed. "It is always better," says Dionis, an old and good French surgeon, "that a patient should live with three members than die with four." But many patients will obstinately insist on going to the grave with four members, and will not submit to the operation until it is too late to resort to it. Amputation, as you will find in practice, is frequently called for, and very often followed by a successful result.

AMPUTATION OF THE SUPERIOR EXTREMITIES.

You must study to perform the operation with as little pain to the patient as possible, for that purpose as quickly as you can, and so to leave the truncated part that it shall not be a source of suffering and annoyance to the patient afterwards. In other words, you must proportion the hard and soft parts well to each other; you must make the incisions in such a way that the bones shall be deeply covered with a good quantity of soft parts, muscle and skin. You must determine beforehand on the mode of incision, whether it shall be made from within or without, and exactly where it shall take place. You must think of the mode of stopping effusion of blood during the operation, and this can generally be done by moderate pressure on the trunk of the vessel going to the part. By well-applied pressure with the finger on the vessel, you completely stop both the pulsation and the flow of blood into the limb. The blood which is in the limb will certainly run out from the veins, but there shall be no spurting out above from the arterial branches. In cases of amputation close to the trunk of the body, as in the shoulder or hip joint, this is the only way in which pressure can be applied. But there are many circumstances in which it is advisable to take other means of arresting the bleedings. You may not have an assistant to whom you can trust; and it is of great

consequence perhaps that the patient should not lose a single drop of blood more than can be avoided. Here you will apply a tourniquet. You can make one for the occasion with a handkerchief and a bit of wood. Put on a bandage underneath in the course of the vessel; lay the head of a roller upon it, and then place a bandage round it. You then put your handkerchief round, tie a reef-knot, and put in the handle of an instrument, or a piece of wood, and twist it round in the same way that workmen secure logs of wood on a wagon. You may easily secure it with the ends of the handkerchief, so as to prevent it untwisting; or you may use a screw tourniquet; and these are of all sorts, some simple and some complicated. Here is the improved screw tourniquet of Petit. It is not enough that you have provided yourself with this excellent contrivance; you must take good care that the strap is put properly through the rollers, otherwise it will be found worse than useless. I recollect once, some years since, going into a large hospital on what is called the operating day, to see what was going forward: the tourniquet was put on previous to an amputation, the incisions were made, but the instrument could be screwed no further. A scene of indescribable and, under other circumstances, most laughable confusion ensued. Two assistant surgeons got on the table, and pressed with all their might and main on the groin to stop the bleeding. The limb was in the end removed, and the vessel secured. I am not very sure but that the femoral artery was tied before the incisions were completed. On taking off the tourniquet it was plain enough, to any one who understood the matter, that it was improperly and awkwardly strapped.

Fig. 154.



It was some time before the staff of the hospital and their instrument-maker, who was present, to see that all was in order, could be made to see their mistake. You must see that the instrument is well arranged, for it is of no use unless it is so. You may as well apply the back of the knife in making the incisions, as put on the strap of the tourniquet the wrong way. You must have all your apparatus simple and efficient, and in the best possible order, otherwise you cannot expect to get on at all comfortably, creditably or well. When you first put on the tourniquet, no pressure must be made on the vessel; the surgeon must be ready to make his incision be-

fore it is screwed up ; for if you allow it to remain on a minute or two the whole limb is gorged with blood. If you are desirous that the patient should not lose blood, it is of the utmost moment to attend to this point. Put on the tourniquet; you may even allow the surgeon to transfix the limb with his knife; the instant the principal vessel is about to be divided, screw it up quickly, and again, as soon as the larger arteries are secured, take it off. If you go on screwing it up, look at the end of the vessels, then unscrew it; if you see something bleeding, try to catch the vessels, and then screw again; there is an immense quantity of blood lost, the veins pour it out as fast as the arteries, you do not know what you are tying, and you are almost certain to tie a great many vessels very unnecessarily.

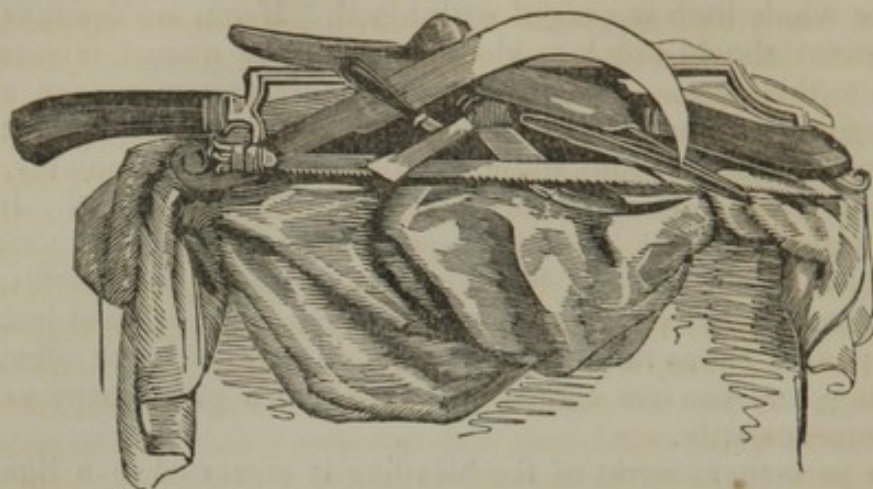
The permanent arrest of the bleeding is entrusted to a ligature. Ligatures are applied in the way I before described, and for this purpose you employ the spring forceps that we use in the hospital. The old surgeons used all sorts of curious means to stop bleeding: bits of bluestone, wrapped up in lint, &c., and they did not hesitate even to apply the actual cautery. Then came Ambrose Paré, and he recommended the application of a ligature round the end of the bleeding vessel; not that he was the originator or inventor of this practice, for we find that Celsus recommends tying the wounded vessels above and below where they had been separated. These were the instruments employed for the purpose—coarse and large artery forceps. This plan was, afterwards, in some measure forgotten; the vessels were surrounded, along with the surrounding parts, by means of a large needle and ligature, but as these shrunk and wasted, secondary hemorrhage was almost sure to follow. Then you find some surgeons, again, resorting to escharotics, and others to the actual cautery. After that, some surgeons used a knife that had been made red hot, so that the vessels were seared as soon as cut; others were not, apparently, quite so cruel; they prepared a knife made of horn, dipped in aquafortis, or strong nitric acid.

The operation formerly was a clumsy one, and was performed with awkward instruments; hence the results were not such as could be boasted about. Here are some, if not all, the instruments which have ever been used, and such as you find represented in old works for the removal of limbs. They are very coarse and large knives, and are made crooked. Here is one like a sickle. These are a few out of some dozens of knives which I have collected from time to time.

Instruments then came to be improved and simplified; they were made less crooked, and here are those for what is called the *circular* amputation.

Now the operation is sometimes performed by the circular method, and a very good stump can be made in this way; it is done

Fig. 155.



with tolerable rapidity, but it is, in my opinion, a less satisfactory operation in the majority of cases and circumstances, than the one by flaps. Many objections have been made to the latter. It has been said, that by dividing the soft parts in that way, you have a large surface uncovered; you cut the vessels obliquely, and there is a great chance of secondary hemorrhage. But I believe that if you measure the surface of a well performed circular amputation—measure the surface of the integuments and muscles that are cut irregularly, and then measure the surface after a smooth and even flap amputation, they will be found much the same in extent. The one is a hollow cone, with a very ragged and irregular surface, whereas the other consists of two nearly equal and smooth surfaces. In the flap operation, the incisions are much smoother than in the circular; the parts are not detached from each other; the skin is left connected to the muscles, and the muscles to the fascia. The vessels are cut very much alike in both amputations. They are generally deep seated, and are divided by the turn which the surgeon makes with his knife round the bone. If they should be cut at all obliquely, which rarely happens, you can easily pull them out sufficiently and tie them accurately.

Similar amputations may be required in the smaller joints of the upper extremities, on account of disease or injury. Bony and other tumours frequently occur in the fingers, giving rise to deformity of the hand, and preventing it being freely used, if at all, and sometimes there is great destruction of the bones and joints, consequent on deep-seated inflammation, paronychia or whitlow. You are called upon now and then to remove portions of the extremities in consequence of injuries occurring to inexperienced persons who go out shooting. The sportsman is perhaps using a double-barreled gun for the first time; he cocks both barrels, and, without thinking of it, one only is discharged. He sets about loading without uncocking the one not discharged; he has his hand on the muzzle, and away goes the greater part of it; or he uses a powder

flask to light a fire, and it explodes in his hand. A friend of mine lost his hand and his forearm, through no mistake of his own, however. He had been out shooting on a very wet day, and when he went into the house to dress, he put a plate before the parlour fire to dry his powder on. An old woman, who looked after the cottage, put the plate by the side of the fire on the hob, and hearing my friend coming down stairs, hurriedly put it in its original place. He went to the window, with the plate in his hand, having taken it by the cool side, whilst the other was, it would appear, red hot. He began to pour the powder out, when away went the flask, the sash of the window, and part of his right hand. He walked six or eight miles to a surgeon, who, unfortunately, was but little accustomed to these cases, and returned with him. This man set to work, and cut the part clean off, although possibly the greater portion might have been saved. In all these cases, it is of the utmost moment that you should use your most anxious endeavour, and try every method to save portions of the hand, however small, and not cut away more than you can help. You cannot get an instrument-maker to contrive anything half so good as even one finger, or the smallest portion of one. I have often saved one finger only, and you should leave even the little finger, if you can do nothing else.

The hand, perhaps, has been caught by machinery, and been thoroughly bruised. On examination, you discover that many of the fingers are squeezed to a mere pulp, but one or two are not quite so bad as the rest. You remove the parts that are irreparably injured, and, at all events, try to save the rest. If you can leave the thumb and the stump of a finger to oppose it, it is wonderful what use a patient will make of them. Here, for instance, is a cast of a most admirably useful hand—everything adrift but the thumb and little finger. I think the patient was treated by my colleague, Mr. Quain, and well treated, too, under the circumstances. You see, occasionally, patients coming to the hospital who have had their hands dreadfully mutilated, but still a portion is retained, which they find of great service indeed. There is one man who now comes to the hospital in whom we saved not only a portion of the thumb, but part of two fingers, and they are more useful to him than anything that could by possibility be adapted to the forearm. I think in this case part of the fingers sloughed away.

In these amputations there is no necessity for a tourniquet, or for an assistant putting his hand upon the vessels, though I very well recollect that when I was a student, not the slightest amputation was performed, even the removal of the last phalanx of a finger, with-

Fig. 156.

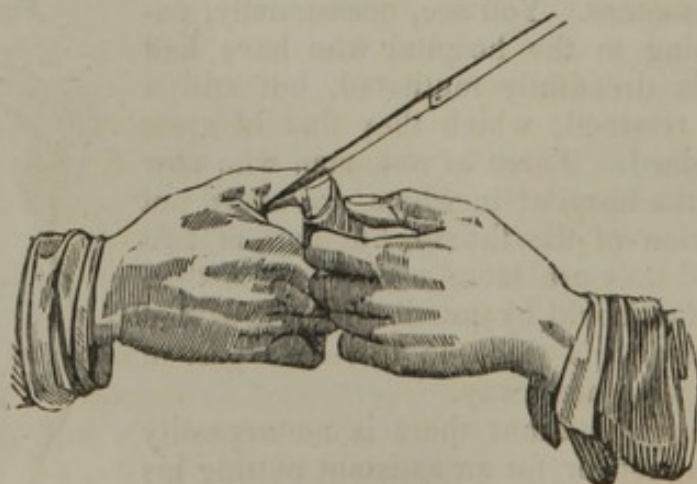


out a tourniquet being put on. Surgeons then were dreadfully frightened at bleeding.

You will sometimes be called upon to take off the last phalanx of the thumb or finger, in consequence of its being very much crushed or on account of a very bad onychia, where there is intractable ulceration about the nail, and the bone has been exposed and become carious.

This is a very simple proceeding, and is done with an instrument of this kind—a small narrow bistoury. You have here instruments of another kind—a chisel and mallet—for cutting off fingers. I picked these up somewhere in the Low Countries; they were in a shop window, to be sold for the use of surgeons. In Germany, and on some parts of the continent, they still, I am told, chop off toes and fingers. The operation is represented in Scultetus, but nobody in this country would submit to have his finger put on a block and chopped off, as a butcher would chop a joint of meat. You divide the soft parts, skin, tendons, and ligaments scientifically, and you may do it from the back or the front. You take hold of the portion to be removed, whilst the arm and hand are steadied by an assistant; you run the knife round from one side of the joint to the other and from point to heel, dividing the skin, the capsule of the joint, and the lateral ligaments. You thus get into the joint easily enough. You then change the position of the finger and thumb, put the blade of the knife behind the bone, and cut off a nice round flap. I need not tell you that no harm results from applying the flap to the cartilaginous end of the bone. Some persons, even at this time of day, scrape off the cartilage, thinking that if it be left there, it will prevent the wound healing; but that is not the case. A secreting surface, when no longer of use, soon changes its character.

Fig. 157.



You may otherwise apply the knife on the forepart, and then you reverse the proceeding. The middle phalanx also can be taken off

in the same manner, as I now show you. The flap is, as you see, made, in the first instance, by transfixing and cutting towards the

Fig. 158.



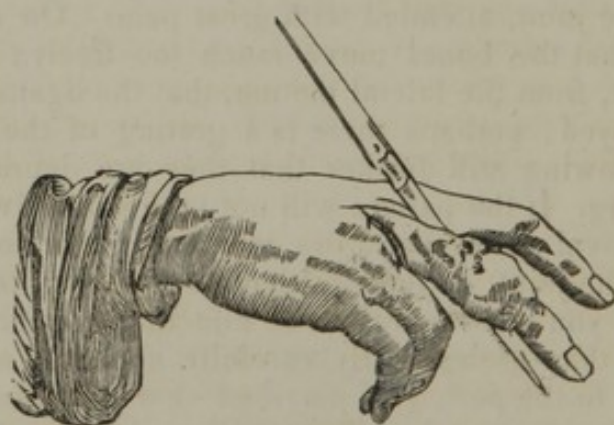
point of the finger; the disarticulation is then simple enough. This is a quicker process than making two flaps, and sawing the bone or clipping it through.

You may require to take away the fingers higher up still. Very often, as the result of whitlow, the phalanges are in a state of necrosis, and the joints are open. This may take place as a consequence of some injury about the knuckle. Perhaps a man gets his finger taken into another man's mouth, and it is severely bitten—by no means an uncommon cause of disease requiring amputation—or a man hits another in the mouth, and cuts his knuckle deeply against his teeth; or he falls down amongst sharp flints, and lacerates the integument; or the joint may be open in the articulation, between the middle phalanx and the last, as the result of disease. You have great swelling about the joint; an abscess forms—perhaps more than one. The patient comes to you with profuse discharge from the joint, attended with great pain. On examination, you perceive that the bones move much too freely; that there is reason to think, from the lateral motion, that the ligaments are sodden and destroyed; perhaps there is a grating of the bones upon each other, showing still further that they are deprived of their smooth covering. If the patient will not take your advice and submit to the removal of the part, you may endeavour to bring about ankylosis of the joint, in the position he wishes it to be; but, at the same time, you must represent to him that the part will probably be worse than useless. By carefully applying a splint, and giving support to the part, you may find that portions of bone are discharged; a cure may take place with an anchylosed state of the articulation. In cases where the bones are not extensively destroyed, as by a deep whitlow, where the tendon escapes and portions of the bone are discharged, you may thus succeed; but then you have an awkwardly distorted finger, sticking out stiff and immovable, or crooked, and drawn towards the palm of the hand; it prevents the patient grasping anything, and, after submitting to all the pain and the hazard of a cure of this kind, he probably will solicit you to amputate the stiffened, deformed portion of the hand.

We have now under treatment a poor fellow, a tailor by trade—a fighting tailor—who got his finger injured against the teeth of his antagonist: the forefinger of his left hand. The middle joint was thoroughly disorganized; the teguments and cartilage gone by ulceration; the end of the proximal phalanx exposed; the synovial membrane, no doubt, and the soft parts thoroughly softened and swollen. He declared that if he lost his finger he and his family must beg their bread, or, worse still, go into a workhouse. The finger has been fixed in a bent position, that which will enable him to hold his work. The exposed bone has been discharged, and the case seems to go on favourably.

In cases of extensive disease of the finger, the death of the tendons, and the destruction of the bones, brought on in the way I have described, the best practice is to take away the affected finger at the articulation, between the metacarpal bone and the diseased part. This may be done in one of two ways; one is, by putting the blade of a narrow knife over the knuckle; carrying it down in this way, forming a flap, then, with the *point* of the instrument, opening the articulation, cutting at the same time the extensor tendon. Having thus exposed the head of the bone *throughout*, you put the knife behind it, and, in detaching the member, make a second flap. The other mode of proceeding is to make the two flaps first. This is described as Scoutetten's method. Who Scoutetten was, I never could find out; but his method is, as you see, an excellent one. You carry the knife round the joint and get your

Fig. 159.



flaps, in the first instance, and then take out the bone. These operations may be done by standing either before or behind the patient, according to circumstances. If you are unwilling to have the blood spurt all over you, stand behind him, and then Scoutetten's plan is a good one. If you are in your working clothes, as you see me not unfrequently in the hospital, you can sit before the patient, and then the other mode is preferable.

LECTURE XVI.

AMPUTATION OF THE THUMB; THE HAND; THE FOREARM; THE ELBOW;
THE UPPER ARM; THE SHOULDER-JOINT.

I SPOKE yesterday of the amputation of fingers and parts of fingers. In the event of the hand being crushed, or receiving a gunshot injury, or taking on diseased action of a serious nature, involving the bones, joints, or tendons, I cautioned you against removing more than was absolutely necessary. Here is the cast of a hand, in wax, from which the fore and ring fingers were taken out with their metacarpal bones. This was done on the spur of the moment, and it was altogether an awkward case. In the first instance, the patient had a small tumour on the back of the hand, which was treated in the country as a ganglion; it was punctured with a needle, but instead of the swelling going away, ulceration took place, and when the patient presented himself at our hospital, there was a very ugly-looking sore, as large as a crown piece, at the back of the hand. This looked superficial; and being so far misled by the previous history of the case, having been told that more than one surgeon had looked upon the disease at first as connected with the tendons only, I determined to save the hand, if possible. I dissected round the ulcer, making the incisions very wide of the disease, and was about taking it from the root, when I found that the metacarpal bones of these two fingers were more or less affected, and was then under the necessity, without much consideration, of taking the bones away, with the fingers of course; for it was of no use to leave the fingers unsupported. The bones were taken out at their articulations with the carpus, and the case went on, it was hoped favourably, towards a permanent cure. The hand remained sound and useful; but in somewhat more than twelve months the man returned to show the tumour here represented between his fingers, it being evidently a reproduction of malignant disease. He attributed the swelling to a wrench in attempting to lift a heavy packing-case. It was considered right to take off the hand by amputation of the forearm. This was done; but still the man had a great deal to go through

Fig. 160.



All at once the stump, which had been healing kindly, assumed a carious appearance. It became enormously swollen within a few hours, and profuse hemorrhage took place, which there was considerable difficulty in stopping. This might have been—and was, sure enough, by some who saw it—taken for malignant disease; but it was exactly like what I had seen before in unhealthy seasons, and in badly-regulated hospitals. The season was a very severe one; there had been a great snow-storm, with very cold weather of long duration. Not many days passed over before a number of other wounds assumed the same appearance; the parts got puffy round about them; the discharge became slimy and tenacious, very putrid; and bloody fetid gas filled the cellular tissue around them. They extended rapidly, presenting a circular form. Many of the patients lost a considerable quantity of blood. In fact, we were visited by a rather rare disease—hospital gangrene—one which I trust I may never see again. Luckily, out of a good many patients who were so attacked, and in all parts of the hospital almost simultaneously, not one perished. Many of the wounds and ulcers were frightfully extended, but they speedily got clean, and healed afterwards very kindly. You will find, in the excellent collection of wax models, the progress of the disease well shown during the destructive process, during the cleansing of the surface by the separation of sloughs, and again when these had disappeared, leaving a *circular*, clean, granulating surface. We were at a loss to account for this invasion; there was nothing as regarded the hospital, its ventilation, or drainage, or management, the dressing of sores, &c., that could be blamed. The disease came upon us suddenly, and as suddenly disappeared; and I need not tell you that we have seen nothing of the kind since.

In the case in question, the cure was delayed a week or two by this attack of phagedena. There has been no threatening whatever of the original disease, and I see the patient, occasionally, going about in perfect health.

I showed you how portions of the hand were to be taken away when their structure was irrecoverably destroyed, as by accident, and also when the joints were thoroughly diseased, the bones and tendons being involved. In the latter case, the tendons sometimes slough out. I likewise stated that a stiff finger was generally useless, and that it was an incumbrance, whether bent or straight. But it is different with regard to the thumb; and here you will make very strong efforts to preserve the part; for although it should be stiff, it may yet perform its functions so far very usefully. When there is distinct disease of one of the articulations with destruction of the cartilages, and caries of the bone, you may still bring about a favourable termination of the case. You must support the patient's strength, endeavour to improve his general health, put the part in a splint, and keep it applied, so that the joint shall be perfectly im-

movable till perfect ankylosis occur. In hard-working people, who are obliged to make strong exertions with their hands, it is not often advisable to preserve a portion of a finger, which must, to a certainty, be stiff and useless, and an incumbrance to the motions of the organ; but in the case of the thumb, it is always desirable and proper to use every exertion to save it as entire as possible.

Sometimes, however, you must take away a portion of the thumb. If it be lacerated, it is better to take it away than allow it to drop off after gangrene has seized upon it, and you cannot tell how far the gangrene might proceed; you may thus be obliged to remove the last phalanx. This operation is to be performed in the way that you saw me do it yesterday, either by opening the joint at once from its posterior aspect, and making a flap in taking away the bone, or by first making a flap from the palmar aspect by transfixion, and then performing the disarticulation. Then, in removing the proximal phalanx at its articulation, owing to the great size of the end of the metacarpal bone, you will be obliged to make long flaps, in order to cover its extremity sufficiently.

Again: you may, though rarely, be under the necessity of taking away the metacarpal bone of the thumb as well. This you may do by laying the edge of the knife, near its point, on the web of the thumb, having it made tense by the abduction of the part to be amputated. You run up the knife, from point to heel, as high as you can; by doing this with decision you certainly open the articu-

Fig. 161,



lation. You then divide the tendons and ligaments, turning the thumb thoroughly back, after which you lay the blade of the knife behind the bone, and continue, as best you can, to make a suffi-

ciently long flap. By cutting the integument well down over the next articulation, you are able to save a sufficient quantity of soft parts to cover the exposed surface; you then—after the cessation of all oozing—lay the two equal surfaces in contact, so that they may adhere. There is nothing here to interfere with the healing, provided you do not bandage up the part at too early a period.

The little finger is to be taken off in the same way; but cases requiring amputation of the thumb and the little finger, with the metacarpal bones, are exceedingly rare. I have repeatedly taken away the little finger when the whole has been involved in bony tumour. In order to remove the tumour, you must remove the bone with it, and also the finger.

There is another way of taking off the thumb. In the amputation of this organ you require to be ambidextrous, to use well and steadily both the right and the left hand. You put the point of the knife on, over the articulation, towards the ulnar aspect of the bone, and bring it down by the radial side; then, using the other hand, you push it through the ball, and make the point of the instrument appear at the top of the first incision, and cut out a second flap. You then disarticulate and remove the bone, having two flaps instead of one, and one right line of incision.

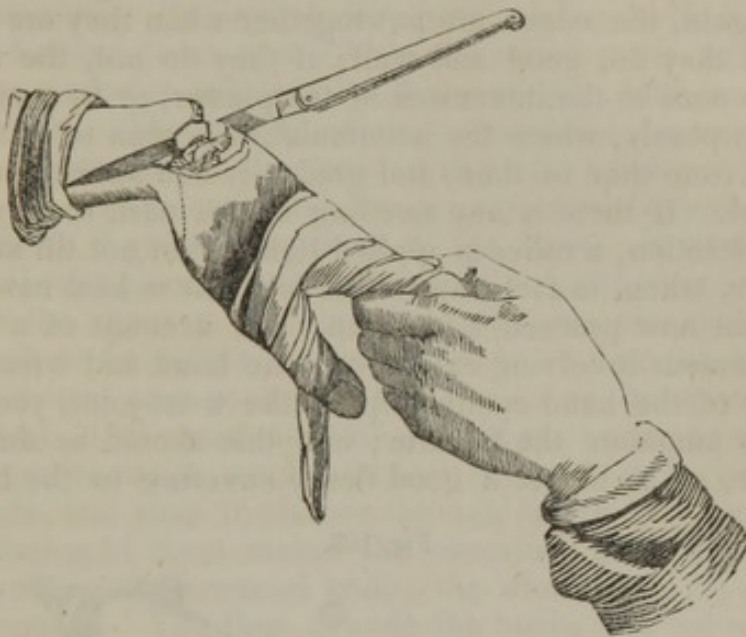
On the other side, you perhaps begin the incision with the left hand, then shift the knife to the right, thrust it through the ball of the thumb, and finish the operation, as already described and shown. You must be guided altogether in your course by the condition of the part, and by the state of disease or injury for which you are amputating. It is well to have two modes of proceeding to choose betwixt.

There is a great difference, as you will soon discover, between amputating on the dead and on the living body. But the facility with which disarticulation is effected is much influenced by the age of the individual, whether alive or dead. The ligaments in this old woman are so tough and rigid that they actually turn the edge of the knife.

You may be called upon to take away still more of the organ. Cases occur, now and then, of the hand being so much injured—as by a heavy body falling upon or passing over it; or it may be lacerated and torn to pieces by gunshot—that you are under the necessity of taking away the whole of it. If the hand only is injured, and the metacarpal bones are shattered, you may amputate, still leaving a very useful stump. You do a service to the patient if you preserve to him the rotary motion of the forearm. This amputation at the joint, though not a common operation, you may, by chance, be called upon to perform. I have done it two or three times. One case occurred in this hospital of a young man who got his hand under a large millstone: it crushed the hand very close upon the articulation of the wrist, leaving just enough of sound in-

tegument to cover the end of the bones of the forearm. Sometimes the hands get entangled in machinery, between rollers or cogged wheels, and it may be that the forearm is uninjured. Here you require to have an assistant to compress the humeral. You apply the knife thus, make a large flap from the dorsum of the hand, and open the joint: then lay the knife on in this manner, taking care not to get it entangled with the pisiform bone, and another flap is made from the palmar aspect. You secure the radial and ulna,

Fig. 162.



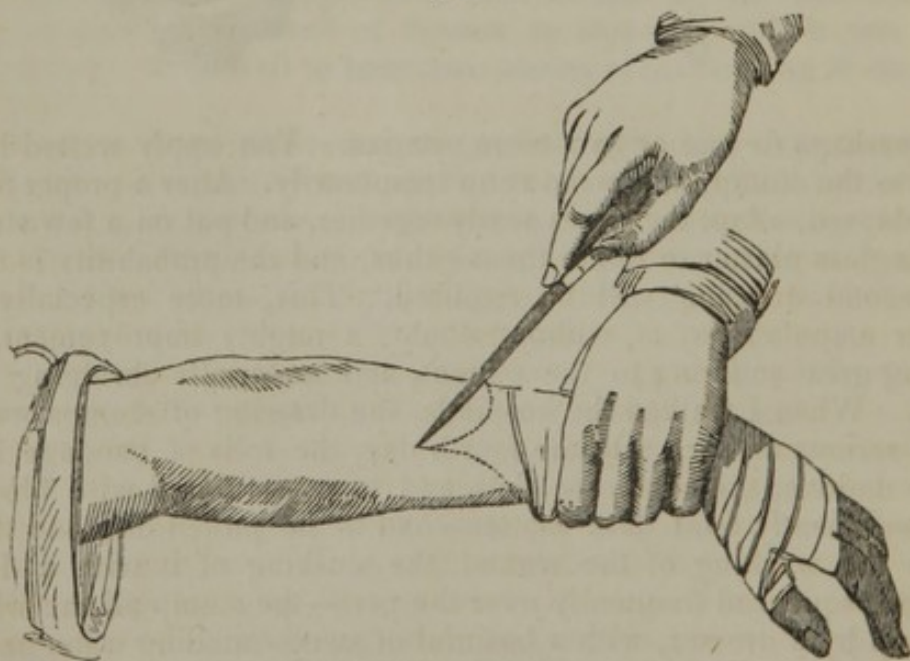
and perhaps tie one or two more arteries. You apply wetted lint, cold to the stump, and wrap it up temporarily. After a proper time has elapsed, adapt the edges neatly together, and put on a few strips of isinglass plaster to retain them—thus, and the probability is that no second dressing will be required. This, more especially in larger amputations, is, without doubt, a mighty improvement, as saving great suffering to the patient, and materially abridging the cure. When I walked the hospitals, the dressing of stumps was a most serious matter. On the fourth day, the rolls of bandage had to be undone, the compress cloth and tow—saturated with bloody and sufficiently fetid dark matter—had to be pulled off; and then came the washing of the wound, the slushing of it with a dirty sponge, squeezed frequently over the part—the stump all the while held up by a dresser, with a basinful of sweet-smelling water under it. I well recollect the fatigue I endured after a forenoon's work of this kind. Then came the changing of the plasters: one or two being removed, the surface dried, and other long slips were put in their place; previous to this the bandage was sometimes put on in part; then the tow, compress cloth, and roller, had to be renewed.

The pain suffered by the patient was, no doubt, most excruciating. I have repeatedly heard them declare that the daily dressings, at least for the first week, were more difficult to endure than the operation itself; and the screams of the poor victims used to be dreadful. The consequence of this mode of proceeding was, that the discharge was encouraged, and rendered most profuse; little or no union ever took place; the healing of the wound was always completed by granulation. The edges of the cavity, and of the cut skin, were, however, most perseveringly pushed and squeezed together from day to day—I need not tell you, to very little purpose.

Here, again, the edges are put together when they are likely to cohere; if they do, good and well; if they do not, the matter is allowed to ooze in the interstices of the plaster, or by a perforation snipped purposely, where the accumulation is seen to exist. It is soaked up from time to time, and gradually and speedily ceases to be secreted. If there is any swelling of the part, or any appearance of retraction, a roller is applied lightly, but not till after eight or ten days, when, in fact, the wound is about to heal naturally.

We must now proceed higher up. On account of a diseased wrist, or tumour involving extensively the hand and wrist, or serious injury of the hand coming up to the wrist-joint, you may be obliged to amputate the forearm; and this should be done about the middle, so as to get a good fleshy covering to the bones. I

Fig. 163.



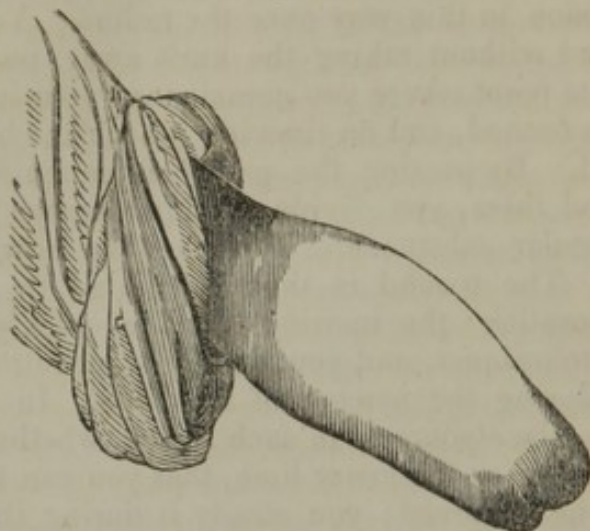
advise you, in all these small amputations of the fingers, the wrist, and the forearm, to practise the flap amputation; it is here, without doubt, better than the circular operation. The parts are unequally distributed; there is more muscular substance on one side of the

limb than on the other, and you must so contrive it, notwithstanding this, that your flaps shall be as nearly equal as possible in extent, length and surface. I recommend you, in the first place, to make one flap by cutting from without inwards, then transfix the limb, and complete the amputation, cutting outwards. You keep the hand in the middle state, betwixt supination and pronation, and make your incision in this way over the radius. You thus make a large flap, and without taking the knife away, push it through, and bring out its point where you commenced your incision. Thus the other flap is formed, and on drawing it back the bones are completely denuded. By passing the point of the knife betwixt the bones and round them, you divide the interosseous ligament and remaining muscular substance. You perceive how smoothly the parts are cut. The wound is thus calculated to unite without extensive suppuration; the incision is made quickly; there is no occasion for a tourniquet, and you do not want retractors to keep the part back during the sawing of the bone. In sawing bones you will always place yourself in such a way, whether the amputation be in the upper or the lower limb, that you can lay hold of the part that is to be removed; you steady it during the sawing, for you cannot trust your young assistants to do so, however attentive they may be. An assistant, with a hold of the lower part of the limb, may raise it too much and lock the saw, or he may depress it too much and snap the bones through before they are half cut: the splintering of them makes the operation look very awkward. You do not require a second knife; the whole is to be done with one instrument. You thus denude the bones and cut the two together, and divide them by using the saw lightly, and at the same time quickly. You must learn to use the saw as well as a cutting instrument. The knife I have used is well shaped to cut from without to within, or the reverse way. It has something of a belly and a coarse-set edge, with a straight back, so that you can tell accurately where the point is to come out. If you employ an instrument with a straight edge and a convex back, as many operators do, you cannot exactly tell where you will bring out its point. You must, of course, proportion your cutting instrument to the size of the limb you have to remove; you tie the vessels and dress the wound *secundum artem*. In amputating in this way, the soft parts are sufficiently long and full, so as to cover the ends of the bones without pulling and without bandaging. We seldom put a roller on, unless there is, as I have already said, swelling of the stump, and then it is used only to give support to the vessels.

A stump thus well-formed, after the ligatures are thrown off, and it has healed firmly, is as round as a segment of a ball; gradually, however, changes take place in it. The muscular substance shrinks and disappears by absorption. The vessels become obliterated for some distance above where they had been cut and tied; they

become impervious and thread-like. The ends of the bones are gradually rounded off, and approximate each other; ultimately they sometimes become connected by a bridge of bone. The skin becomes loose and wrinkled; every deep tissue, in fact, shrinks, ex-

Fig. 164.



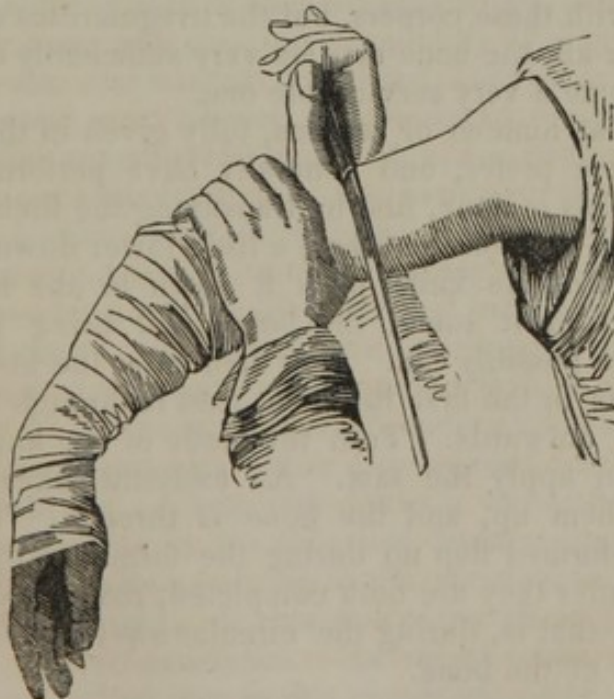
cepting always the nerves: these enlarge remarkably, and become bulbous at their divided extremities, and if sufficient skin and muscular substance have not been originally saved, and the nerves have been cut short and well covered, these bulbous ends adhere to the skin, are liable to be compressed against the bones, and thus often great suffering is caused.

Cases may occur in which it is necessary, or in which you may choose, to take off the arm at the elbow-joint. This is an amputation, like that of the wrist, not very often practised, but cases may occur in which you think it advisable to have recourse to this proceeding. I have had occasion to amputate here more than once, and, as I have before told you, there is no objection to it. The soft parts heal over a secretory surface just as rapidly as they do over a sawed bone.

This operation is performed by transfixing the limb: the knife is pushed right across the fore part of the articulation, under the origins of the flexors of the wrist and fingers, and a good long fleshy flap is thus cut out; then the blade of the knife is laid on thus, and, if possible, entered between the head of the radius and the external condyle of the humerus. You cut away till the limb is retained only by the olecranon process; this you may cut out, or you apply the saw, detach it, and thus leave the attachment to the triceps. There is one vessel to tie here, perhaps two; and you must recollect that in the living body there is a certain degree of elasticity and tendency to retraction of the parts; you must therefore take care to make your flap sufficiently long.

The bones of the forearm may be so involved in a tumour, the elbow-joint and the soft parts may be so diseased, or the limb may be injured so high up, that you may be under the necessity of amputating the humerus. Here you may adopt either the flap or the circular method. You may make a very good job indeed by the latter mode; but this proceeding, as you are aware, is certainly attended with more pain, and is necessarily a more tedious operation. The cutting of the skin in that gradual way, sawing it through by pressing the knife down upon it, is attended with a considerable degree of suffering to the patient, and there is also the dissecting back of the skin from the muscles. You will find that you cannot make quite so satisfactory a stump by this operation as by the other proceeding. Here is the sort of instrument with which the circular amputation is performed; but the same knife used for transfixing the limb may be used upon a pinch. You may, as has repeatedly occurred to me in private practice, find yourself called, perhaps in the middle of the night, to amputate a dreadfully crushed limb; you find from circumstances that a circular operation will answer best, but you may have none but the instruments for the flap amputation at hand, at least, not to be got at without some delay. You can make shift very well indeed to perform the circular operation with these. The knives have a good edge, and are long enough for the purpose. The parts are properly held; the knife, whatever its form, (here I use the thick-backed concave-edged instrument, the old amputating knife,) is put under the arm and carried through the skin down to the fascia. Sometimes you

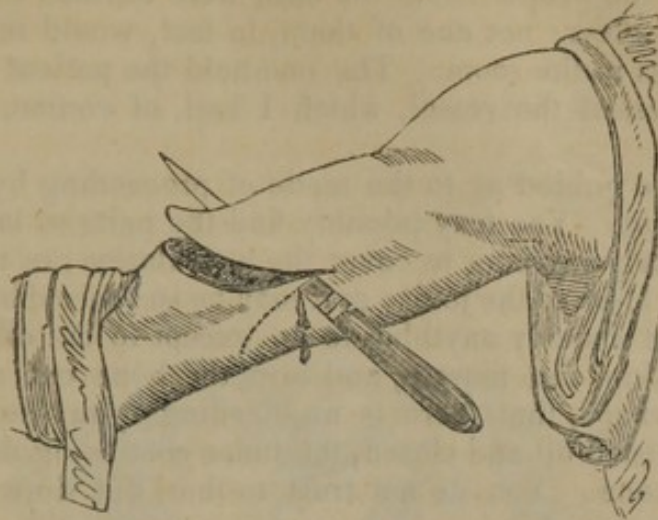
Fig. 165.



may pull the skin back from the fascia, with scarcely any dissection, but generally you are under the necessity of dissecting the skin and fat, and turning it back as you would the sleeve of your coat. This is not done without inflicting pain, and, as you perceive, the skin is thus completely detached from the fascia and muscles. That is the first part of the proceeding; then the knife is applied again in the same way, and drawn through close to where the skin is attached; by this means you cut down nearly to the bone. These muscles retract, and then the knife is applied again, and the deeper muscular fibres divided: this leaves, as you plainly see, a very irregular and very extensive surface. In comparing this with the flaps, you must measure the inner surface of the integument, and the ragged ends of the muscles. If you aim, as is your duty, at making a good stump by the circular method, you must divide the tissues in the way I have shown you; you must cut again so as to denude the bone as high as you possibly can, and then you must have a retractor, to get the parts well back. Long ago, retractors were made of sheet iron; other people used split leather; but you will find the end attained by employing a piece of cotton or linen split. You put the retractor on, have it well held back, and denude the portion of bone, taking care that you do not allow the saw to come in contact with any of the soft parts. You then saw the bone, with the precaution I have already described, holding the instrument vertically. Unless you employ some sort of retractor, in this circular method, you may bring the saw in contact with the muscles. Here you have a large hollow cone; the vessels are tied, the parts are placed in apposition, and then the edges of the integument are brought together. You have an awkward-looking stump, in the first instance, with these corners, but the irregularities are gradually absorbed; after all, the bone may be very sufficiently covered, and the stump become a very serviceable one.

But for a great number of reasons, fully given in the "Practical Surgery," I here prefer, and generally have performed, the flap amputation. This is done, first by transfixing the limb on one side of the bone, and then on the other, a little lower down. You must enter the point of the knife, push it down to the humerus, and endeavour to turn it round the bone, and bring it out as far behind it as you possibly can. You then enter the knife again, not quite so high as in the first instance, pass it through the same incision, and cut outwards. Turn the blade of the knife round the bone, and then apply the saw. An assistant takes hold of the flaps, raising them up, and the bone is through. The assistant holds the first-formed flap up during the formation of the second, and it is only after they are both completed, that *forcible retraction* is resorted to—that is, during the circular sweep of the knife and the denudation of the bone.

Fig. 166.



The shoulder-joint is found disabled by injury, more especially in naval and military practice, and cases occur in which recourse must be had to amputation at the socket; but this is an operation which we have, not unfrequently, to perform also in civil practice. I have been obliged to amputate the shoulder-joint several times, on account of severe injury, the arm having been entangled in machinery, and torn off near the articulation. I have also been called upon, repeatedly, to perform the operation in consequence of disease of the humerus—perhaps a large tumour growing in the substance of the bone. It is an operation which you need not be afraid of undertaking. If there be anything at which to be frightened, it is the occurrence of hemorrhage during the operation. This need not vex you; you may trust implicitly to a good assistant to press above the clavicle on the vessel as it passes over the first rib. The patient must be well placed, so that the pressure may be effectual. You may lay him on a table, and secure him, in order that he may not slip away from the assistant; or, what is better, place him in a chair, with a large sheet put under the injured side, and have a strong assistant to hold him up and support him in the chair, and then let another assistant stand behind him, with a door key wrapped round with a bandage to press down upon the vessel. Besides these two assistants, you require a third to aid you in tying the vessels. I have been obliged to undertake the operation with only one assistant, not very old or experienced, and a postillion, to hold the patient up. I was sent for to a young farmer, who had got his arm entangled in the rollers of his thrashing machine, and had it crushed to jelly nearly up to the shoulder. I arrived about the middle of the night. It was at a place where I was unable to procure any further assistance. As might have been expected, there were no medical men in the immediate neighbourhood, and I

had with me only a young pupil, and the man who drove the post-chaise. All the people about the farm were terrified to death, and worse than useless; not one of them, in fact, would remain in the house, far less in the room. The one held the patient up, and the other compressed the vessel, which I had, of course, to take up and secure.

You will be guided as to the mode of proceeding by the nature of the accident. You may possibly find the parts so lacerated that there is scarcely anything to cover the articulation; or the arm may be shot away close to the joint; or it may be so bruised by machinery that you have scarcely anything to do except to cut off the ragged portions of skin and muscle, and turn the bone out of its place. You find, perhaps, that there is no bleeding; you see the end of the vessel twisted up and closed, the inner coat being drawn within the external one. You do not trust to that, but draw it out, and put a ligature round it.

But then you may be called upon to amputate where the parts about the joint are perfectly sound. There may be a large cartilaginous or bony tumour surrounding the humerus, or growing probably from its medullary canal, and expanding its walls, and it would be very imprudent to leave any portion of bone so affected. Although it may be sound in the upper third, yet you should take away the whole of the bone. The danger attending the operation is so slight, that you need have no hesitation about resorting to it. I believe that if the operation is well performed, it is as successful as amputation below the knee. I amputated in one case, in the institution over the way, on account of spreading mortification: the mortification had gone up so high, and so rapidly, that there was scarcely room to make the flaps; indeed, one of them was slightly discoloured, and yet the patient did perfectly well. The mortification was noticed in the forearm by the house-surgeon, during his forenoon visit, and when I came (not having been previously apprized that anything untoward was going on) at the usual hour of visit, the whole extremity was in a state of gangrene, and was proceeding rapidly upwards.

If the parts are all sound, and you have your choice, you perform the operation by transfixing the limb. If the patient be sitting up, you make your posterior flap, in the first instance, on the right side; you enter the knife below the acromion, well forward, pass it away down, and bring it out under the posterior border of the axilla. If you are amputating the left arm, you enter the knife in the opposite direction, and bring it out below, and in front of the acromion. Having cut out the flap you disarticulate the head of the bone, and by carrying the knife thus it is completely detached. The assistant is then able to put his fingers down and compress the humeral, or rather the axillary artery, before it is severed. The knife is then behind the head of the bone; and the interior flap is soon made.

Fig. 167.



When the patient is properly placed, the incisions may be completed, and the arm may be on the floor in twelve or fifteen seconds. The assistant still keeps up the pressure on the subclavian, and the gentleman who has been more immediately assisting you raises his fingers to the vessel, holds it with the forceps, and you tie it. You then sponge out the blood, and tie other vessels that may be bleeding, such as branches of the subscapula, and so on. The parts are, after due time, brought together, and form a good stump; but they are, in some cases of injury, of course, very ragged.

Having completed amputations of the upper extremities, the next best thing that we can do is, after saying a very few words about the chest and abdomen, to go to hernia, or the diseases of the urinary organs. I shall not have much to say about strangulated hernia; for Mr. Cooper has not only, I presume, carefully described the parts, but all the circumstances under which an operation is required, therefore I have only to occupy your attention very shortly about the operation itself.

LECTURE XVII.

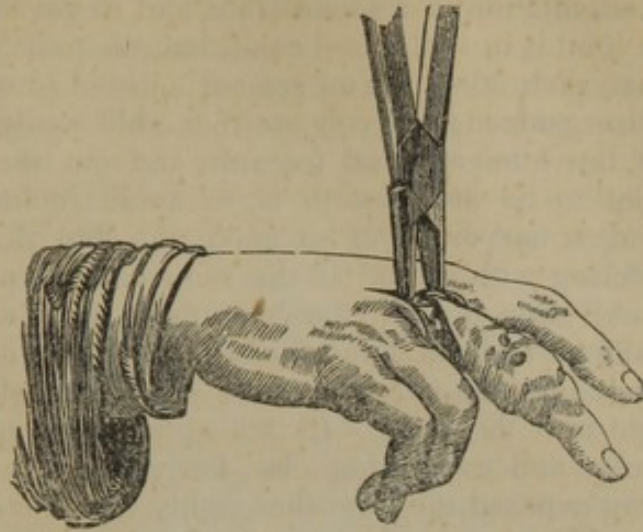
EXCISION OF THE ELBOW-JOINT.—EXCISION OF THE SHOULDER-JOINT.—
PARACENTESIS THORACIS.—PARACENTESIS ABDOMINIS.—EXTIRPATION
OF OVARIAN TUMOURS.—HERNIA.—INJURIES OF MUSCLES AND TENDONS.

I OMITTED to mention yesterday one amputation of part of the hand. I spoke of taking away entire the metacarpal bones of the thumb and little finger, and I showed you a cast in which the two middle metacarpal bones were removed in consequence of disease of rather a bad character. It is very seldom, indeed, that you will be called upon to take away a single finger, excepting the little one, with its metacarpal bone entire; but if the necessity should arise, you must be prepared to encounter the difficulties attendant upon it. You must study well the directions of the articulating surfaces of the bones, and you must take good care that in cutting amongst them you do not break the blade of your knife short off. I had no difficulty, as I told you, in amputating the two I referred to yesterday; that operation was easily accomplished with a common dissecting knife, and before a strong bistoury could be brought.

Not unfrequently you will find it necessary to take away a portion only of the metacarpal bone; the articulation between the hand and the fingers may be diseased as well as others, and you may be required to remove the diseased head of bone. You may cut down on the back of the hand, carry your incision round into the palm, exposing the head and shaft of the metacarpal bone, separate the finger, and apply the saw to it; but the incision must be extensive, in order to permit the free use of this instrument. The better plan is to expose the bone from behind, turn the knife round the articulation so as not to cut the palm extensively, and then clip the bone through, as I shall now show you. We will suppose that the middle finger is the seat of disease. I make the incision very much in the same way that I did in removing the finger at the articulation, only that it must be a little more extensive, carried farther into the hand.

You perceive that the bone is thus denuded up to the joint, but it is seldom necessary to take away more than the head of it. Then with the cutting pliers, which are now introduced in many surgical operations, and by which they are much abridged in duration and diminished in severity, you take away the head of the bone, saving entire the palm of the hand. The extremity of the bone is almost as clean as if cut by a fine saw. You tie any vessels that require it; and the whole dressing consists in this case, as well as in am-

Fig. 168.



putation at the articulation, in tying the two next fingers together by a tape, and perhaps bringing the integuments together by a single point of suture. By this means you divide the bones at any point you desire. You must observe how the instrument is applied to the bone; the flat side must be presented to the trunk of the body. Thus the section will be clean; that of the bone being less so, and perhaps slightly split and splintered. In amputating any of the phalanges in their continuity you can use this instrument if you will, but the saw can equally well be employed. In the majority of cases, the disarticulations I have already demonstrated to you are preferable.

EXCISION OF THE ELBOW-JOINT.

Some diseases of the elbow-joint do not require that amputation should be performed. You can in a great many of them, when the disease is limited to the joint, and when the health is tolerably good, take away the diseased bones, preserving the lower part of the limb and the motions of the forearm. In young subjects, the motion of the elbow-joint may be even in some measure restored. Such operations were recommended and practised long ago by Mr. Park, of Liverpool, and Moreau, a celebrated French surgeon. It has been revived, and practised a good deal by many surgeons, and among others by Professor Syme, of Edinburgh, and Sir Philip Crampton, of Dublin. You have seen it performed in several instances in the hospital, and I have had recourse to it many times, both in private and public practice. The operation on the dead body is very different indeed from that on the living. I do not propose to do more here than to make an incision, to show you

how to get down upon the joint. It is a troublesome thing to separate the articulation in a sound state and to get the bones out; but when the joint is in a diseased condition, the parts may be easily separated from each other. You are not entitled to operate unless the joint is disorganized, and you are then able easily to thrust out the bones of the humerus and forearm, and cut them off. The principal point to be attended to is, to avoid including in your incision the ulnar nerve. You so make the flap that you guard against interfering with it, and at the same time expose the joint throughout. All sorts of flaps have been made, but the most simple plan is to make an incision along the nerve towards its radial side. In this way you turn the nerve over the condyle, and then make a cross-cut right into the joint. In this operation you cut at once, through muscles and everything else, fairly down to the diseased joint. Having exposed the joint thoroughly, you have no difficulty in opening it. There is no looking for the lateral ligaments; you cut them across; and in the living body there is, as I have said, no trouble whatever in getting out the end of the humerus, applying the saw, and cutting off its extremity. You then denude the other bones, always taking care to cut towards them, thus saving the muscles and their tendons, the vessels and nerves; you will forthwith saw off the ends of these bones. In operating on a young subject, you can cut these bones with pliers, and in very young subjects there is no occasion whatever for the saw under any circumstances. In this specimen—a case of acute mortification from the improper application of a bandage where the limb has been removed in the middle of the upper arm—the saw, I think, was dispensed with. After the removal of these bones you bring the wound together, having put the bones of the forearm at right angles with the humerus, and in a state betwixt supination and pronation. After the wound is in a great measure healed, you may employ passive motion; and in young subjects the motion of the joint may, as I have said, be to some extent preserved.

[This operation has been frequently performed in this country. Dr. Thos. Harris, of the navy, Prof. Pancoast, Dr. Buck, of New York, myself, and probably others, have all had occasion to resort to the measure, and in most cases the result has been highly satisfactory. T. D. M.]

EXCISION OF THE SHOULDER-JOINT.

The shoulder-joint is sometimes affected with a similar disease. The apparatus of the joint is destroyed, the upper part of the humerus is, perhaps, in a great measure denuded by an abscess, and sometimes there is a corresponding disease in the glenoid

cavity. Your object must be to get the patient out of the hectic condition into which he has fallen, and this you cannot effect without removing the diseased bones.

Here you will make the incision at the back part of the joint, and carry it fairly down to the articulation, pretty nearly along the posterior border of the deltoid. Having thus cut down at once upon the diseased head of the bone, there is nothing to prevent you from displacing it and taking it out of the socket. The capsule is all destroyed, the head of the bone is probably a good deal diminished in size, and by cutting open the joint you at once dislocate it. You carry the limb across the chest, and by pushing it up a little you get to the neck of the bone, and by applying your saw, you may take away all the diseased articulating surface. You have thus made a large cavity, and if on examining the surface of the scapula you find that also diseased, you can easily, by detaching the soft parts, and applying cross-cutting pliers, cut that off. By this means you get rid of the disease, the cause of discharge and hectic. It is of great consequence to take away all the diseased bone, and the probability is, that if you succeed in doing so, the discharge will cease, and the sinuses heal up permanently. And you may be told, or you may have read in books, that you ought to be guided in making your incisions by the site of the openings; that you ought to lay the various papillæ and sinuses into one wound. This, however, is a cruel and unnecessary course; the fact is, that upon removing the cause of the discharge, the openings will all heal up without your troubling yourselves about them. The same remark applies to operations in other parts of the body, to amputations of portions of the hand, foot, &c. The patient, after losing the head of his humerus, though he may not be able to use his arm above his head, will still have all the motions of his hand and forearm.

There are a few small subjects which perhaps it is as well to discuss before we take up the operations upon the urinary and genital organs.

PARACENTESIS THORACIS.

Some affections of the chest require an operation. Mr. Cooper has no doubt told you a great deal about wounds of the chest; but you have now and then also to interfere in order to get rid of the results of inflammatory action, independent of injuries or wounds. You may be required to operate in order to evacuate the serum or purulent matter found in the cavities of the pleuræ. You must make very sure indeed that there is a collection in the chest before you propose any operation, and you must be equally certain as to

the side on which effusion or suppuration has occurred. You ascertain the fact on a proper examination of the cavity by percussion and by auscultation. There are signs which will lead you, accurately enough, to a true understanding of the deposition and its situation. These are, an absence of the respiratory murmur, and dullness on percussion; in cases where there is a considerable quantity of fluid, you will hear it splash about when the patient moves. I have seen cases where, on the patient's stooping forward, and then suddenly raising the body, you could, at almost any distance, hear the fluid making a noise as it fell down upon the diaphragm. The chest is sometimes a good deal altered in appearance on that side where the fluid occurs. Occasionally the accumulation is so great that the chest is expanded and motionless, and the ribs on the affected side are separated from each other to a considerable extent, the intercostal spaces being remarkably enlarged. I used to see cases treated, long ago, in the wards of the Edinburgh Hospital, under some of the old clinical professors, where there could be no doubt of the existence of the fluid, where the skin, in fact, was beginning to get thin and even discoloured, and you could ascertain that there was fluctuation by putting your fingers on the swelling. Sometimes, when the quantity of fluid is small, and confined to one portion of the chest, there is no expansion, and the ribs are movable.

After determining on this operation, you must so plan its performance that you do no mischief; you must take care that you do not wound any of the internal parts, the viscera of the chest or abdomen, or interfere with the diaphragm. It is advisable, perhaps, that you should make some sort of exploration of the chest previously; and instead of using an exploring needle, you had better employ a small trocar, such as that recommended by my friend Dr. Babington, and through which not only serum will escape, but even purulent matter. A suitable probe is introduced through it, in order to ascertain whether there is fluid, and with it you will feel whether there is a cavity or not, or what is opposed to the end of the instrument. If there be a cavity, you can, so far, ascertain its extent. This probe is useful in cleaning out the tube from any little masses of lymph, or lardaceous stuff that may obstruct it. Having thus ascertained the existence of serum or pus, you proceed to make a puncture to let it escape. The old plan was, to make the incision in what was called the point of election, between the fifth and sixth ribs, at an equal distance between the sternum and spine. You were directed to draw the integuments upwards and then cut down upon the intercostal muscles, taking care to cut upon the upper edge of the sixth rib; this you did to avoid the intercostal vessels. Sometimes a permanent opening was made, but it was very seldom that any great good came from the proceeding. Air was admitted into the chest; and when the operation

was undertaken for empyema, the cavity very often became filled with putrid fluid; this was sometimes confined, sometimes evacuated; the patient was seized with irritative fever, and perished, or if he got over the first shock of the operation, he ultimately sank from profuse discharge. The present plan is, to make an opening with a small trocar and canula, the trocar not being much larger than that used for hydrocele. The space selected is a little lower down than the old place—the space between the sixth and seventh or between the seventh and eighth ribs, and that far back in the most dependent part of the cavity, below the inferior angle of the scapula. Having ascertained that there is fluid contained in one side of the chest, that the other is sound, that there is perfect resonance, and the air seems to enter every portion of the lung, you place the patient in a proper position, by raising him over to the sound side. You make a minute incision with a lancet, and then push the instrument in over the upper edge of the eighth rib, or the instrument may be introduced without any preliminary incision. Care must be taken to withdraw the canula before the whole of the fluid is evacuated, or there is any chance of air entering in. The fluid escapes freely during expiration; and as soon as you observe any indications of the air passing in, which it would do during inspiration, you withdraw the trocar and canula. This operation can be repeated as often as is necessary; there is not any risk attending it.

PARACENTESIS ABDOMINIS.

You are required also to tap the abdomen, but that I need say little about; it is an exceedingly simple operation, but still it is attended with some risk. Now and then, low inflammation supervenes, and persons perish in cases where the operation is undertaken, both on account of common and of encysted dropsy; generally, however, it is not attended with serious consequences. I have met with cases where patients have submitted to this operation over and over again. I tapped a woman, as you saw, the other day in the hospital, under rather unfavourable circumstances, who had been tapped altogether above sixty times. Of course you must not undertake this operation except under urgent circumstances. You will satisfy yourself that there is a quantity of fluid in the belly, and that there is a necessity for interfering—as, for instance, that the breathing is embarrassed, and so on. You will be cautious of interfering in bad cases, more especially where the disease has existed long, and the patient is much exhausted and weakened.

In common dropsy, there is no difficulty in introducing a proper

instrument into the cavity of the belly. You generally make your puncture in the median line. I have sometimes, when the umbilicus has been very prominent, the integument being thinned, distended, and protruded by a fluid, made a puncture there with a lancet, and thus allowed the cavity to be gradually emptied. You are told it is right that the bladder should be emptied beforehand; but it is really not at all in the way. The parts being all distended, you have nothing to do but, with the point of a lancet or bistoury, to make a little puncture through the skin, tendinous expansion, and peritoneum between the umbilicus and the pubis. If you do that you can then use a trocar without any edge, or very sharp point; you insinuate that through the opening, carrying the canula with it. You then withdraw the stilet, and allow the fluid to escape. It is of great moment, during the gradual escape of the fluid, to keep up a certain pressure on the parietes, so as to prevent any effusion of blood into the cavity of the abdomen. You must give uniform support to the viscera by a suitable bandage, and keep it up, otherwise the veins of the omentum and mesentery are apt to give way. The serum is tinged, and the belly may even become filled with blood. Without this precaution, the patient will become faint, and still more so if any considerable bleeding takes place into the abdomen. This is the instrument that you should use after making a puncture with a sharp-pointed knife of any kind. I make a puncture, in the first instance, because the instrument slips in better after it, and it is preferable to taking a sharp-pointed bayonet-like instrument, of the kind I now show you, and making a thrust with it into the abdomen. The former is the safer way of proceeding; for if any folds of the intestines or portion of the omentum should be floating about, there is no danger of wounding them.

The same sort of operation is practised in cases of encysted dropsy. You ascertain previously the existence of the fluid by a proper examination of the belly. You put your hand on the parietes on each side, and there is an impulse communicated from the one to the other by striking with the points of the fingers of one hand. The tumour occupies, probably, only one side of the abdomen, and there is a greater projection on this side than on the other. Very often, in addition to the cyst, there is a great mass of solid matter. All sorts of things are found in the cyst, sometimes mere serosity, sometimes a thicker fluid, sometimes a brownish-looking glairy, very tenacious fluid, so thick that it will scarcely pass off through a common and very capacious canula. You find, now and then, hydatids, and in the solid parts you meet with curdy matter, brain-like matter, hair, teeth, and I cannot tell you what else.

Now it is only when the tumour attains a very large size, and becomes inconvenient from its bulk, when the parietes are much distended, and the limbs swollen in consequence of pressure, that

you interfere in cases of this kind. Unfortunately, when you once begin to tap, you are obliged to repeat it often, and every time, perhaps, at shorter and shorter intervals. There are patients whom I am in the habit of tapping who will carry their burden nine or twelve months. I know ladies who have gone on being relieved in this way for twenty or thirty years, suffering no pain whatever, who are not at all injured in their health, and enjoy themselves very much.

In some of these cases, you may think it necessary to try another situation than the *linea alba*, and may tap in the *linea semilunaris*, or wherever you think it may probably exist; for the *parietes* yield unequally, rendering it impossible to tell exactly where it is. It does not preserve its exact position, but you may safely enough tap in the space between the anterior superior process of the *ilium* and the *umbilicus*. You may be really far away from the *linea semilunaris*, but still there is no great risk in tapping in this situation. There is no chance of interfering with any vessels or nerves. Sometimes it may be necessary to make more than one puncture; you have, perhaps, several cysts, you tap one, and then you find another large fluctuating mass; you tap that, and withdraw a further quantity of fluid. In this way, you considerably reduce the size of the cavity.

REMOVAL OF OVARIAN TUMOURS.

I need not tell you that wounds of the abdomen are dangerous; patients perish from trifling openings where the viscera are not at all involved, and yet you are aware that, of late years, the belly has been opened intentionally, with the view of ascertaining the existence of tumours, and of taking them out. These incisions have been made sometimes of limited extent, and sometimes from the *ensiform cartilage* down to the *pubes*. Some people do not hesitate to make a hole in the abdomen, put in their fingers, and feel what is there, strangely enough exemplifying what *Hudibras* says—

“As if a man should be dissected
To see what part is disaffected.”

These operations are, in my opinion, exceedingly unjustifiable; I have always set my face against them, and I think always shall. In the first place, the diseases you meet with here are not always—I may say, are very seldom—of a dangerous character. Women labour under encysted tumours connected with the uterus and ovaria, and under solid tumours, too, and yet enjoy perfect health; the disease does not kill them. Sometimes—though very rarely indeed—you meet with malignant diseases here, but it is impossible to ascertain their nature through the *parietes* of the abdomen. If there be malignant disease, you cannot expect to cure the patient

by any known means, and you are not warranted in having recourse to the removal of the disease; for even the operation itself is attended with most imminent risk. You are told how many patients recover where the disease is not of a malignant character; but many people write disingenuously; they do not tell the whole truth. When they have an unsuccessful case they do not bring it forward, but every successful case they advertise most unblushingly. I have taken some trouble in looking after the cases, having, by chance, seen some of the first that were operated upon, and tried hard besides to dissuade the patients from undergoing it. I have examined previously some of the cases in which Mr. Lizars performed this operation in private practice, for I took good care to prevent him from cutting open women's bellies in the hospital after he became attached to it. A new rage has of late sprung up for this proceeding. Mr. Key has, within these few months, operated on one case; a Mr. Clay, of Manchester, on several; Mr. Bransby Cooper on one; Mr. Lane; Mr. Walne, more than once; besides others. There are some American and foreign cases, besides those of the Edinburgh professor. I have here the particulars of thirty-one cases in which the operation has been performed by what is called the greater incision—that is, from the cartilage ensiformis to the symphysis pubis—with various success. Out of these, sixteen died; in some of them there was no tumour, and in some it was not removed. There is an immense difficulty in the diagnosis; you cannot tell what is the nature of the tumour, and in some instances, as it appears, the practitioners engaged could not say whether there was any tumour or not. The first case operated on in Edinburgh was that of a woman who had been at one time under my care. She was treated for an abscess of the loins, connected with disease of the spine. There was a considerable excuvation of the spine; she was a puffy, podgy little woman; she had an exceedingly protuberant belly. She recovered from the effects of the disease for which I treated her; the bones had grown together, but her stature was much diminished; she then complained of a swelling in the abdomen, and got into the hands of Mr. Lizars. He proposed to open the belly; she came to consult me, and in fact, to beg that I would perform the operation. I declined; and endeavoured, by every argument that occurred to me, to persuade her not to submit to it. She did not, however, follow my advice, and having given her consent, an incision was made by the professor from the sternum to the pubes, and after turning over the viscera, nothing to take away was discovered. Strange to say, the woman recovered almost without a bad symptom. But if you should make certain that there really is a tumour, you cannot possibly tell what its attachments are, and in many of the operations the diseased mass has been exposed, turned over, and found so adherent that it was not possible to remove it. Well, we began with

thirty-one patients; out of the fifteen who did not die, six had no tumour, or it was not removed. In some, the tumour could not be got at; the patient was sewn up again, and lived in spite of this emboweling process.

With these results, I do not think that the operation is justifiable. Besides, in Professor Lizars' most successful case, there was, certainly, a large tumour removed without a fatal result, but the other ovary was ascertained to be in a diseased condition, and was left, so that the cure was rather incomplete. I think the poor woman was paraded in this city amongst the physician-accoucheurs and others. It is far better, I apprehend, to let the patient alone; when the tumour attains a great size, and contains any fluid, this may be evacuated. I have known of several instances in which the fluid has escaped from time to time by the vagina, with temporary relief. The patient may thus live a great while, and you do not seriously endanger her life. I would not be induced, under any circumstances, to open the belly and explore it, far less to cut it open and attempt to take away the tumour.

Another operation has been proposed, and in a few cases performed in encysted dropsy—namely, the making of a hole, pulling the cyst out with the fingers, and putting a ligature round its base. This has been done both successfully and unsuccessfully. Some time back a very fine young woman came to me, anxious to have the operation performed. She was in excellent health, but then there was the greatly enlarged belly, which was, from its appearance merely, a great and constant annoyance to her, as calling forth the remarks of her ill-natured neighbours. It was proposed that the operation should be undertaken, but I declined it. She fell into the hands of a practitioner who did perform it, but she died within two days, in dreadful agony. The case was published, and an attempt made to show that I had sanctioned it. This, of course, I was bound to contradict.

A case was related to me the other day by a very excellent and experienced practitioner. The patient, a middle aged woman, began to get very large on one side; a fluctuating swelling soon filled the abdomen; but by and by she suspected she had become pregnant. The motions of a child could, after a time, be felt far back towards the left lumbar region: she went her full time, and was delivered of twins. Some difficulty arose in the accouchement, in consequence of the protrusion of the posterior wall of the vagina; the tumour was pushed back; the head of the first child got down, and the patient made a tolerable recovery. The abdominal tumour increased, and it was at last necessary to have recourse to paracentesis. The cyst soon filled again, the patient became more and more emaciated, and sunk exhausted. My friend thought this would be a good opportunity of trying the new operation. He found the parietes as thin as two folds of brown paper,

and the most intimate adhesions existed, so that by no possibility could the cyst be separated at any one point. The same difficulty has, I am told, been experienced more than once in the living body.

[I am truly gratified to find Mr. Liston throwing the weight of his great authority in the balance against the operation of "*ovariotomy*." It is certainly hazarding but little to assert, that in a few years the measure will be consigned to the oblivion it so richly merits. The following extract from one of my lectures gives a little more at large than the text of Mr. Liston, the objections urged against the operation.

"A distinguished philosopher has classed man among the most cruel of all animals; and certainly, were we to restrict our observations to the mere work of the surgeon, without entering into an investigation of the motives which lead him to the performance of bloody and terrific operations, this example alone would be sufficient to lend countenance to the assertion, repugnant as it must be to the feelings of every one possessed of the common attributes of humanity. Certain it is, however, that some of our operations may be considered as supporting, to a limited degree, the charge made against our race; and there is none in the whole domain of surgery better calculated to elicit, even among the profession, a more profound sensation of horror, or better deserves the epithet of cruel, than one recently introduced into practice; and were we not convinced that nothing but a fervent desire to relieve a suffering mortal could induce a surgeon to undertake its performance, we should at once look upon its author as a being destitute of either sympathy or compassion, and richly deserving the detestation of his fellow men. The operation to which I refer is that for the removal of *ovarian tumours* by what is called the *great incision*! In other words, by an incision that extends in a straight line from the cartilago-ensiformis to the symphysis pubis!! It is called the *great* or *major incision*, to distinguish it from another operation for the removal of diseased ovaria, in which the opening made into the abdomen extends but a few inches, and which was suggested by Wm. Hunter, but has obtained its present reputation in consequence especially of the labours of Jeaffreson.

"As this subject is attracting a vast deal of attention, both abroad and at home, it will not be inapposite to furnish you with a slight sketch of its history and present position. It would appear that in consequence of the frequent failure of purely medical means to relieve dropsy of the ovary, several surgical operations have from time to time been performed. Thus, some have advised 'puncture of the cyst, evacuation of its contents, and then injection of some stimulating fluid, for the purpose of exciting adhesive inflammation.' Others attempted a cure by making 'a free incision into the ovary, evacuating its contents, and converting the opening into a fistulous sore.'—(Ledran, Houston, Voisin, &c.) Others, again,

suggested the removal of a part of the cyst, 'so as to enable it to evacuate its contents into the peritoneal sac.'—(Blundell, &c.) *Acupuncture* with long needles has also been performed, but the operation usually preferred has been simple *tapping*. Indeed, with the exception of the latter, all the others have with great wisdom been abandoned, and the acknowledged failure of this operation to afford more than temporary relief in many cases, while in others it was followed by death, induced surgeons to seek for something upon which their confidence could with greater security be placed. Accordingly, we find that some fifty years since L'Aumonier, of Rouen, extirpated an enlarged ovary, under the supposition that it was dropsical. The case turned out, however, to be one of *abscess* of the organ, and the patient ultimately recovered. This was unquestionably, I believe, the first removal of a diseased ovarium; but soon after, in 1809, Dr. McDowal, of Kentucky, performed the operation in a case of real ovarian dropsy, and the patient recovered. This successful result induced others to repeat the experiment; and since that period *seventy* cases in all have been reported, and, undoubtedly, others have been performed of which no account has been furnished. But at no period, probably, has there existed so much excitement in reference to this operation as at the present moment; and you will find, as is ever the case where men allow feeling or interest to obtain a mastery over their judgment, that the most disgraceful acrimony and harshness of language has been indulged in towards each other, by the advocates as well as the opponents of the measure in question. For my own part, gentlemen, I have endeavoured faithfully and cautiously to examine the subject, being prejudiced neither for nor against it, and must confess that, from the *information now furnished to the world*, I am induced to range myself among its opponents, except in cases of unilocular cyst without adhesions; and even here I deem it altogether unjustifiable until all other means have proved nugatory, and the fatal termination of the case without it appears inevitable; and, when had recourse to, it becomes the bounden duty of the surgeon to state candidly its dangers, and the probability of its failure. In order that my opinion may be borne out by sufficient reasons, I beg leave to offer a list of the most prominent objections urged by different authorities to the operation, and which must present themselves at once to every one who carefully investigates the merits of the question. I wish it to be understood, however, that should the difficulties about to be stated ever, by subsequent observation and research, be removed, I shall be ready at once to change my present views, and rank myself among the advocates of the operation.

"1st. *The difficulty of arriving at a just diagnosis*.—Although many of the advocates of the operation endeavour to get over this point by declaring, that *generally*, by a careful examination, we are able to discriminate between *ovarian tumours* and other *tumours* of

the uterus or its appendages, many of the most accurate observers declare such a thing impossible; (Dr. H. Lee); and if we judge by the deplorable mistakes made by men of acknowledged ability, we cannot refrain from joining in this opinion. For example, we find that Lizars, Dohlhoff, King, Granville, Dieffenbach and Martini, all men of remarkable tact in diagnosis, were woefully mistaken.

"In the cases of Lizars, Dohlhoff and King, *no tumour whatever existed*, while in those of the other gentlemen, adhesions, the existence of which was not suspected before the abdomen was laid open, compelled them to abandon the operation at once. And Mr. Phillips has stated, 'that to his knowledge, out of *fifty* cases reported, *fourteen* were abandoned after the commencement of the operation, in consequence of adhesions or other circumstances; and in five instances no tumour was found!' Now, here is evidence enough of the impossibility of doing that which some declare to be, in many cases, comparatively easy. Daily observation, too, teaches us that there are many cases of disease essentially different in every respect from ovarian tumour, but which, nevertheless, present phenomena almost identical with those characteristic of the latter affection.

"2d. *The danger of the operation itself*.—On a careful review of the cases published, it appears that a patient who submits to ovariectomy, is subjected to the danger of, 1st. *Peritoneal inflammation*, of which some have died; (Lizars, Clay, Granville, Key, &c.); 2d. *Hæmorrhage*, and although there appears less risk from this cause than one would imagine, yet the cases of McDowal, Lizars and Clay, prove it is often a matter of grave importance. 3d. *Implication of the intestines*, which will require a hazardous dissection for their relief; (Lizars, Chrymer and Atlee;) 4th. *Extreme suffering*; notwithstanding the fact that some bear the operation with comparatively little suffering, others are prostrated, and die from the agony occasioned; 5th. *Protracted convalescence*, and this must be anticipated in almost every case.

"But, say the advocates of ovariectomy, if all these dangers really exist, how is it possible that so many escape death, for statistics show that the mortality is only about 1 in 3 or $3\frac{1}{2}$, which is not greater than that belonging to the other great operations of surgery?

"But we are not disposed to place a great deal of reliance on statistics. I once heard a distinguished teacher declare, 'that he would not give a fig for a man who could not make cases enough to sustain any theory he might choose to advance,' and although this was said in badinage, it is a melancholy fact, that many of our professional authors act up to the doctrine. Again, it is fair to suppose that several cases, in which the operation has proved fatal, have been carefully consigned to the tomb; for men are always loath to declare to a world, but too ready to take advantage of the circumstance, their want of success, or their misfortunes. Since my return home one of these suppressed cases has been communicated

to me by my friend Dr. Jarvis, of Portland, Conn., and many others no doubt exist. We can, in truth, scarcely rely upon the published testimony in favour of the operation. But I am not disposed to estimate the merits of this measure by statistics, nor should it be thus contrasted with other capital operations. A writer in the Edinburgh Medical and Surgical Journal for April, 1844, has, I conceive, taken the correct view of the bearing of the whole matter, and as his remarks are brief, I beg leave to introduce them. 'If,' he observes, 'we look alone to the mortality, independently of all other considerations, and assume the above tables as correct in giving the ratio of mortality for the large abdominal incision, we find that it is not greater than for other great surgical operations. Thus M. Malgaigne has shown that in all the Parisian Hospitals, from 1836 to 1840, inclusive, 201 amputations of the thigh took place, but of this number 126 died; and the result of amputations of all kinds showed a mortality of 38 in the 100 for *pathological* causes, and 40 in the 100 for *traumatic* causes. M. Textor, on the other hand, in mentioning the statistics of strangulated hernia, treated at Wurtzburg from 1836 to 1842, states that of those subjected to an operation, 32 were cured and 24 died, or 3 out of every 7 cases; while at Paris the mortality was 4 out of 7 cases. All this would seem, therefore, to be a strong proof of the legitimacy of the abdominal section, seeing that the mortality is not so high for it as for those surgical operations. This is quite true, but the difference between the one operation and the other is this, *that the one saves 3 out of every 7 patients, who could not by possibility survive even a few days, were the operation postponed; and the other sacrifices one unnecessarily to prolong for a few months or years the lives of two, who would perhaps after all have lived as long had no operation been performed!* In the one case the amputation, or the operation for hernia, is performed for the legitimate purpose of saving life, which otherwise could not be saved; in the other, or the abdominal section, life is heedlessly sacrificed in the attempt to relieve what, after all, is only a burden, and has never yet been found to shorten the average duration of human life. In the one case the surgeon is acting in conformity with the highest principles of humanity and morality, doing all he can to save the life of a fellow-creature; in the other, while we cannot deny that he may conscientiously believe that he is undertaking what is to save life, we fear he is often influenced more by the eclat of performing a great and dangerous operation.'

"3d. *The nature of the disease does not sanction so violent a remedy.*—The celebrated William Hunter long since declared, in reference to ovarian disease, 'that a patient will have the best chance of living longest under it who does the least to get rid of it!' This opinion was based upon the fact, so readily acknowledged by most surgeons, that the complaint being rarely malignant,

is for the most part indolent in its character; progresses slowly, seldom proves more than a source of inconvenience, until many years have elapsed, and sometimes never occasions serious constitutional disturbance, the patient finally dying from some other disease; and lastly, that it has not, as yet, been proved to have materially shortened the life of the patient, most of those who die of it usually reaching an average age. That we have many examples of the reverse of this is true, but the cases are not sufficient to authorize our resorting to a measure of such hazard as ovariectomy, in every case, in order to protect those suffering from the disease from what may in reality never occur.

“4th. *It is contended that palliatives will often succeed in making a patient comfortable during a long life.*—Every surgeon will tell you, that he has often relieved the distressing symptoms, sometimes produced by ovarian disease in its advanced stages, and although these means may occasionally fail, and require to be frequently repeated when successful, it is yet the duty of every man to have recourse to them ere he resort to the more heroic one of ovariectomy. In the early stages of ovarian tumour there is rarely any occasion for the interference of the surgeon, and in the more advanced, when the tumour is large or inflammation has taken place, rest, counter irritation, leeches, anodynes, cathartics, low diet and mechanical support, and when the distention is very great, *tapping*, will, for the most, be sufficient for the relief of the most urgent symptoms; therefore it appears to be the opinion of a majority of the best surgeons of the present day, that a *palliative* treatment is to be preferred to an operation, except under very peculiar circumstances.

“5th. *An operation does not always succeed in relieving a patient radically, even when she escapes the dangers immediately consequent to its performance.*—This objection applies particularly to those cases in which there exists some malignant disease of the organ, and it is to be feared that there are many relapses or formations of malignant diseases in other organs, from which the patient ultimately perishes. The poor woman then suffers not only the risk of losing her life by the operation, but she has not even the consolation of permanent relief, should she escape its terrors.

“6th. *The disease may terminate spontaneously.*—Although an example of this kind is exceedingly rare, we are yet authorized to believe that such a result has taken place, and certainly we should give our patient the benefit of the chance. The rule then should be, never to operate as long as the disease is making no progress. —(*Churchill.*)

“Such are the most prominent objections urged against ovariectomy by the most eminent men of Europe, and while we hope that future observations may divest the operation of many of its dangers, and establish a more correct diagnosis in the disease for the relief of

which it has been proposed, we sincerely trust that no one will heedlessly attempt so hazardous a procedure without duly reflecting upon the immense responsibility he assumes." T. D. M.]

HERNIA.

I have nothing to say on hernia; Mr. Cooper must have told you everything about it. You may be called upon to operate for umbilical hernia; and you have doubtless been informed that you must not open the whole sac; that the less you interfere the better. The tumour is generally of immense size; some of the viscera are always protruded; and then, during a fit of coughing, or action of the abdominal muscles from exertion of one kind or other, a fresh portion enters the sac. You turn the tumour on one side, and endeavour to ascertain where the increase of swelling has occurred. Should all other means of relieving the patient fail, and the symptoms become more and more urgent, an incision must be made two or three inches in length, according to the obesity of the patient, and in such a direction that you can get at the neck of the tumour. You will then try to open the enlargement without getting into the sac; but this is exceedingly difficult. The sac is here always very thin; you penetrate it, feel where the stricture is, enlarge it a little, and then, by gentle pressure on the swelling, return a quantity of the contents, and in that way relieve the patient.

In inguinal hernia you proceed so as to expose the abdominal aperture. You make an incision by pinching up the skin, and putting your knife underneath it. This is very advisable, more especially where the hernia has been long strangulated, and there is reason to dread disorganization of the tissues. If you put the knife on the part, you may unexpectedly and at once get into the sac, and wound the tender bowel. You expose the coverings cautiously, whatever they are, turn them aside, and reach the sac; and if you can by possibility divide the stricture without opening the sac, that is to be done. In all cases of recent hernia you are warranted in trying this, and if you succeed, depend upon it you avoid a great deal of danger to the patient. It is not always so likely to succeed in this kind of rupture as that which presents at the top of the thigh. You know that if, in recent cases of hernia, we succeed in putting it back by the taxis, by gentle pressure on the swelling, the patient is generally freed from unpleasant symptoms in a short time; the vomiting ceases, the pain goes off, the bowels act, and in three or four hours the patient is quite well. The danger is not greater if you succeed without opening the sac than it is after applying the taxis. The patient has only a wound of the integuments of the belly from which to recover, but no inflammation of the peritoneum

is to be dreaded. There are none of the bad consequences arising from the operation itself, and often inseparable from it, to be combated. I need not tell you of the necessity of so making the internal incision, that for dividing the stricture, so as to avoid the blood-vessels. After the operation has been completed, more especially if you have been under the necessity of opening the peritoneal sac, you take means to prevent the escape of the bowel; you put on a spica bandage, (a double-headed roller turned round the loins, groin, and upper part of the thigh,) with proper compresses underneath. This is essentially necessary, because, if the patient is restless, or there is cough, a small fold or knuckle of bowel may come down again, become adherent, and be strangulated, and the patient will then be in very great danger indeed.

INJURIES OF MUSCLES AND TENDONS.

I have a few words to say with regard to injuries of muscles and tendons. That subject has not been broached this session, and I shall occupy a few minutes upon it. It is very seldom that these parts become diseased, but now and then you meet with swellings of the tendons, somewhat resembling those that take place on bones. These occur when the tendons are put much on the stretch; when the tendo-Achillis is thus affected, it is to be remedied by the patient wearing a high-heeled shoe, by the application of a plaster—a bit of the *emplastrum ammoniaci cum hydrargyro* spread on thin and pliable leather—and by some attention being paid to constitutional treatment.

You meet with divisions of the muscles and tendons arising from accident. In the upper extremities you sometimes see laceration of the biceps. Persons not in the habit of violent exertion perhaps attempt suddenly to lift a great weight; they feel something snap, and, on examination, you find the biceps torn through. This accident also takes place in the lower extremity. I have seen the quadriceps femoris torn across. An old man was carrying a bottle of wine in each hand down to the cellar; both his feet slipped at the same time, and in his effort to save himself, both the tendons were torn across close to the insertion of the extensor muscles of the leg. It is seldom that the tendon of the patella is torn, but you often meet with laceration in the back of the limb, in the fibres of the gastrocnemius, and of the tendo-Achillis.

In these cases it is necessary for union that the parts of the muscles or tendons injured should be brought and retained together for a certain time. In laceration of the biceps, you keep the arm bent; in laceration of the muscles in the forepart of the thigh, the limb is to be extended, to be put in the same position as for fracture of

the patella, the thigh being also bent on the pelvis. In laceration of the gastrocnemius and the tendo-Achillis, you extend the foot and flex the knee completely, applying such an apparatus as will keep the joints in this position, and this must be observed for a sufficient time. A very simple plan, and at the same time an efficient one, is to carry a band from the back of a slipper to a ring put on the thigh.

Even in sores of some standing, over the gastrocnemius, you will find your account in relaxing the parts affected, and maintaining a favourable position by such means as above described.

Sometimes you meet with a compound division and laceration of these muscles. I have now and then seen the skin and some of the fibres of the muscles of the fore-part of the thigh torn across by the leg being forcibly bent under the thigh. Occasionally there is a compound division of the tendo-Achillis. The tendo-Achillis is wounded; a person is cut across the back of the limb, the tendon is wholly or partially divided, and you must, of course, in such a case, attend both to the wound and the tendon. Nobody at the present day would think of sewing the tendon, as was the practice formerly, putting needles and ligatures through it. You put the limb in a proper position to bring the divided ends of the tendon into contact, and that, together with a light superficial dressing, is all that is required. This position of the limb is necessary, although the muscles and tendons are not both involved. You will meet with many cases of laceration, where you will be under the necessity of attending to them as if the parts were extensively divided. One of those boys who go about with white mice had his leg lacerated, and there was a wound across the back of it. The wound was ragged, and there was no chance of the parts coming together by the first intention. The whole treatment consisted in placing the limb in the same position as if the tendo-Achillis was wounded, and the wound healed with but a very slight scar. I think I have already alluded to this case as treated in the hospital.

Sometimes there is great deformity, attended with contraction of the tendons, and this occurs in all parts of the body. It may be congenital or acquired. A fœtus gets twisted up in some way in the uterus; it comes into the world with its limbs distorted, with its foot twisted up, and the great toe in contact with the inner side of the leg. You meet with all sorts of deformities from birth; but a great many are acquired. I have told you of squinting arising from a bad habit; in the same way the limb may be retained in one position, from disease of the joint or some other cause, and a single muscle may become permanently shortened; as you may find in infancy one set of muscles during teething become paralyzed, or placed in a state of rigid contraction, pulling the limb into some awkward position.

In a great many of these cases, whether the deformity is conge-

nital or acquired, benefit may be obtained by surgical proceeding. In many of those distortions called club-foot, if an apparatus is put on at a sufficiently early period, the bones will yield to their proper form. All the bones are present and of their natural size, and there are the articulations, but they are not correctly placed in regard to each other. By suitable mechanical applications, however, the limb can be brought to a proper shape, and made to assume its natural appearance. But if the deformity is allowed to continue long, and the bones are expanded more on one side than the other, the tendons and muscles are contracted to a very great extent, and it is impossible, without great suffering, to bring the limb to a proper form. With the view of enabling the instrument-maker to bring the limb into a proper position, so that the patient shall not endure great and long-continued pain from the use of the contrivance, it is often advisable to divide the shortened muscles, those which oppose the bringing of the parts into a normal position; and this practice has risen to great importance of late years, although the proceeding is not by any means a new one. Some of the old surgeons operated on the tendons; we find, for instance, that a celebrated professor of Montpellier, Delpech, was in the habit of dividing the tendo-Achillis by a free incision. Stromeyer proposed dividing the tendons by a subcutaneous incision; and this method has been adopted to a great extent to cure a variety of deformities. But this division of the tendons is not sufficient; it only enables the parts to be gradually put into a proper position and retained in it. All the tendons of the body may be divided for one purpose or another. I have now spoken of a division of the muscles of the orbit, and of the sterno-mastoideus in the neck: it is very seldom that division of the muscles of the upper extremities is required. It has been proposed to divide the muscles of the shoulder-joint in old irreducible dislocation, but I think this is hardly warranted. You know that changes take place, in the process of time, by which the patient can use his limb very freely, indeed better than if the bones be put back into their original position. I have told you that very little good arises from dividing the tendons of the fingers. You may, however, remove deformity of the wrist by a division of the tendons. I have met with cases where the hand has been turned down, and by a division of the flexor carpi radialis and flexor carpi ulnaris, and retaining it in proper position for some time, the functions have been, in a great measure, restored. The same may be said with regard to the extensor tendons. But it is principally in the lower extremities that these operations are resorted to. I believe that a great deal of benefit arises from these operations, but the advantage arising from them is that of giving greater efficiency to mechanical apparatus.

LECTURE XVIII.

CONTRACTIONS OF THE LEG AND OF THE THIGH.—ANCHYLOSIS.—CLUB-FOOT.—CALCULUS.

At the close of the lecture yesterday, I was speaking of some deformities; I stated that they were often congenital, but that sometimes also they were acquired.

CONTRACTIONS OF THE HIP AND LEG.

You may meet with a contraction of the hip-joint, cases where the limb has been long in one position, from rheumatic or neuralgic affections. The joint is stiff, but not ankylosed, and the evil can sometimes be remedied by dividing the sartorius.

[I have met with several cases of this kind, and in some, division of the sartorius and adductor muscles was requisite, but well directed extension and counter-extension maintained for a few weeks, has in the majority of patients succeeded perfectly. I generally employ a modification of Hagedorn's apparatus for fracture of the thigh, taking care to pass a counter-extending band across the perineum of the contracted side, and attach it to a mortice or catch in the splint. Extension is kept up by a gaiter, the strings of which, after passing through the foot-board, are fastened to a small ratchet or windlass. A turn of the windlass is taken once or twice a-day, and thus, by degrees, the limb is brought to its proper length and position. T. D. M.]

The knee-joint becomes now and then contracted—sometimes from a bad habit, as in cases of necrosis of the neighbouring bones—sometimes from disease of the articulation. When speaking of diseases of the joints, I stated there was a tendency on the part of the patient to bend the knee-joint in most cases of disease of the synovial membrane, in order to take off the pressure from the loose portion (ligamenta mucosa and alaria) between the bones. The limb is gradually bent on the thigh, often a little outwards and backwards; the disease in the joint may cease, and still the contraction continue. In these cases you may sometimes succeed in getting the joint extended by ham-stringing the patient, cutting across the flexor tendons, the tendons of the biceps, the semi-tendinosus, and the semi-membranosus—by subcutaneous section, of course. There are some few instances in which this is advisable, and you will then be able to extend the joint by a proper apparatus.

But there are many cases where this has been proposed and carried out in which it would have been better had no interference taken place. I have seen cases where the limb was contracted, and the joint ankylosed—the patella and femur being dislocated from the bones of the leg, these latter being twisted and carried much back. The division of the tendons cannot enable you to restore the bones to their natural position, or to make a new articulation, and you are not warranted in dividing the tendons in such cases, still less in using great force, as has been proposed, to break up the connections of the bones and extend the limb. There is great risk here of bringing on disease again, and you must choose your cases and consider well whether benefit is likely to be derived from the operation or not. In many cases of old-standing disease of the knee-joint, there is an arrest of development in the bones of the thigh and leg; they are not only much less in bulk, but they are much shorter than natural, to the extent of even five or six inches.

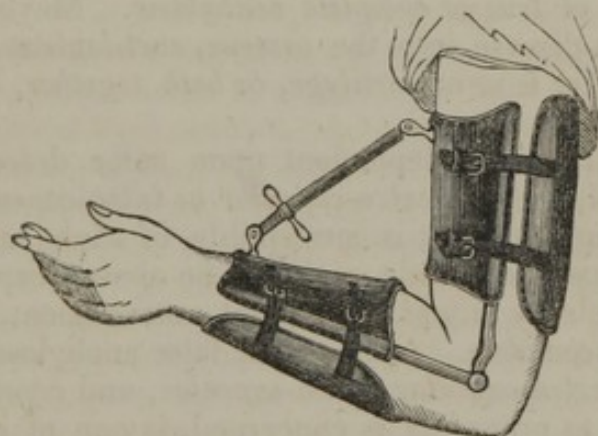
[The following case of contraction of the elbow-joint, and the subsequent remarks on ankylosis, are taken from my clinical reports, as drawn up by my friend and former pupil Dr. H. T. Child. The apparatus employed is similar to the one made use of in contractions of the leg, and is nothing more than the instrument of Stromeyer somewhat modified.

CASE.—*False ankylosis of the elbow-joint succeeding fracture of the condyles of the humerus, of three months standing, and materially impairing the usefulness of the whole limb—Treated with the screw of Stromeyer.*—The patient, a boy *ætat.* ten years, received a fracture of the condyles of the left arm about four months since, and was subjected at that time to the usual treatment for this injury, by the gentleman under whose charge he was placed. The bones united with some deformity, though not a great deal, and the integrity of the joint itself was well preserved. The natural motions in every direction, except *extension*, could be exerted, but it was impossible to straighten the limb;—the forearm was flexed at nearly a right angle, and when an attempt was made to diminish the angle, the contraction of the biceps and brachialis internus muscles resisted the effort so completely that scarcely any alteration in the shape of the limb could be effected. There was no pain in the joint even when it was forcibly twisted and the bones pressed against each other, nor was there any swelling or deposit of callus to interfere with the motions, or contra-indicate an immediate treatment of the case. The resistance to be overcome was seated in the tendons of the biceps and brachialis internus muscles, which were thrown into bold relief and became rigid whenever an attempt was made to straighten the limb.

This case, Professor M. remarked, would be a very tempting one for those who resort to the knife on all occasions and at all hazards—and the tendons of the muscles in fault would be at once divided.

But he wished the class to recollect what he had so often impressed upon them, that an operation, it matters not how trifling its nature, should always be considered the last resource of the surgeon, and ought never to be performed until all other means calculated to accomplish our end had failed, or unless, from the nature of the case, we could say that nothing but the knife would benefit the patient. In the present instance the operation would be very simple, but it would be painful, and might result in serious consequences, and from the short duration of the contraction the tendons were not too rigid to resist *mechanical* means alone. He should, therefore, employ the treatment which he had used for some years in the management of such cases, which consisted in the application of an instrument (a modification of the screw of Stromeyer,) so constructed as to keep up gradual extension of the limb. Should this fail, he might then divide the tendons by passing a small knife between them and the integuments and cutting from without towards the joint, removing the difficulty at once. The instrument was then applied, and the screw turned until the child complained of the extension. (See fig. 169.) The screw is to be turned daily a thread or two, until the

Fig. 169.



limb is straightened, and then its action must be reversed, the arm being gradually brought back to its first position; after this the limb must be alternately extended and flexed several times a day. By doing this and at the same time making use of the warm bath, friction with oleaginous mixtures, and covering the parts with oiled silk, we secure free motion to the joint, and accomplish a perfect cure. Professor M. next proceeded to make some remarks on ankylosis.

The term ankylosis or ankylosis is derived from the Greek word *ἄγκυλη*, signifying *bent* or *crooked*, and is employed to designate that condition of a joint in which its motions, both active and passive, are either partially or entirely destroyed, accompanying which loss there is usually a change in the natural shape of the part. It must be

borne in mind, however, that often in ankylosis there is little or no alteration of the shape of the joint involved; it is neither *bent* nor *crooked*, as the etymology of the term would indicate. The beautiful specimens of ankylosed hip, elbow and knee-joints, contained in my collection, and to which your attention has already been directed on another occasion, prove this fact.

As the stiffness may involve one joint or several, may depend on different conditions of the constituents of the part, and may also be either partial or complete, surgeons have divided this disease into several kinds.

When the stiffness is confined to but one articulation, and is dependent, as it usually is, on the influence of some local cause, the ankylosis is termed *partial* or *local*. When all or nearly all the joints are involved, as in the cases of Baron Percy, Bernard Conner, and others reported in the different surgical works, and the defect is the result of an internal or constitutional cause, it is called *general* or *universal ankylosis*.

Another division of ankylosis is based upon the degree of motion preserved, and the character of the tissue in which the resistance to motion resides. Thus, when all motion is lost, and the articular facets are united by bone, cartilage, or dense fibrous tissue, we have a case of *true* or *complete ankylosis*. Mayo has divided this form of the disease into the *osseous*, *cartilaginous*, and *mixed*, inasmuch as either *bone* or *cartilage*, or *both together*, may form the uniting medium.

When the stiffness is dependent upon some defect of the soft tissues of the joint, either *extra-capsular* or *intra-capsular*, or of the *capsule* itself, and the joint is susceptible of slight motion at the time our examination is made, or, if this be absent, capable of being rendered movable by proper subsequent management, the ankylosis is *false* or *incomplete*. Again, these false ankyloses may be divided into the *extra-capsular*, *intra-capsular*, and *capsular*, and this division, so far as prognosis is concerned, is one of much importance. In the first, the tissues surrounding the joint, viz., integuments, cellular tissue, muscles, tendons and fascia are involved, and the case is generally susceptible of cure. In the second and third the rigidity is occasioned by some lesion of the ligaments or synovial membrane, and although curable, if taken in time, is exceedingly prone to terminate in incurable or true ankylosis, by involving the cartilages or bones, or both, in the disease.

It must be obvious that the defect under consideration cannot, with strict propriety, be considered a *disease*; it is rather a product or termination of morbid action, and often on this account its occurrence proves one of the most certain indications of a cessation of disease. True ankylosis is indeed often the only favourable result in certain affections of the joints, and we consider the case as

cured when by our remedies we are able to bring about its occurrence.

Before undertaking to relieve a stiff joint, therefore, we must carefully investigate its causes, and ascertain whether or not it is proper to attempt a cure of the deformity to which it often gives rise.

Causes.—The causes which operate in the production of anchylosis are numerous, and most of them occasion the complaint by keeping the parts involved motionless, or nearly so, for a length of time. There are some, however, that seem to exert their influence under all circumstances; for example, *old age*, *chronic rheumatism* and *chronic gout*. It is true the joints usually involved from the operation of any one of these causes are those possessing comparatively but little motion, as those of the spine, pelvis, and some of the ginglymoidal; and the individuals themselves are forced to lead very sedentary lives, which will of course favour the occurrence of stiffness.

True anchylosis is also occasionally developed in the effort which nature makes to protect herself from harm in certain curvatures of the spinal column. This beautiful provision is well shown in several specimens in my collection taken from individuals affected with this complaint. Ledges of bone are thrown out in the hollow of the different curves, so that the spinal column is supported and prevented from yielding so far as to endanger life.

True anchylosis is, however, most generally the result of some disease of the synovial membranes, cartilages, or bones of a joint, although it may result from long confinement to one position, as has been clearly shown by Malgaigne, Teissier, and others. It is commonly believed that the anchylosis resulting from long confinement of a joint to one position, as in the treatment of fractures of the extremities, belongs to the class of incomplete or false; and this to a certain extent is true, but we often have produced instead, complete and incurable stiffness. This fact adds another to the long list of objections to the use of an *immovable* apparatus in the treatment of fractures.

False anchylosis, especially the extra-capsular form, is developed by causes somewhat similar, although they produce lesions by no means so grave as those which are present in the true. The most common of all these causes is *rest*. When a joint, even although perfectly healthy, is confined to one position for any length of time, we find its integuments and the cellular tissue beneath them contract and become more or less rigid; its ligaments and tendons also stiffen, and the muscles to which they are attached shorten, where the limb is flexed, and lengthen, when it is extended, and often undergo changes in their tissue, by which they lose their physical characteristics, and are rendered to a certain extent useless, while the synovial secretion is arrested or diminished. A good illustration of

the influence of rest upon the joints is afforded by the stiffened limbs of the *Fakirs* of India, who, actuated by religious motives, condemn themselves to the observance of one position during their whole lives. The same thing is often seen after the treatment of fractures, luxations, or sprains, where the limb has been maintained in one position for too long a period.

Wounds followed by sloughing of the skin, burns, scalds, &c., in short, any injury likely to be followed by extensive cicatrization, may lay the foundation of extra-capsular ankylosis. You all know the power with which one of these cicatrices forms, often destroying or displacing some of the most important parts of the body. Here is a hand, the fingers of which nearly touch the back of the forearm in consequence of a burn. This drawing you recollect as the one taken from a patient whose chin was drawn down to the sternum by the cicatrix of a burn, and held there for twenty-seven years. Such cases can only be relieved by very extensive plastic operations.

Extra-capsular ankylosis is also sometimes brought on by the development of an ulcer, or an abscess, or a phlebitis, or an angio-leucitis, the result of some trivial wound or blow received upon the part. The complaint being generally confined to one side of the limb, there is contraction in this direction, produced partly by the patient's flexing the limb to take off pressure from the inflamed surface, and partly by the swelling itself displacing the tendons and fascia in the neighbourhood. By-and-by lymph is deposited, and unless the disease is cured, there remains permanent contraction of the limb, with motion in but one direction. This form is readily distinguished from that dependent upon shortening of the muscles by the following experiment. If we take hold of the limb farthest removed from the body and steady the one to which it is attached, and then attempt to separate them, or bring the member to its proper shape, we find in this form of ankylosis that the soft parts, although rigid and unyielding, are yet *smooth* and *even* upon the surface. Now when the tendons or muscles are chiefly in fault, as in the case before us, and the same experiment is tried, we find them standing out in bold relief, as hard and as rigid as pieces of wire, while the soft parts in the vicinity are comparatively loose and yielding.

Different affections of the tendons or muscles, in the vicinity of a joint, may also cause extra-capsular ankylosis. A man, for example, receives a slight wound of a tendon or muscle; irritation or even inflammation of the part sets in, and the joint contracts by a shortening of the muscle alone. Sometimes the same cause may excite adhesions between the tendon and its sheath, or may even cause a sloughing of the same part.

Sometimes this form of ankylosis is dependent on a constitutional cause, as rheumatism or gout: and the boy presented to you the

other day with telapes equinus from rheumatism, both of whose ankles were immovable, was an instance of this kind. Often, too, a loss of muscular power, either by sloughing, or wounds, or paralysis on one side of the joint, by destroying, as it does, the balance of power which naturally exists, will bring on this form of ankylosis. The sound muscles being no longer opposed by their antagonists, pull the limb into an unnatural position; and as there is no power to overcome this influence, they keep it contracted, and gradually accommodate themselves in length to the altered condition of the parts, so that when we attempt to straighten the member we find it impossible to do so, until, by stretching or division with the knife, the shortened muscles are made to yield.

In certain forms of club-foot, torticollis, contraction of the fingers and toes, &c., this kind of ankylosis is encountered. In cases of long standing we invariably find the muscles and tendons of the weak side stretched and frayed out, and so much weakened that months and even years may elapse before they regain their natural tone and vigour. This should always be explained to the patient, who will be obliged to make use of artificial support for some time after the member has been restored to its natural shape.

Extra-capsular ankylosis is also the result of contraction of fascia, as we see in certain forms of contracted elbow, knee, and hands. It may also proceed from the growth of tumours, and the deposit of bone around the joint.

Capsular ankylosis.—This form is generally the result of a severe strain or twist of a joint, in consequence of which the capsular ligament is more or less injured—a luxation or fracture near the joint, gout, rheumatism, wounds, and even rest may occasion the same thing. It is extremely difficult to distinguish this variety of ankylosis from the *intra-capsular*; but usually in the latter the cause operating is more violent, the stiffness is accompanied with more pain, and it is more difficult to move the joint. When a capsular ankylosis is examined by dissection, we find the fibrous tissue of the capsule thickened and hardened, and sometimes converted here and there into cartilage or bone.

Intra-capsular ankylosis is the result of some disease of the synovial membrane, usually acute or chronic inflammation, or their results; but the peculiar degeneration of this tissue, so well described by Sir Benjamin Brodie, may also lay the foundation of the complaint. The bond of union here is nothing more than organized coagulable lymph, which sometimes stretches across the joint from bone to bone, in bands or cords; at others it is deposited in patches, and, in a few rare instances, has been found spread over nearly the whole of the articulating surfaces of the joint—thus gluing the bones, as it were, to each other.

The history of the case will generally enable us to decide as to the precise nature of the bond of union; but it should always be

borne in mind that synovitis may lay the foundation of capsular, or even extra-capsular ankylosis, producing, as it often does, sub-inflammation of the cellular and fibrous tissues about the joint, and also the peculiar contraction of the muscles and tendons usually met with in diseases of the articulations. It also frequently gives rise to true ankylosis—the disease extending to the cartilage and bones. The extreme rigidity of the joint, the apparent soundness of the tissues around it, the swelling which, in the first stage of the disease, is usually present, the pain excited by moving the articulation, or pushing one bone against the other, the character of the cause, and the fact that such cases are usually preceded by all the symptoms of inflammation of the synovial membranes, all serve to indicate to us the variety of the affection.

Liability.—It is usually stated that the ginglymoid articulations are more liable than the orbicular to both true and false ankylosis; and the observation is correct, owing chiefly to the circumstance that the former are more exposed to accidents. Their large articulating surfaces, and the number of tendons and fascia by which they are surrounded, also predispose to the occurrence of the disease.

Diagnosis.—There is scarcely any difficulty in distinguishing the different forms of ankylosis from other complaints, but it often demands a great deal of tact to distinguish them from each other. False ankylosis, for example, may exist, and yet the joint be as immovable as in the true variety; but by careful examination we may generally arrive at a just diagnosis. If, for example, there is no motion in the joint, when it is twisted or turned with great force, if these efforts excite no pain, if the stiffness has been preceded by extensive intra-capsular disease, if the joint is comparatively but little swollen, if the patient feels a jarring when the limb is struck, or when he takes a false step, if it be in the leg, if he dreads these shocks, and finally, if, when we attempt either to bend or straighten the limb, the muscles and tendons about it are scarcely moved, we may pretty safely conclude that we have a case of true ankylosis to contend with. False ankylosis is also sometimes confounded with a rigid condition of the muscles surrounding a joint, which suffers from some acute or chronic inflammatory disease. A case of this kind was recently shown me by my friend Dr. Rodman, and it occurred in the son of Mr. B——, of Schuylkill Eighth street. This lad had suffered from coxalgia for some months, and his limb was shortened seven inches—the thigh flexed at a right angle with the pelvis, and no perceptible motion in the hip-joint. At first I was under the impression that true ankylosis had taken place, but on a more careful examination it struck me that it might possibly be a case of simple false ankylosis from rigid muscles. I therefore applied an apparatus by which moderate and constant extension of the limb might be kept up, and had the satisfaction to find

that in the course of a few days, without pain, fever, or any inconvenience, the limb was reduced to the plane of its fellow, and within one inch of its natural length. The details of this case will be given on another occasion. The fact that this condition of the muscles may give rise to complete immobility should be constantly borne in mind in our examination of stiffened joints.

In forming a diagnosis between the different kinds of false ankylosis, we must take into consideration the history of the case. If the rigidity is the result of *rest, cicatrices*, affections of the *subcutaneous cellular tissue*, *spasm* of the *muscles*, *slight wounds of the tendons*, or *injury of the fascia*, it is probably *extra-capsular*. If caused by a *sprain*, or *punctured wound*, or a *blow*, it is *capsular*; and finally, if *acute* or *chronic synovitis*, or *gout*, or *rheumatism*, or *slight disease* of the *cartilages* or *bones* has existed, we shall have the *intra-capsular* form.

Prognosis.—The prognosis in this affection varies with the character of the lesion, whether it be true or false; and if false, the nature of its cause, the duration of the case, the age and health of the patient, and the joint involved.

The prognosis, as regards a cure, is always most unfavourable in true ankylosis; and, until very recently,—indeed, until the publication on this subject by my friend Dr. J. Rhea Barton, of Philadelphia,—all such cases were ranked among the incurable forms of the affection; and even now the propriety of resorting to the operation of Dr. Barton must be the result of mature deliberation. Many cases give rise to so little inconvenience as scarcely to warrant the hazard of the remedy; while others, as those which result from caries, or extensive disease of a joint, should not, as a general rule, be touched, inasmuch as ankylosis is the most favourable termination of the disease; besides which, the operation may excite anew a disease in the part sufficiently intense to destroy the patient. When the stiffness is partial, the prognosis is usually more favourable, but even here we sometimes find it impossible to effect a cure. When it is dependent upon extra-capsular lesion, of no very long standing, and there is no loss of tendon or muscle by sloughing, the prognosis is favourable; but if the ankylosis be capsular or intra-capsular, unless the primary disease has been slight, or confined to the ligamentous tissue, as in gout or rheumatism, and the case of recent occurrence, we shall generally have great difficulty in accomplishing our object.

When the stiffness depends on the location of a tumour, &c., in the vicinity of a joint, the prognosis is generally favourable, inasmuch as we can remove the cause. The younger the person, the greater the probability of a cure in almost all cases; for, as we increase in years, the tissues become more rigid and unyielding. The general health, too, of the patient must be taken into consideration; there are some persons so irritable and prone to inflammation, that

the slightest effort towards a cure, made either with the knife or mechanical means alone, is sure to excite disease. We should, therefore, carefully examine the case, and determine, as nearly as possible, the propriety of instituting any treatment before our attempts are commenced. In illustration of the importance of this cure, I may mention that several persons have either lost their lives, or been reduced to a very critical condition, by the attempts to cure false ankylosis by the screw. Professor Pancoast mentioned to me, a few days since, that he had been told of three individuals whose deaths were attributed to this cause. In my own practice I was obliged, in two cases, to suspend the treatment until the general health was so much improved as to justify the attempt to straighten the limb to be renewed. The prognosis is also modified by the joint involved; for we find it much more easy, as a general rule, to cure ankylosis of the *orbicular* than of the *ginglymoidal* articulations. The function of the joint is also found to modify the prospects of cure; thus, where the articulations of the maxillary bones are involved, as in the cases of Cruveilhier and others, it will be found impossible, by any operation, to afford relief. In one case, mentioned by Blackburn, the patient died from inanition in consequence of this cause.

Treatment.—From what I have already told you, it must be obvious that the treatment will vary essentially in our attempts to cure ankylosis. In the true or complete form of the affection, where the union is cartilaginous, bony, or composed of short and dense bands of fibro-cartilaginous or ligamentous tissue, attempts have been made to establish motion by the application of a machine of sufficient power to break up, either suddenly or by degrees, the cause of the defect; but invariably have these attempts resulted in a failure to accomplish the rupture of the bond of union; or, where this has been effected, in acute inflammation of the part and all its usual effects, and sometimes in the death of the patient. Louvrier, of Paris, is the last of those who advocate this plan of treatment, (which had long before this date been practised by Lafond, Hildanus and others, in false ankylosis); but the recent unfavourable report of the "Academy" relative to his success, will be sufficient to consign his measures "to the tomb of all the Capulets."

In striking contrast with this operation of Louvrier are those for the same affection, introduced by my friend Dr. J. Rhea Barton, of Philadelphia. I do not hesitate to assert, that the age has given birth to nothing more brilliant, more profoundly philosophical, more eminently useful, or better calculated to shed lustre upon our science. Two plans of relieving the deformity from stiff joints have been proposed by Dr. Barton. In one the establishment of an *artificial joint* is the object in view. In the other, *the removal of a portion of one or more of the bones involved, by which a limb flexed at any angle may be rendered straight.* That a false joint might be esta-

blished by first cutting through a bone, and then keeping up motion between its divided ends, was a point fully established by the experiments of different surgeons, especially Chaussier, Köcler, Sir A. Cooper, and Larrey, and also by the success which had followed the excision of joints, in cases of caries, &c., by Park, Moreau, and others; but Dr. Barton was the first to propose the application of the principle in the treatment of ankylosis. The manner of performing the operation will, of course, vary in each case; in one it may be proper to carry the incision through the original joint; in another, through the bone immediately above or below it. In the first case of Dr. Barton's, that of a sailor, in whom the hip-joint had been injured by a fall, and which was characterized by great deformity, the latter operation was performed—the femur being sawed through “at the lower part of its cervix, a little above its root.” This plan should always be preferred when practicable, especially where the ankylosis has been the result of previous ulceration of the joint, inasmuch as we avoid by it the risk of exciting anew the disease in its original seat. When the operation succeeds, the false joint may resemble, to a certain degree, an original one, not only in its functions, but also in its anatomical characters. The bones, for example, are tipped with cartilage, and covered with a layer of condensed cellular tissue, which strongly resembles synovial membrane; but usually, instead of this, the bones are united to each other by ligamentous matter, so flexible that it yields to the contractions of the different muscles surrounding the joint, and thus the limb becomes subject to the will, and is almost as useful as before the destruction of its original articulation.

But although this operation of Dr. Barton's is one of the most ingenious and beautiful in surgery, it must not be performed in every case and without due reflection. In the first place, it is unquestionably a hazardous procedure, and subjects the patient to great danger; and in the second, it is liable to be followed by a return of the defect—bony matter being sooner or later deposited in the connecting medium. I cannot do better, however, than give you the advice of Dr. Barton himself. This operation, he states, is justifiable only under the following circumstances, viz.:

“When the patient's general health is good, and his constitution is sufficiently strong; where the rigidity is not confined to the soft parts, but is actually occasioned by a consolidation of the joint; where all the muscles and tendons that were essential to the ordinary movements of the former joint are sound, and not incorporated by firm adhesions with the adjacent structure; where disease causing the deformity has entirely subsided; where the operation can be performed through the original point of motion, or so near it that the use of most of the tendons and muscles will not be lost; and finally, where the deformity or inconvenience is such as will

induce the patient to endure the pain and incur the risk of an operation."

An operation, similar in principle to this of Dr. Barton's, has been performed, according to Professor Samuel Cooper, by Mr. Anthony White, of London.

The second method of operating, proposed by Dr. Barton, is intended for the relief of those cases in which, from the size of the joint, and the shape of the limb, it would be hazardous or impossible to attempt the establishment of an artificial joint. So far it has been restricted to operations upon the lower extremities; but in deformities of the upper it would be equally useful. The case operated on by Dr. Barton, a report of which you will find in the American Journal of Medical Sciences for 1838, was one of bony ankylosis of the knee-joint, attended with great angular deformity, the leg forming nearly a right angle with the thigh.

The operation consisted in first exposing the femur just above the patella by a triangular incision, the base of the triangle resting upon the front of the thigh; then removing from it, by means of a small saw, a wedge-like piece, and finally, in gradually bringing the limb down, by a double inclined plane, the inclination of which could be varied at pleasure, to a straight position, and retaining it there until union took place. In order to protect the popliteal artery, and also to steady the fragments by the interlocking of the asperities of each, the incisions with the saw were not carried entirely through the bone, but terminated within a few lines of its posterior surface. The solution of continuity was then rendered complete by an attempt to bend the bone, which caused, of course, the fracture of that portion which had not been divided with the saw. The operation was perfectly successful.

Either of these means is vastly preferable to the *excision of the joint*, advised by some, as well as to the "*amputation de complaisance*," recommended by certain French surgeons. Neither excision of the joint, nor amputation, two of the most dangerous operations of surgery, should be performed for the removal of what is merely an inconvenience, and my advice is this: refuse to the last any entreaty of the patient who may urge the performance of either of them upon you.

We come next to speak of the treatment of *false ankylosis*. And here, before undertaking the management of the case, or giving our prognosis, it is absolutely essential for the proper remedies to be applied, that a correct diagnosis should be formed. When the stiffness of a joint is evidently the result of *rest*, no previous disease of its various constituents having occurred, the difficulty may generally be removed by passive motion, frictions with oleaginous substances, electro-magnetism or galvanism, the vapour bath, fomentations of various kinds, hot mineral baths, especially those of Virginia, and finally, in bad cases, by the use of an instrument

similar to that applied in the case before you. When the limb is flexed, the screw must be worked so as to separate one part from the other; when it is straight, the motions of the screw are reversed, so as to approximate them. The disgusting practice of enveloping the part in the hot entrails of a recently slaughtered animal, recommended by Boyer and others, I need hardly tell you, should not be resorted to, inasmuch as it is productive of no benefit that cannot be obtained by less revolting remedies.

Where the joint is rendered motionless by the contraction of the skin after a burn, an ulcer, or an abscess, the treatment must be based upon the principles laid down when I called your attention to the subject of cicatrices; usually, but not universally, a plastic operation is required.

When previous inflammation of the extra-articulation tissues has given rise to stiffness, we must be exceedingly careful in our attempts at giving relief, or we may cause the disease to reappear. In all such cases I employ the screw of Stromeyer, along with the remedies usually resorted to in simple stiffness from rest; and there can never be a necessity here for the knife. Should the instrument cause pain or inflammation in the joint, I at once suspend its extending action, and merely employ it as I would a carved splint, to keep the part at rest, while at the same time I order leeches, cold applications, low diet, purging, &c., and never renew extension or flexion, as the case may be, until all traces of inflammatory action have disappeared. The practice of treating such cases by an extending apparatus is by no means a novel procedure; for we find that Hildanus, Lafond, Boyer and others, employed machines very similar to those made use of by us at the present time. It is true, however, that much has been done by surgeons now in active practice, especially Stromeyer, Lisfranc, Blandin, Amsbury, &c., to bring this method into general notice. In this country, Dr. Detmold, of New York, was the first to recommend it; and since that time it has been extensively employed by myself, Dr. Chase, and almost all the surgeons in the land; and I cannot too strongly recommend it to your attention. It is by no means uncommon to find, in cases of this form of ankylosis, deposits of coagulable lymph in the cellular tissue about the joint, which materially interfere with its motions; and before a cure can take place they must be removed. To effect this, frictions with unguentum hydrargyri or iodini, local vapour baths, but, above all, pressure with adhesive straps and a bandage, should be at once employed.

When the ankylosis is dependent upon a contraction of fascia, as we see in certain deformities of the knee, ankle, sole of the foot, elbow, palm of the hand and fingers, although mechanical measures may answer, still it is often necessary to resort to the knife. My own practice in those cases is, to make the attempt first by mechanical measures alone—the apparatus being modified to

suit the case; and should these fail to accomplish the object in view in the course of three or four weeks, I then divide the fascia. The operation is very simple, and is performed with a small scalpel, which is introduced between the skin and the fascia, just as in the operation for club-foot, and then turned upon its edge, is made to incise the resisting tissue from without inwards. The knife is then withdrawn, the little puncture made in the integuments closed with adhesive plaster, and the extending apparatus applied. Gradual extension may be at once commenced, but we must carefully avoid being in too great haste to effect a cure, for fear of exciting, by our efforts, inflammation. It is also highly important to commence *passive motion*, in the course of a few days after the extension is completed, and to *keep up extension* for some weeks after the limb has assumed its natural shape; unless attention be paid to these two points, the deformity will almost to a certainty reappear.

Stiffness occasioned by contractions of the muscles and tendons, the result of rest, paralysis of antagonists, and sloughing, require to be treated with much discrimination. When the contraction is organic, and may be traced to rest of the joint too long continued, passive motion, the usual remedies for rigid joints, and lastly, in obstinate cases, the screw, will generally accomplish a cure. It is in this form of ankylosis, especially where the knee-joint is involved, that tenotomy is so often employed; but the practice indicated as proper in the case before you, is that which you should adopt. First try the screw, and should the tendons and muscles resist for any length of time, then their division will be admissible. The operation is precisely similar to that described as the best when it becomes necessary to divide fascia.

When, on the other hand, paralysis of one set of muscles allows another to distort the joint and produce ankylosis, it is impossible, by any operation, or the use of any machine, to restore the part to its normal condition. In such cases we sometimes derive benefit from the application of the remedies supposed to exert a favourable influence in palsy, such as galvanism, electricity, frictions with veratria and strychnia, cold bathing, &c. In recent cases, I have sometimes found advantage from the application of a splint, which prevented the distortion of the limb, while the remedies for the paralyzed muscles were being administered. I have also tried, in one case of palsy of the extensors of the hand, a contrivance recommended by Sir Charles Bell, and by its use prevented ankylosis, and enabled the patient to employ the member in his ordinary avocations. This machine was composed of four pieces of steel, of sufficient power to keep the fingers straight, when no effort was made to flex them, but not strong enough to resist the voluntary action of the flexors, placed along each finger, and fastened at one extremity into a bracelet around the wrist, and at the other into a common brass thimble, the fingers being inserted into the thimbles,

and the bracelet fastened around the wrist; the springs took the place of the extensor tendons, and a glove being drawn over the whole, it was impossible to detect the presence of anything unnatural.

When sloughing, or destruction of the tendons or muscles by a wound is the cause of the ankylosis, it is, of course, impossible to accomplish a cure. The same may be said of those cases in which the tendons are bound down very firmly by adhesions, the result of previous acute inflammation. When gout, rheumatism, sprains, luxations, synovitis, or disease of the cartilage or bones have given rise to capsular or intra-capsular ankylosis, the treatment is very similar to that already indicated, but we must expect a more tedious convalescence. The use, in these cases, of alkaline baths, is highly recommended by certain of the French surgeons. Finally, we should always inform the patient that usually, in false ankylosis, it is necessary to support the limb by mechanical means for some weeks or months after it has attained its proper shape, or until the weakened muscles, fascia and tendons have regained their original tone; or, at least, are strong enough to prevent subsequent contraction of the part. During this period we should employ all the best remedies for giving tone and vigour to the weakened parts, such as frictions, cold bathing, electricity, &c.; and in many cases constitutional remedies are highly important. T. D. M.]

CLUB-FOOT.

About the foot, as I said at our last meeting, there are a great many deformities which can be remedied by the use of a well-adapted apparatus only. But again, the putting of the foot straight can, in very many cases, be much facilitated and accelerated by the previous division of some of the tendons. The sooner that this is had recourse to, the better; not, however, that you are to set to work and operate on mere children, on delicate new-born babies; but when the child begins to walk, then effectual means are to be taken to put the foot straight. If an apparatus be applied very soon after birth, you may effect your object without any operation at all, but when the muscles on one side become, as they do in time, much shorter than they ought to be, then you cannot, without great pain to the patient, succeed in bringing the foot straight. Here you must divide such tendons as oppose the bones coming into their proper positions. Where the foot is extended, and the toes reach the ground, but the heel is raised two or three inches, you divide the tendo-Achillis, and thereby get the heel into its place at once. A little contrivance is required to keep the part in its due place, and the apparatus must be carefully retained till the tendon has re-

united, and become strong. You are aware that the tendons unite fast enough, even when the divided extremities are removed to a considerable distance from each other; the new substance soon forms, and by and by resembles pretty closely the original tissue. Here is a preparation taken from a horse, in which the tendons had been divided. It is one of the operations which veterinary surgeons constantly perform, and have long been in the habit of performing. They do not hesitate to cut a large hole, in order to get at the flexor tendons, when the point of the hoof is presented to the ground, and union soon takes place with an useful member. This might be effected, there can be no doubt, through a mere puncture, by subcutaneous section.

Sometimes you may be under the necessity of repeating the operation, the tendons requiring to be divided more than once. Considerable improvement may take place from one division, but you cannot, in all cases, in the most thoroughly deformed, with safety, separate the tendons so far as is requisite to bring the heel quite to the ground. But after the tendon has been firmly re-united, say for some months, you divide it again, perhaps at another point, and bring the foot at last to a proper position. Here are some repre-

Fig. 170.



sentations of these deformities, (*vari*), and here is a specimen of a foot restored, by division of the tendons, to a good handsome form and useful condition. You will observe that still some thickness remains in the tendon where it had been cut across.

Fig. 171.



In some very bad cases, such as that I now show you, other tendons besides that of the gastrocnemius require division, in order to bring the foot at all near to its normal state, and allow the sole to be presented to the ground ; the tendons of the tibialis anticus and of the flexor proprius pollicis must be cut, as well as part of the plantar fascia. Great care must be taken—more than has sometimes been—in order to avoid the vessels and nerves, and also the articulations.

Fig. 172.



Sometimes congenitally, and sometimes from bad habit or awkward position, the sole of the foot becomes very prominent, and the patient rests, in a great measure, on the internal cuneiform bone, and head of metatarsal bone of the great toe, (*valgus*;) there is no transverse or longitudinal arch ; the patient, consequently, walks

very badly, and with great pain; you find that the extensors of the toes and the peronei muscles are on the stretch. By dividing these tendons you are often able, and *at once*, to bring the foot to its proper form and bearing. I have seen not a few cases in which the operation was attended with very great benefit, the foot instantly resuming its natural appearance on the tendons being cut across. But sometimes, again, apparatus must be worn for a short time, in order to confirm the cure. We have had two very good cases of this kind in the hospital during the present session.

These tendons are easily divided, whatever they may be, by a sort of small knife, almost like a needle, the blade varying in length and size according to the bulk of the tendon to be operated upon. Here are knives of all descriptions, some with exceedingly short and others with longer blades: some straight, some convex, and some concave. Here is an instrument suited to the division of small tendons, the tendons of the toes, for instance. This is an operation that you may often have recourse to with advantage. You see many of the toes distorted, pressed together, in consequence of the foot being crammed into small, narrow-soled shoes. The toe next the great one stands up; the middle joint is partly ankylosed, and upon the prominent part of the joint is a troublesome corn. The whole foot is deformed, and the patient cannot wear a shoe of good shape to hide his awkward-looking hoof, and walks very clumsily. In cases of this kind very great benefit is derived from the division of the extensor, or in bad cases, of both extensor and flexor tendons. In many instances the division of the former is sufficient; the toes are drawn back, and immediately that they are allowed to come down the patient is able to extend the phalanges. The flexor tendon is, in fact, kept on the stretch by being bent over the convex extremity of the metatarsal bone, and the moment you relax the tendon, out shoot the phalanges. This operation I have performed many times. The first time I had recourse to it—now many years since, and I believe the first time it was thought of—was in a young man, an officer in an infantry regiment, who could not march conveniently in consequence of the toes of both feet being contracted and prominent. He came to me to request that I would amputate these troublesome members. It struck me that the division of the tendons might be sufficient, and this I proposed. He complied so far with my wishes. He insisted on my taking off one toe and trying my way with the other. He was very much vexed with himself afterwards that he had not submitted to my plan with respect to both toes. From the one operation he obtained great relief, and at once; the other entailed a confinement to his couch for some weeks.

Here, again, is a knife suited to the division of larger tendons the tendo-Achillis. I will cut one tendon, to show how it is done, The limb is to be kept thoroughly on the stretch, and you enter the

point of the knife at some distance from the tendon you mean to divide. You apply the edge against the tendon, and if this is quite tense, by a gentle pressure away it goes, and you at once feel a considerable space betwixt the divided ends; you either cut it directly across, or, what is better, a little obliquely. Immediately that you find there is a space between the divided ends of the tendon, the foot, or part of it, can be put in a much more favourable position.

[For the sake of the country practitioner especially, I beg leave to introduce a lecture on club-foot, recently delivered before my class, inasmuch as it contains a good deal of practical matter which Mr. Liston has been unable from the character of his course to introduce.

“Among the various deformities to which the human frame is liable, there is probably none of more interest and practical importance than the one that forms the subject of this morning’s lecture. Producing great physical inconvenience, while, at the same time, the defect is obvious to every eye, and subject often to the idle and ill-natured remarks of the thoughtless and heartless, we find that at all periods and in every land, it has attracted the attention of the profession; and surgeons, from Hippocrates down to the present day, have considered its pathology and treatment among the most interesting questions of the science. Notwithstanding this, it remained for the present age to witness the promulgation of the only true exposition of the nature of the deformity, as well as the application of its appropriate remedy.

To Thelenius, Michaelis, Reiche of Magdeburg, Meyer of Wurzburg, Holscher of Hanover, Haess of Strassburg, Dieffenbach of Berlin, Pauli of Landau, Delpech of Montpellier, Duval of Bordeaux, Bouvier of Paris, Little of London, Whipple of Plymouth, and especially to Stromeyer of Hanover, are we indebted for the most important contributions to this department of orthopedic surgery; contributions which I may with safety assert, have rendered the treatment of *club-foot* as simple and as efficacious as that of any other remediable disease.

The term *club* or *twisted* or *reeled* foot, is applied to every case in which the foot rests upon the ground on any other portion than its sole. Duval has defined club-foot to be “a defect resulting from inequality in the antagonizing muscular forces, and the permanent retraction of certain muscles.” This definition explains the *cause* of the deformity, but is not sufficiently explicit in reference to the different varieties. This surgeon (Duval) has also proposed the general term *strephopodic*, (στρεφω-πους,) for all deviations of the foot, and characterizes each variety by inserting a Greek preposition significant of the deviation assumed;—thus, *streph-endo-podic*, means *inversion*, *streph-exo-podic*, *eversion*, &c. &c. Such a classification may answer very well for those who are fond of refinements

in nomenclature, but it is too 'scientific' for ordinary people. Adopting the first definition, it would seem that an almost endless variety might exist, but observation proves, that every case may be referred to one of *five distinct species*, each of which presents striking peculiarities, but is at the same time subject to several modifications.

In the *first*, the foot rests upon its outer edge, and is directed inwards. This constitutes what the ancients termed *Talapes Varus*.

In the *second*, the foot rests upon its inner margin, or a portion of it, and is directed *outwards*. This was named by the older authorities, *Talapes Valgus*.

In the *third*, the heel is drawn up, and the foot rests either upon the *extremities of the toes*, or its *edges* just above them, or upon its *ball*. This defect, from its fancied resemblance to the foot of a horse, has been called, *Talapes Equinus*, *Pes Equinus*, or *Horse-foot*.

In the *fourth*, the foot, from contraction of the tibialis anticus and extensor digitorum muscles, rests upon the *heel*. To this the term *Talapes Calcaneus*, or *Talus*, has been applied.

In the *fifth*, the foot undergoes so complete a change in its usual relations, that its *dorsum* is brought into contact with the earth. From this circumstance it is called *Talapes dorsalis*; by Scoutteten it is spoken of as *phalangeal club-foot*.

Each of these *general divisions* includes three or four or even five varieties, the characteristics of which depend upon the degree of deviation of the foot from a normal condition, and will be pointed out to you, after we have considered the causes of club-foot.

Bonnet has attempted to simplify the classification of club-foot, by ranging all under two heads:—

1st. Those in which the defect is consequent to retraction of the muscles supplied by the *external popliteal nerves*. This includes Varus, Equinus, and Phalangeal club-foot.

2d. Those produced by contraction of the muscles supplied by the *internal popliteal nerves*. Valgus and Talus would be embraced in this division.

CAUSES.

Club-foot may exist before birth, or it may be occasioned by causes operating subsequently. To the first we apply the term *congenital*; the second is called *accidental* or *acquired*.—(*Talapes acquisitus*—Little.)

With regard to the *congenital predisposing causes*, it must be confessed very little is known. Some have attributed the deviation to a bad position of the fœtus in utero; others to hereditary predisposition: others to dislocation of the bones; others, as Velpeau, to a deficiency of liquor amnii, as a consequence of which the ute-

rus contracts forcibly upon the child, and thus causes a more than usual degree of *flexion* of the feet; others, as Breschet, to an 'arrest of development;' others consider the defect a positive monstrosity or *lusus naturæ*; very often, and particularly by the vulgar, it is referred to the influence of the imagination of the mother, who during pregnancy has been frightened, or has seen a case of club-foot; lastly, Ambrose Paré attributes it to the mother's sitting too much *cross-legged*! by which position the uterus is pressed upon and caused to contract spasmodically. All these opinions are but vague hypotheses, utterly unworthy your attention; and it is better for us to confess our ignorance at once, than to waste time in idle attempts to explain a phenomenon utterly beyond the ken of man.

The *proximate* or *immediate* cause of most cases of congenital club-foot is now very generally conceded to be, *some affection of the cerebro-spinal system, that produces unequal or irregular contraction of the muscles, by which the antagonism is destroyed*.—This will occasion shortening of some and elongation of others, and we usually find either condition complicated with *atrophy* or *condensation*. In some cases, the *extensors*, in others, the *flexors* are in fault; sometimes only one, sometimes several muscles with their tendons and fascia are involved.—This doctrine has been well explained by Guérin and others, but Duverney was probably the first to refer the cause of club-foot to irregular contraction of the muscles of the part.

Accidental Causes.—The *accidental* causes of club-foot are, for the most part, manifest, although the deformity occasionally makes its appearance, when no explanation of its development can be given! Among the accidental causes may be cited contusions of the joints, sprains, luxations, fractures, preternatural laxity of the ligaments, and partial paralysis of the lower extremity. The latter cause is usually confined in its operations to either the very young or the very old; in the *first* it is usually the result of previous convulsion; in the *second* it is an effect of age. The muscles and ligaments being weakened on one side or the other, their antagonists still retaining their vigour, pull the foot towards their points of origin, until at length a complete deviation of the member from its natural position is accomplished. This variety of club-foot is very common among feeble and delicate old persons, and the deviation, in almost every instance, is *inwards*! It is stated that the celebrated Talleyrand, for the last few years of his life, had his feet so deformed. Sometimes the defect is brought about by individuals who suffer from corns or indolent ulcers about the feet, walking on *one side* of the foot, to save the tender parts from pressure. This becomes in time a fixed habit, and the *muscles*, as well as the other constituents of the *ankle* and *tarsus*, gradually accommodating themselves to their new positions, a perfect club-foot may be produced. The gait of an individual who indulges in this habit, be-

comes of course uncertain and difficult; the centre of gravity of the body being carried considerably beyond the ankle-joint, he is obliged to make constant efforts to maintain himself in the erect posture. Finally, diseases of various kinds, as convulsions, scarlet fever, white swelling, scrofula, cicatrices, irritations near the joint, rickets, &c., may cause a deviation of the foot from its natural direction, by producing irregular action of the nervous system, or by inducing local irritation from which the habit of using one set of muscles more than another, is sooner or later acquired.

CHARACTERISTICS OF EACH VARIETY OF CLUB-FOOT.

TALAPES VARUS.

Having thus passed over the *causes* of the different varieties of club-foot, we may next describe the appearance presented in each. I have already mentioned that each class presented *three* or *four* varieties! The first, or mildest form of Varus is seen in this cast.

Fig. 173.



You perceive that nearly the whole sole rests upon the earth, but it is slightly *elevated* along its inner margin. This shows that the chief weight of the body must bear upon the *outer* edge, which presents almost a crescentic form. The inner is also curved, and often presents a superficial fissure about the junction of the tarsal with the metatarsal bones. The external malleolus is well marked, and apparently a little *behind* its natural position, while the internal has nearly disappeared. The instep, too, is nearly *natural* in its shape, which is not the case in the other forms

of the affection. I wish you, however, particularly to observe that the heel is here but *slightly* drawn up. In the living specimen, if you take hold of the toes and bring them forcibly towards their proper position, while the heel is firmly fixed, the foot may generally be brought nearly to a straight line, and you will also find that the different motions of the tarsal and metatarsal joints are nearly natural. This variety of Varus is often termed the *pigeon-toed*, or "moon-foot," and is by far the most susceptible of remedy. The tendons chiefly in fault here are the tendo-Achillis, and the inner margin of the fascia plantaris.

In the *second* variety, the foot rests almost *entirely* on the *anterior* portion of its *outer edge*, as you here see.

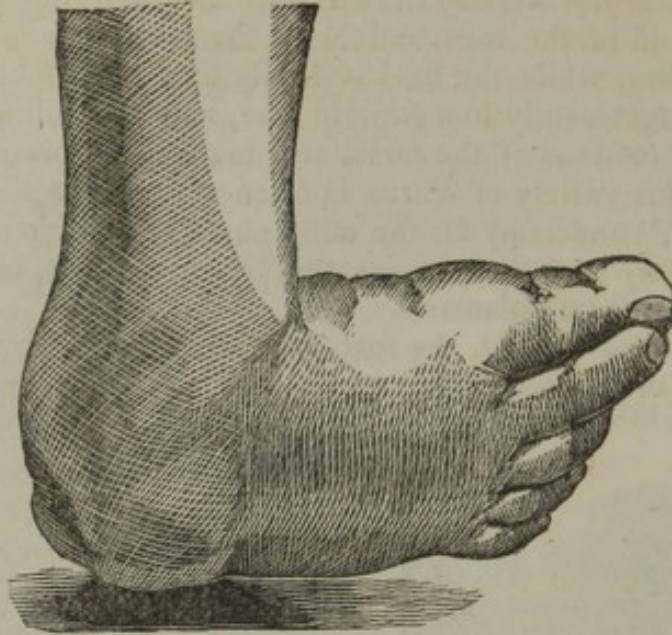
Fig. 174.



Sometimes the little toe and the one next to it, assist in supporting the body. The inner margin is also more curved than in the first, the great toe turns in, and the dorsum of the foot is nearly vertical. The external malleolus is very prominent, while the internal has nearly disappeared, and the line of junction between the *foot* and *leg* is, for the most part, a regular curve. The heel, too, is more retracted than in the first, while the motions of the joints are considerably impaired, and it is impossible to bring the foot to its natural position by the hand alone. This is one of the most common forms of varus, not only as a *congenital*, but also as an *acquired* defect. The tendons in fault here, are the tendo-Achillis, that of the tibialis anticus, and a portion of the fascia plantaris.

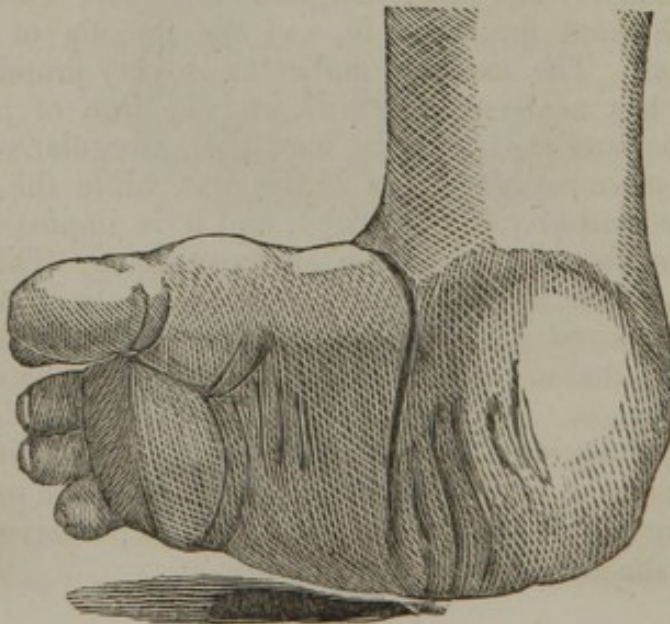
In the *third* variety, the foot is *completely* turned inwards, and forms a right angle, and in some cases even an acute one, with the leg. The dorsum of the foot presents, as you perceive, *directly in front*, while the sole is turned backwards.

Fig. 175.



The *outer* edge is below, while the *inner* is above, so that those portions of the foot usually placed in a *horizontal* position, now become *vertical*! The internal malleolus is almost obliterated. The *external*, on the contrary, is more prominent than natural, and seems to be placed *behind* and below its usual position! The *dorsum* of the foot also presents a number of irregularities, owing to the partial displacement of the tarsal bones, and is more rounded than natural. The *sole* is generally *shorter* than usual, and is divided by one or more *vertical*, and sometimes very deep *fissures*, which are owing to an *approximation* of the bones of the inner margin of the foot.

Fig. 176.



The most interesting feature, however, as regards *practical* bearing, is the position of the *heel*. In *every* case of congenital varus in the third degree, you will find it drawn *upwards* and *inwards* by the muscles of the calf, and sometimes it is even wanting altogether. From this contraction of the muscles, or shortening of the tendo-Achillis, the skin just above the heel is *generally puckered* or *wrinkled*. When the individual has exercised a great deal we find the outer edge furnished with a large bursa mucosa, the integuments covering which are generally hard and callous. This bursa is a provision of nature to prevent any injury of the bones and ligaments, from the constant pressure to which they are subjected. Often it happens, however, that these bursæ inflame, and give rise to most intense suffering, and they are sometimes exceedingly troublesome during the whole life of the individual! You will generally find the *toes* more or less deformed, and separated from each other, but after the deformity of the foot has been relieved, they in a short time acquire their proper positions. In this form of varus it is impossible to bring the foot to a natural position by the hand, and whenever this is attempted you will find the tendo-Achillis, and the fascia plantaris rendered remarkably *tense* and rigid! and sometimes the tendons of the tibialis anticus and posticus.

When both feet are affected the toes of each are brought almost in contact, and sometimes even pass one another, so that in walking the individual is obliged to carry one foot over the other, which is accomplished by causing them, when elevated, to describe a sort of semicircular motion. This, along with the smallness of the base of sustentation, causes the gait to be vacillating and uncertain.

A superficial examination of one of these cases would naturally lead us to suppose that the defect was not confined to the bones of the feet, but also extended to those of the leg. The apparent *advancement* of the *internal* malleolus, while the *external* is carried farther back, would strengthen such an idea. If we examine it carefully, however, we shall find that in almost every instance the bones of the leg are unaffected, and that the change in the position of the malleoli is due entirely to the inclination *inwards* of the anterior portions of the feet. Sometimes we find a slight *inward inclination* of the knee joints, but this has nothing to do with deformity of the foot, at least in early life. The tendons that resist us here are the tendo-Achillis, the tendons of the tibialis anticus and posticus, and the fascia plantaris.

The condition of the *muscles* of the leg is worthy your attention! At birth, or indeed until the child begins to walk, you will find them presenting a normal appearance in every respect; the leg is as fleshy and well formed as that of a child whose foot is perfect. But as soon as he begins to walk a change in their size is speedily discoverable. They become smaller and smaller, just in proportion as he grows older and takes more exercise, until at length they

are reduced to mere ribbons, and the limb itself is hardly anything but skin and bone. Now how is this to be accounted for? Exercise, you know, generally *enlarges* instead of causing a limb to waste! Dupuytren explains it, when but one foot is affected, by supposing that the child instinctively reposes his whole weight upon the *sound* one, and makes use of it on all occasions; as a consequence of which its nutrition is increased in activity, and it becomes larger than natural. On the other hand, the deformed limb remaining almost inactive gradually wastes away. Although this may be correct in such cases, it does not explain the atrophy of the limbs when both feet are deformed. It is more than probable that it is attributable to several causes—for example, the *unnatural* position of the muscles, their irregular actions, and the state of rest in which most of them are kept, together with the sedentary disposition of individuals so deformed. These must all exert a considerable influence in its production.

But the atrophy is not confined to the circumference of the limb; it also affects its *length*, a fact first pointed out by Dupuytren. When there is a loss in circumference, the *muscles* generally suffer; when there is loss of length, the *bones* and *ligaments*, and the case is extremely difficult of cure! Dupuytren remarks that he has always met with this shortening after the patient has turned his *tenth* year, although at birth he may have had the limb of the natural length!

Accidental Varus.—In the early stages of accidental varus, the part presents an appearance somewhat different from that met with in the congenital variety. For instance, the angle of junction with the foot and leg is much more *obtuse*, there is less displacement of the tarsal bones, and there is also less retraction of the heel. We also find that in the first nearly *all* the bones of the tarsus and metatarsus are partially displaced, whereas, in the second, the *astragalus* and *calcis* remain nearly in situ! Where the case is neglected, however, or is of long standing, or if the patient has used much exercise, nearly all the characteristics of the congenital variety are present.

Dissection.—The appearances on dissection of a case of varus, depend very much upon the age of the individual affected, and the degree of the deformity. We shall find, however, that at *no age*, and in no degree, is there a complete *luxation* of the bones of the foot, as some would have us believe. A *deviation* from their normal direction, with *partial* separation of the articulating surfaces, is all that we meet with.

However great the deviation of the *tarsal* or *metatarsal* bones may be, we find both in young and old, the *astragalus* the *least* changed. In young children it maintains nearly its normal position, but when the individual has used much exercise we find it turned

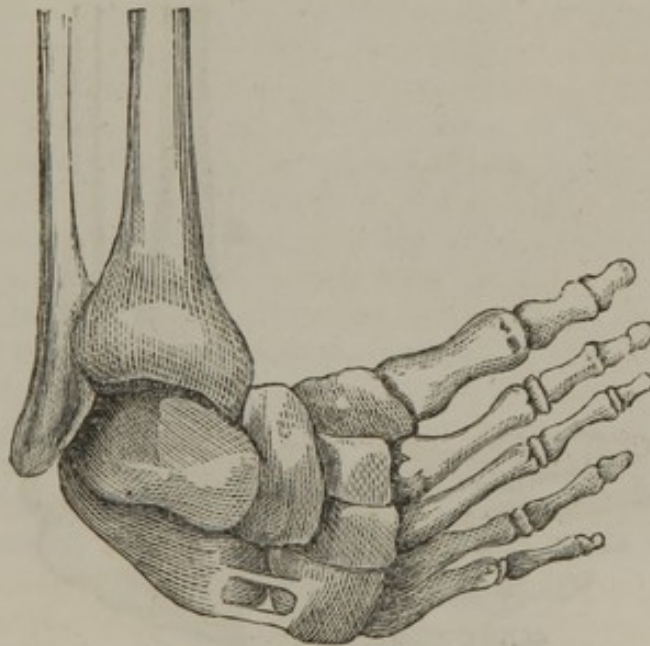
inwards, but never abandoning entirely its connection with the bones of the leg, which are generally well formed.

The large protuberance which you observe upon the dorsum of the foot, is formed in part by the anterior articulating surface of this bone, which is rendered prominent by the rotation inwards of the os scaphoides. Being covered only by integument, we often find in persons who have walked a great deal, this surface worn away and flattened, and covered by a large bursa.

The *scaphoid* bone itself, by rotating upon its lesser axis, is placed *obliquely* across the extremity of the astragalus instead of fitting it accurately. In consequence of this its *internal tuberosity* is carried *upwards* and *inwards* towards the internal malleolus, while its *external* is *depressed*!

The *cuboid* also turns upon its lesser axis, and is separated from the os calcis, instead of accurately fitting its lesser apophysis. This of course would cause the ligaments connecting them together to be much longer than natural, and produce a considerable depression just over the joint, which does not exist in a well-formed foot.

Fig. 177.



It is chiefly upon this bone that the individual rests his weight, consequently we find it often flattened, and almost always covered by large bursæ mucosæ, while the integuments over it are thickened and callous!

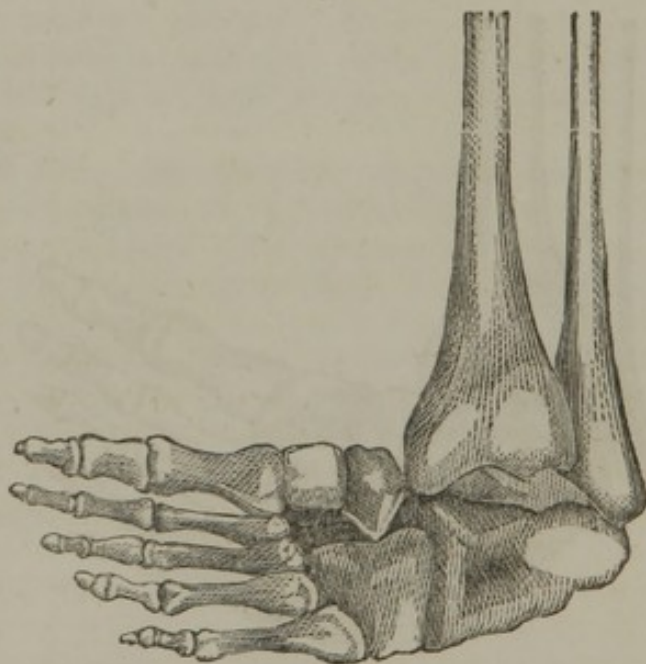
The most *striking* deviation, however, is that of the *calcis*. We find it in almost every case of the second or third degree, so completely turned upon its small axis, that its greater or posterior tuberosity is carried inwards a considerable distance within the internal malleolus, while at the same time it is drawn forcibly

upwards by the muscles of the calf. This elevation of the *posterior* tuberosity necessarily tends to *depress* the *anterior*, and prevents a perfect articulation of this portion of the bone with the cuboid, as I have already shown; while the articulation between the astragalus and the upper portion of the calcis is also rendered imperfect from the same cause. In many cases the greater tuberosity is so much diminished in size, and so forcibly drawn upwards that nothing like a heel exists.

As the necessary consequence of this deviation of the larger bones of the tarsus, we find the three *cuneiform*, the *metatarsal*, and the *phalangeal*, all directed *inwards* and *upwards*, so that the anterior portions of the foot become *vertical*, instead of retaining their usual *horizontal* position!

An examination of the sole of the foot also exhibits very clearly the change which the respective bones of the *tarsus*, *metatarsus*, and *phalanges*, have undergone. It is much *deeper* than natural, and the heel is not as wide as it usually is, while the anterior portion of the foot is larger.

Fig. 178.



You will always find that the individual bones are *smaller* than those of a well-formed foot of the same age, in consequence of which the whole member is much less in size than it should be. This is especially observable in persons somewhat advanced in life. If you operate on such a foot you need not anticipate its future development, it always remains smaller than natural, but the defect may easily be remedied by a properly constructed shoe. When the person operated on is a child, or youth, the foot generally acquires

in time its proper size. It is stated by some, that in all cases of long standing, ankylosis of the tarsal or metatarsal bones is present. I have, however, in my own practice, observed but few cases in which this condition of the bones obtained, and I have examined a large number with a view to its detection.

Ligaments.—The ligaments which hold the bones of the foot together in consequence of the deviation of the latter, are more or less displaced. All those which are placed on the *inside* of the foot are rendered *tense* and firm, while the *external* are increased in length and relaxed. You will often find in cases of long standing the aponeurosis plantaris *shortened, hard*, and apparently diminished *in breadth*; so firm is it in some instances, that we are obliged to divide it, before the foot can be properly directed! The dorsal ligaments are generally elongated.

Muscles.—From the nature of the displacement it must be evident to you, that the muscles which pass from the leg to the foot will also be displaced. The two tibials, particularly the anterior, (which is inserted into the base of the metatarsal bone of the great toe,) are so much contracted as to offer a powerful resistance to the eversion of the foot, and often require division before this can be accomplished. The long flexors of the toes, and the adductor of the great toe are also very much contracted. The gastrocnemei, solei, and plantaris, however, as I have already mentioned, suffer more in this respect than any other muscles, and in nine cases out of ten, particularly in cases of long standing, before relief of the deformity can be accomplished, their tendon has to be divided. In the numerous specimens before you, the great degree of shortening to which they are subjected is very well shown.

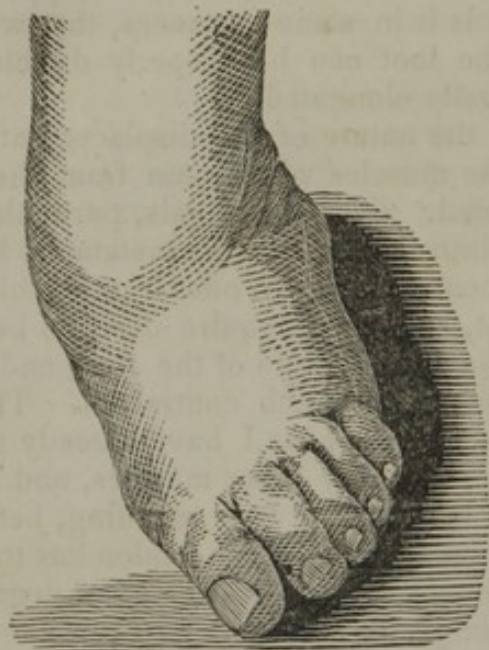
The *Peronei* muscles, on the other hand, are so much relaxed as often to lose their power of contraction, and become, to all intents and purposes, paralytic. This loss of equilibrium in the muscular powers of the limb, has been considered by Duverney and others, as the proximate cause of the deformity. In varus of the first and second degree, the deviation of the constituents of the members from their normal condition is of course much less.

TALAPES VALGUS.

The second variety of club-foot, the *valgus* of the older writers, is characterized by the foot resting upon its *inner* edge, while its *external* is elevated, and presents three principal varieties. This is a rare form of congenital club-foot, in consequence probably, as my excellent friend Dr. Little, of London, suggests, of the earlier development in the foetal state of the *flexors* and *adductors*. It would appear that the *extensors* and *abductors* being developed at a later period are weaker.

In the first degree the foot still rests chiefly upon its sole, but more particularly upon its *inner* edge, and the *ball* of the *great toe*, while the *outer* is *slightly* elevated, and does not touch the earth. The *instep* is flatter than natural, and a considerable depression is met with just *below* and a *little in front* of the external malleolus. The *inner* edge presents a considerable eminence near its centre, formed chiefly by the scaphoid bone, and the internal malleolus is more prominent than usual! The tendons in fault here are those of the peronei muscles and sometimes those of the extensor digitorum.

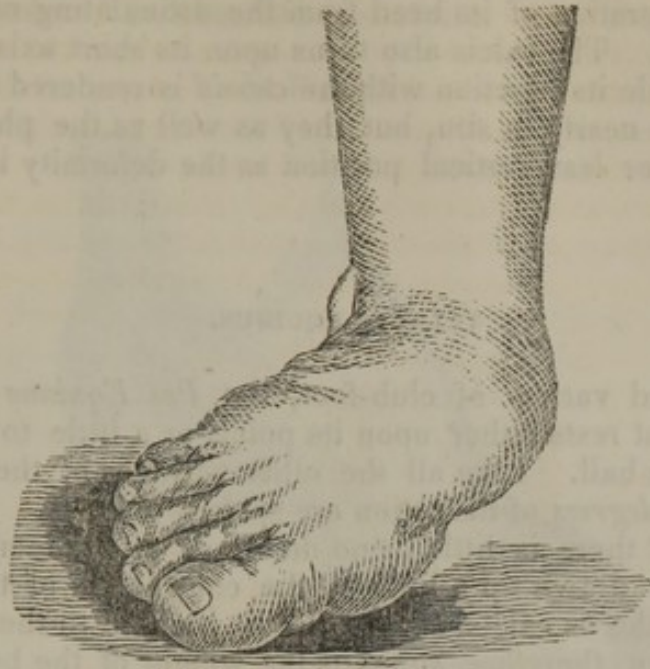
Fig. 179.



In the second, the foot rests almost entirely upon the anterior portion of its inner edge; the heel is drawn *upwards* and a little *outwards*; the sole forms an obtuse angle with the earth, the internal malleolus, as well as the projection formed by the scaphoid bone, is more prominent than in the first variety, while the depression on the dorsum of the foot is much deeper. The muscles of the limb are usually very feeble, and the patient has but little command over its movements. The same tendons are affected here, as in the first degree, but the tendo-Achillis is also involved.

In the third variety, which is very rare, the foot is turned completely out, and rests *entirely* upon its *inner* edge, which causes it to become almost vertical, the sole looking directly backwards, while the dorsum presents in front. The *internal* malleolus is of course very prominent, while the *external* is nearly lost in the depression between the *leg* and *foot*! When this is congenital the heel may be drawn up, but when it depends upon the reception of some injury, as is often the case, this displacement is not always

Fig. 180.



present. We have the same tendinous resistance here that we have in the other varieties, but it is of course much greater.

Fig. 181.



Dissection.—The ligaments and muscles are found in a condition very similar to that which they present in varus, only we find the *internal* extended, while the *external* are shortened and tense.

The astragalus undergoes more displacement than in varus, and there is a separation of its head from the articulating cavity of the os naviculare. The calcis also turns upon its short axis, and looks *outwards*, while its junction with the *cuboid* is rendered closer. The cuneiform are nearly in situ, but they as well as the phalanges assume a more or less vertical position as the deformity increases in degree.

TALAPES EQUINUS.

In the third variety of club-foot, the *Pes Equinus* of the ancients, the foot rests either upon its point, or a little to one side of it, or upon its ball. Like all the other varieties of the deformity, *three or four degrees* of distortion are spoken of.

In the *first* there is little or no deformity of the member. The heel is merely drawn up a little by the contraction of the muscles inserted into the os calcis, and cannot be brought to the earth. The ball of the foot, therefore, supports the weight of the body.

Fig. 182.



In the *second*, the heel is more retracted, and along with this retraction, there exists a very perceptible *contraction* of the aponeurosis plantaris. The sole of the foot is consequently *deepened*, and the whole member is very much bent upon itself. The dorsum of the foot is also more uneven than natural, owing to a partial luxation of the scaphoid bone. The weight of the body is here received chiefly upon the *toes*, which, when the individual has used

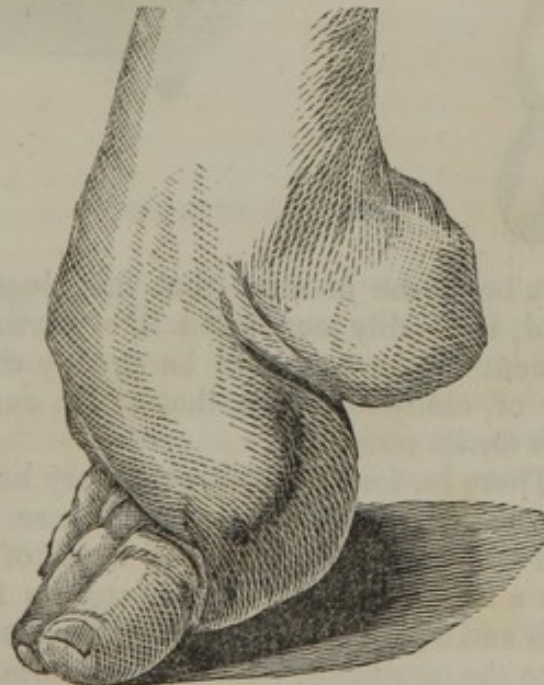
much exercise, are often displaced or deformed. This is a case before the patient has taken much exercise.

Fig. 183.



One after the person has walked for a number of years.

Fig. 184.



In the *third*, the heel is so much retracted, that the foot forms nearly a straight line with the leg, and the heel itself is sometimes scarcely visible. The foot rests upon the extremities of the toes, which yield either to one side or the other, whenever the patient

attempts to walk, so that his weight is received not on the toes themselves exactly, but rather upon the inferior portion of the *outer* or *inner* edge of the foot. The aponeurosis plantaris is here generally contracted, and the dorsum of the foot more convex than natural. The integuments just above the heel are usually thrown into wrinkles, from the contraction of the ankle.

A case before much exercise has been taken. (Fig. 185.)

One after many years *use* of the member. (Fig. 186.)

Fig. 185.



Fig. 186.



It must always be borne in mind that this degree of *pes equinus*, if neglected, is readily converted into *Varus* or *Valgus*, by which the treatment of the case will be greatly complicated. Of all the varieties of club-foot, it is that which requires the most prompt measures for its removal.

Dissection.—There is, for the most part, very little displacement of the bones of the foot, in this deformity; there is merely a sort of rolling off of the scaphoid, from the head of the astragalus, and occasionally a displacement of the astragalus from its connection with the tibia and fibula. The dorsum pedis is more convex than natural, owing to the scaphoid, cuboid, cuneiform, and metatarsal bones being drawn towards the sole. The ligaments on the front of the foot are extended, while those on the sole are shortened and tense. The muscles, especially those of the calf, from a want of use, gradually waste away, so that the leg is soon reduced to a very small size; but notwithstanding their smallness, they are *firm* and

rigid. Those of the front of the limb, the tibialis anticus especially, are elongated and relaxed, but when the foot is properly placed they soon regain their natural tone and strength, as the defect resided chiefly in their *length*, with no *lateral* inclination, which always renders a proper retraction of a muscle more difficult and tedious.

Fig. 187.



TALAPES CALCANEUS.

This is an exceedingly rare form of the defect under consideration, but, like all the other varieties, may present several degrees of deformity. In the *first*, the foot rests upon the heel, and its anterior portion is *slightly elevated*, and cannot be placed, by the volition of the patient alone, in contact with the earth. The tendons in fault are those of the tibialis anticus, and extensores digitorum. The tendo-Achillis is slightly stretched, and the fascia plantaris is in a similar condition. The bones of the foot retain their normal relation to each other. By a slight effort the surgeon can place the foot in its natural position, but as soon as the compression is removed the deformity makes its appearance.

In the *second* degree, we have the same general characteristics; there is merely an increase of the deformity.

In the *third*, the dorsum of the foot is often placed in contact with the front of the leg, and the tendons of the tibialis anticus and extensores digitorum are so firm and unyielding that it is impossible

to bring the sole of the foot to the horizontal position. The usual appearance of talus is exhibited in figure.

Fig. 188.



Dissection.—The appearances on dissection may be inferred from what has already been said. We find little or no displacement of the bones, with the exception of the astragalus and calcis; a rigid condition of the ligaments and tendons on the front of the foot and ankle; thickening and atrophy of those on the back part of the ankle, especially of the tendo-Achillis, and wasting of the muscles of the leg.

In two cases I have seen the *os calcis* so long that it was impossible, even after the division of the tendons, to place the forward part of the foot on the same plane with it, and in order to enable the patient to walk with comfort a kind of socket was made in the heel of the shoe, into which the *os calcis* was inserted, while the rest of the foot was placed upon an ordinary sole.

A person thus affected walks with great difficulty without artificial aid; the *os calcis* is a pivot upon which a portion of the weight of the body is sustained, and at each step turns upon its short axis, so as to communicate a rotatory movement to the whole foot and leg.

TALAPES DORSALIS.

This is an exceedingly rare form of club-foot, and is often very

difficult to relieve. Like all the other varieties of the defect we meet with different degrees in the amount of deformity.

In the *first* the foot rests upon the dorsum of the toes and the metatarso-phalangeal articulations. The heel is very much retracted, the sole of the foot stretched and thrown into ridges, while the dorsum is rounded, smooth and convex. The toes are usually more or less displaced and deformed.

In the *second*, the foot rests upon the metatarsal bones, and those of the first tarsal row. The sole of the foot is more shortened than in the first degree, the heel more contracted, the dorsum more convex, and when the patient has walked much, is furnished with a large bursa mucosa.

In the *third*, the deformity is still more marked. The foot rests chiefly upon the second tarsal row, chiefly upon the anterior prominences of the astragalus and os calcis; the sole is often, though not invariably, very much contracted and shortened, the heel drawn up by shortening of the tendo-Achillis, the dorsum convex, as in the other degrees, and furnished with a bursa when the patient has used much exercise.

Fig. 189.

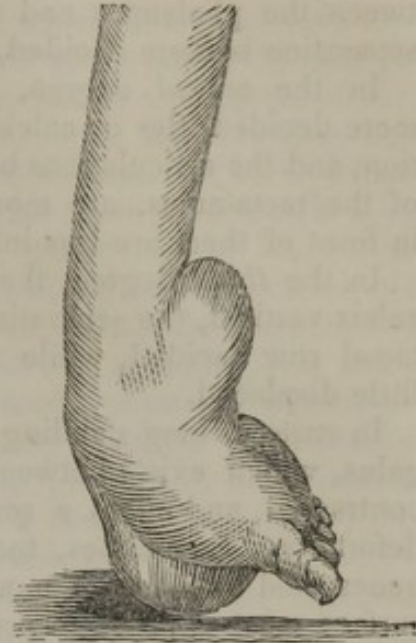
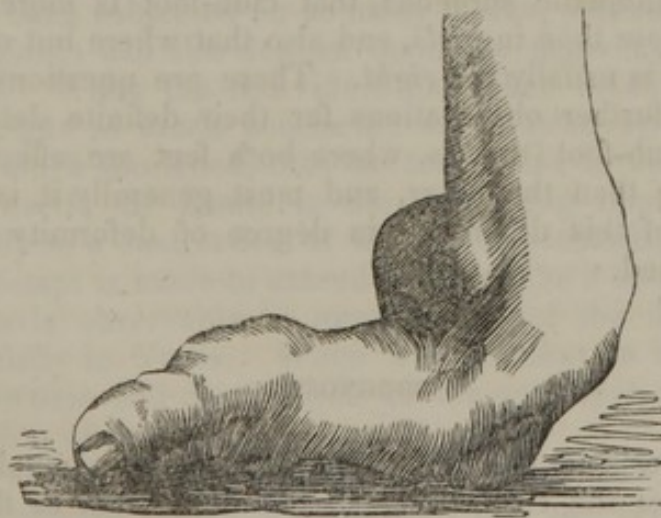


Fig. 190.



Dissection.—From whatever cause produced, whether congenital or acquired, we find, on dissection, that the parts chiefly in fault are the muscles of the calf, which, by excessive shortening, draw

up the heel, the flexors of the toes, the plantar fascia, and all the ligaments of the sole of the foot, which are rigid and contracted. From the influence of these agents there is more or less displacement of the bones. In the *first* degree this is limited to a slight rotation of the astragalus forwards, with a slight separation of the different articulations of the anterior portions of the foot, except those between the phalanges and the first metatarsal bones, in which the separation is more decided.

In the *second* degree, the displacement of the astragalus is more decided, the os calcis is also lifted almost to a vertical position, and the articulations between the first tarsal row and the bones of the metatarsus, are more widely separated. The articulations in front of them are less interfered with than in the first degree.

In the *third* degree, the astragalus is nearly dislocated, the os calcis vertical, the separation between these bones and the second tarsal row decided, while the other articulations in front are but little displaced.

In cases of long standing the space for the reception of the astragalus, which exists between the tibia and fibula, is more or less contracted, and offers a serious obstacle to a proper cure of the deformity. Sometimes, too, ankylosis exists among the several bones, and now and then a ledge of bone is thrown out upon the surface most exposed to pressure. When such difficulties are discovered no attempt should be made to cure the case.

LIABILITY.

It would appear from the observation of some of the most experienced orthopedic surgeons, that club-foot is more frequently met with in *boys* than in *girls*, and also that where but one member is affected, it is usually the *right*. These are questions, however, that require further observations for their definite determination. In double club-foot (that is, where both feet are affected) one is always worse than the other, and most generally it is the *right*. The reason of this difference in degree of deformity is not very easily explained.

PROGNOSIS.

The prognosis in this deformity depends very much upon the *complication* of the case, the *degree* of *contraction* of the foot, the *variety* of the defect, the *condition of the bones*, the *age* of the patient, his *disposition* to submit to our remedies, and the *character of the cause*.

An ordinary case of club-foot cannot be considered in any

sense a *dangerous* affection, for although it occasions great physical distress, it never involves the life of the individual. Should it, perchance, become complicated with an *inflammation* or injury of the joints, and especially if the individual be scrofulous in his diathesis, symptoms of the most alarming character may be developed, and not only the *joint*, but even the existence of the patient may fall a sacrifice. I recollect a case which illustrates very forcibly this fact. I was requested, some years since, to meet a professional friend in consultation on the case of a daughter of Mr. G., residing in Front street. The patient, aged about twelve, and presenting traces of a scrofulous taint, had a congenital varus affecting both feet, but with the exception of the local pains which were developed by walking upon the faulty members, she had never suffered from any disease of the part, until within a month or six weeks of my being called in. About that period she happened to trip in walking along the pavement, and fell, spraining one ankle severely, and bruising the other. The family physician was called in, and treated her in the manner usually resorted to in similar cases, but notwithstanding every effort to prevent it, inflammation attacked the sprained joint, and, when I saw her, had nearly destroyed it. Her general health had also suffered considerably, hectic fever, with all its direful accompaniments, being present. She was also troubled with a hacking, dry cough, and upon examination with the stethoscope, we detected tubercles in both lungs, and in one a considerable cavity—our treatment was, of course, palliative merely, and our patient sank in a few weeks. In this case the probability is, that had her foot been well formed, the sprain would have been relieved as in any other case, and the formation of tubercles, which was occasioned by the continued irritation to which the system had been subjected for so many weeks, prevented.

The prognosis will also depend upon the degree of *contraction* of the foot. When the individual has taken much exercise the muscles become so much contracted and wasted away, and their tendons so much shortened, that the foot seems to be almost doubled upon itself; the fissure in the sole being remarkably deep, owing chiefly to a contraction of the fascia plantaris, which feels, when an attempt is made to extend the foot, like a strong and dense cord. This is observable in every variety of the deformity, but more especially in Varus. When it is present to any extent, a much longer time will be required for the cure than when a contrary condition of the foot obtains.

The *age* of the individual must also be held in view when we form our prognosis. It is usually stated that the earlier we commence our treatment the greater will be the prospect of ultimate success; the muscles, ligaments, and even the bones themselves, being just after birth, *flexible* and *soft*, and consequently more readily moulded into a proper shape. At first sight this advice ap-

pears reasonable enough, but you will find that whenever it becomes necessary, from the character of the deformity, to employ much force, or divide a tendon, great difficulty will be met with, if you follow it. In the first place, the *integuments* of a new-born child are so extremely delicate, that *excoriations* and often severe *ulcerations* are almost sure to be developed, even when the utmost care has been taken to prevent their appearance, by padding the instruments, and applying them as accurately as possible. We are of necessity, then, obliged to suspend our efforts for the relief of the defect, and wait until the foot is once more sound, and apparently able to support the pressure of our bandages without suffering.

In the second, the *legs* of a very young child are so *short* and *clumsy* that it is almost impossible to maintain a proper apparatus. It is constantly slipping, and of course can exert little or no influence upon the deformity, for the removal of which it is applied. The constant *flexion* of the limbs, and the frequent necessity for changing the child, are likewise obstacles to a proper action of our apparatus.

In the *third*, the *nervous* system of very young infants is so susceptible, that the slightest causes are often sufficient to throw them into convulsions, or bring on fever. In a child of Mr. A., upon whom, in its third week, I applied my apparatus, after having previously divided the tendo-Achillis in both feet, I was obliged to stop the treatment after the lapse of a day or two, in consequence of its fretting itself into a fever. There was probably not much suffering in this case, because I took great pains to make the bandages as soft as possible, and there was no excoriation; but the mere confinement of the feet was sufficient to cause great disturbance of the whole system.

For the reasons just stated, then, I always, when it is in my power to do so, postpone the commencement of the treatment until the child is five or six months old. When from any cause, however, it becomes necessary for the treatment to be undertaken at an earlier period, you must recollect what I have told you relative to the difficulties of the case, and be prepared for overcoming them if possible.

We should never, provided the case be under our control, permit it to remain unremedied longer than the second year, for after this period the difficulties of the treatment are astonishingly increased. In proportion as the child advances in years, the *muscles* and *ligaments* offer greater resistance, and the articulations of the foot and ankle become stiff and unyielding.

Two questions, bearing upon this portion of our subject, here naturally present themselves. They are, first, What age is *most* favourable for undertaking the treatment of a case of club-foot? Second, At what age may we consider the deformity as beyond the reach of art?

From my own experience, I should say *decidedly*, that the *most favourable period* ranges between the sixth and eighteenth months. The integuments at this age are sufficiently firm to bear the requisite degree of pressure without suffering, while the *muscles, ligaments and bones* are all susceptible of being easily brought to their normal position. I have also found, that when the child has been allowed to pass this period without treatment, the next best period ranges between two and eight; after which the case becomes more and more difficult, as year is added to year.

Before the great influence of the tendo-Achillis in these cases was recognized, and before the benefit resulting from its section was believed in, the period at which it became useless to undertake to cure club-foot, was variously stated. The majority of authorities, however, fixed it at between eighteen and twenty-five; some few professed to have accomplished cures in individuals of greater age; and when the defect consisted merely in a retraction of the heel, it was said that age offered little or no obstacle, and persons forty, forty-five, and even fifty years old, were reported as being perfectly relieved.

It is almost impossible, however, to arrive at any definite conclusion upon this point, as so much depends upon the temperament of the individual affected, as well as upon his mode of life. I have recently treated a woman forty years old, who, from the laxity of her fibre, and the sedentary life to which she had been accustomed, was cured in four weeks less time than a boy of fourteen, whose robust health and active life had rendered his muscles and ligaments firm and unyielding. I am, however, disposed to look upon *mere age* as a matter of but little moment in forming our prognosis. We must direct our attention almost exclusively to the condition of the *foot*, and if everything here is favourable, we may operate almost at any age. Cases are reported in which cures have been accomplished in persons seventy and eighty years old. It is only, however, by the division of the tendo-Achillis, or the tibialis anticus tendon, or both, or other tendons if necessary, that cures of persons much advanced in life can be accomplished. There is no *possibility* of stretching the tendons here, which you know may be affected in the very young.

Our prognosis will also depend upon the condition of the *joints* of the foot; if any of these are ankylosed, or rather, if any that are essential to the proper movements of the foot, it will be useless for us to attempt a cure, even by a section of the different tendons. I wish you to bear this in mind, for sometimes the case at first sight wears a most tempting aspect, and you feel disposed to make an effort to relieve the patient of his deformity. Should you attempt the operation, however, you will most assuredly fail, and bring contempt, not only upon yourselves, but upon our science. The existence of bony ledges or plates, so often met with in old cases, likewise offers a serious obstruction to a proper reduction of the foot.

The *variety* of deformity is likewise a matter of importance. As in the *Pes Equinus*, there is simply in *many* cases but an elevation of the heel, there is little or no difficulty, provided the joints are sound, in effecting a cure, and that too in a very short time, by the division of the tendo-Achillis. When, however, it is complicated with a *lateral inclination* of the toes, (either outwards or inwards,) a longer period of time, and a more complicated treatment will be required.

Varus, in its first and second degrees, is also easy of remedy; in its third, it is often very difficult to manage, and *always* requires a longer time than any variety of *Pes Equinus*.

Valgus being generally the result of some mechanical injury, by which the *bones* as well as the soft parts have been made to suffer, may be considered the most unfavourable variety of club-foot. Where it is *congenital*, however, I have succeeded in relieving it without much difficulty.

Talus often gives us a good deal of trouble when the contraction is excessive, but unless the os calcis is deformed, it is as susceptible of relief as the other varieties.

Talipes Dorsalis is also easily managed, excepting the third degree, when the case is of long standing, and the alteration of the space for the reception of the astragalus, between the tibia and fibula, decided. Here there is much difficulty experienced, and unless the surgeon is very skilful in such matters, it will be best not to interfere.

The prognosis is also very much modified by the disposition of the patient to submit to our remedies. I have repeatedly met with great difficulty in this respect, and was near failing in the accomplishment of a cure, by the unwillingness of my patient to adhere to the necessary treatment for a sufficient length of time. In such cases, *firmness* on your part is absolutely essential. Yield a single point, and you may be foiled in your attempt to relieve the defect.

You will always be questioned by the friends of the patient, or by the patient himself, respecting the *time* it will be necessary for him to remain under treatment. Be cautious how you commit yourselves. It is utterly *impossible* for any one to say *positively*, that he will cure the case in this or that time. We may, however, form some estimate of the *probable* period, by the character of the deformity. A simple *Pes Equinus* at *birth*, by a division of the tendo-Achillis, or without it, may be cured in from two to three weeks. If neglected until the individual has somewhat advanced in life, from four to eight weeks will be necessary, and in very old cases, even longer.

Congenital *Varus* in the first degree, treated directly after birth, or a few months after, may generally be relieved in four weeks. At a later period it will require from six to eight weeks, unless we divide the tibialis anticus tendon, when from four to six weeks will

sometimes be sufficient. In the second and third degrees, treated shortly after birth, *without* a division of the tendon, from *two* to *three months* are required; if neglected until the child is *four, five, six, eight, or ten* years old, from *four* to *twelve*; and if it has been allowed to run on untreated to *puberty*, is often irremediable.

When treated by *dividing* the tendo-Achillis, in the early months, or even for the first two years, about four weeks will be sufficient; when the patient is between the ages of *two* and *ten*, from *six weeks* to *three months*; and at *puberty*, from *two* to *six months*.

Valgus, if congenital, and in the first degree, may generally be cured in from *three* to *four weeks*, in a child. In the second, from *four* to *eight* will be requisite.

The other varieties, Talus and Talipes Dorsalis, require about the same time.

Although such is the usual period occupied in the treatment of these cases, the remark already made, that it is utterly impossible to say positively that a cure will be accomplished in any given time, should always be borne in mind, for even in simple cases, circumstances, over which we have no control, may retard the accomplishment of our end, for weeks and months together.

DIAGNOSIS.

There is no affection of the foot with which the deformity under consideration can be confounded, with the exception, perhaps, of that retraction of the heel so often met with after injuries of the hip, and which bears some relation to Pes Equinus in its first and second degrees. The history of the case, however, should always be sufficient to distinguish the one from the other.

TREATMENT.

From the tedious and often troublesome nature of the treatment required in most cases of club-foot, as well as its usual failure of success in those of any standing, this defect, except in its earliest stages, has been yielded by most practical surgeons to the management of a few individuals, who, from choice or necessity, have directed their attention exclusively to orthopedic surgery; or to the instrument makers alone. The latter, with but few exceptions, being utterly ignorant of the principles which should guide us in its treatment, have often, by their mal-practice, occasioned the greatest distress, and even endangered the lives of their patients. The former, actuated in most instances by a desire of gain alone, but too often degenerate into mere quacks, conceal their plans of treatment, and though often successful, as was the case with Venel

of Switzerland, Jackson of London, Verdier of Paris, and many others, have done nothing by which the profession has been in the slightest degree benefited. Within a few years past, however, surgeons of eminence have been induced to direct their attention to the subject, and as a consequence, we have obtained not only a correct pathology, but also a successful and easily understood method of cure.

The treatment will of course vary with the *variety* of the deformity, and the *age* of the patient. There are several general indications, however, which you will do well to fix in your minds.

Recollecting that the defect resides, in almost every instance, in a *shortened* condition of the tendo-Achillis, to which is sometimes added a similar state of other tendons of the foot, and that there is neither *complete luxation*, nor any *disease* of the bones present, at least in the majority of cases, it will readily occur to you that the *first indication*, and decidedly the most *important*, consists in the application of such measures as shall most speedily bring these shortened tendons to their proper length. Unless this end be accomplished, it will be in vain to expect anything like a removal of the deformity.

The second indication is also one of much moment, and consists in the *retention* of the foot in its proper *position* after the tendons have been elongated, or rather during our efforts to accomplish this end. The *heel* should always be kept *firmly* fixed, during the whole treatment, and unless attention be paid to this point, rest assured that you will be foiled in your attempt to relieve the defect.

The third indication refers to the establishment of a proper degree of *tone* in the muscles and ligaments of the foot, after the member has either partially or entirely regained its normal shape and position.

The fourth indication consists in the application of a proper shoe or boot, by means of which the foot may be *permanently* retained in its proper position. You must always recollect, that the foot remains for weeks, or even months after the operation, *weak*, and often *rigid* in its articulations, although all traces of deformity may have disappeared. In consequence of this, there is a disposition in the muscles of the limb to return to their original irregular action, as soon as the apparatus by which they were kept in their proper position is removed, and unless you counteract this tendency by appropriate measures, the tendons will soon be reduced to nearly their original length, and your operation will prove of no benefit whatever.

You should invariably inform the patient or his friends of this circumstance, so that the treatment requisite to insure complete success may be readily submitted to as long as it may be deemed necessary.

The fifth indication refers to the *preparation* of our patient, and is considered by some as one of much importance, when we pro-

pose to divide the tendons. *Rest, frictions, low diet, and warm bathing* of the feet, with the view of producing relaxations of the ligaments, are the measures usually recommended. For my own part, ever since I have had much experience in the treatment of this defect, I resort to nothing of the kind; and so far from employing warm baths, I consider their use as fraught with ill consequences. They determine a much larger quantity of blood to the feet than is ordinarily distributed upon them, and thus increase the risk of inflammation after the performance of an operation; they also render the integuments so delicate that even the slightest degree of pressure will cause excoriation; and so far from relaxing the tissues, they render them more *rigid* and *unyielding*. I do not hesitate to assert, that I have never used the warm bath, either as a preparatory measure, or for the purpose of cleanliness in the subsequent treatment, without having cause to regret it, and for the reasons just given. I repeat that I very rarely resort to any preparatory measures. Rest for a day or two, a mild laxative, and a light diet, are useful, when the patient is of gross habit, somewhat advanced in life, or just from a journey, which always renders the system more or less irritable. Under ordinary circumstances, I commence the treatment at once, and so far, at least, have had no cause to find fault with such a course.

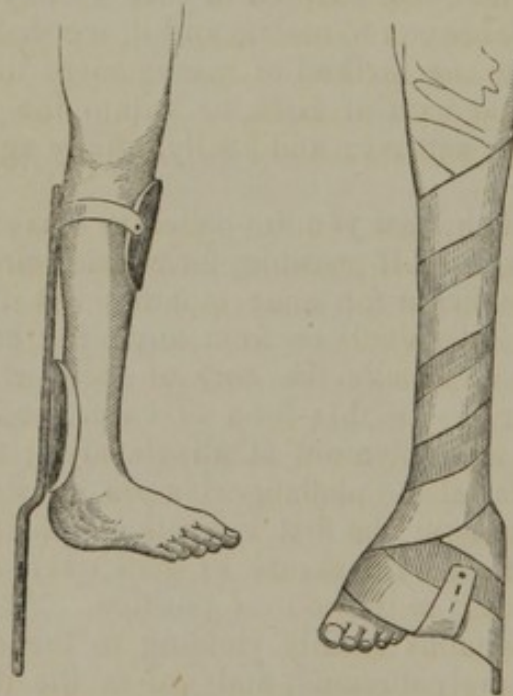
Keeping these indications in view, let us now proceed to speak of the plan of treatment best adapted to each variety of the defect; and the better to enable you to understand it, we shall take up each variety and consider the method of management to be employed when the case is met with at *birth*, or within the *first* year; between the ages of *one* and *six*; and finally, at *any* age *subsequent* to the sixth year.

Let us suppose, then, that you are called to a case of congenital varus in its *first* degree. If possible, for reasons already assigned, you postpone the treatment for some months; but if, from the circumstances of the individual, or from any other cause, you find yourself obliged to undertake the cure at once, what is the best method of procedure? In this form of varus, you recollect, the *heel* is but slightly, and often not at all elevated; there is merely an *inversion* of the tarsal and phalangeal bones, caused by a shortening of the tibial tendons; the first indication is limited, therefore, to the application of such a measure as shall overcome this *inversion*, and bring the foot to its *natural* position. At this early age you will find the tendons readily yielding to the employment of *simple pressure* properly directed, and unless the deviation is *remarkably* great, nothing else will be here required for the accomplishment of a cure. I have in but a *single* instance found it necessary to divide the tendon in this degree of varus at this age. By what apparatus, then, will this pressure be most effectually applied, and with the least pain? Almost every surgeon, if asked this ques-

tion, would describe to you some contrivance of his own, better calculated, in his own estimation, to ensure success than that of any professional brother. Following the example, then, with all due deference to the notions of others, I shall show you mine, and not take up your time with a description of the "thousand and one" mentioned by others. If you keep the indications in view, however, you can always make a contrivance for yourself, provided a proper apparatus be not at hand. Thus you may succeed sometimes, by using Dupuytren's apparatus for fracture of the fibula; applying it, however, on the *outside* of the limb, instead of the inside. Broad adhesive bands, made to envelop the foot, and then fastened to the leg, so as to evert the former, have also succeeded. And, again, enclosing the foot in a hollow tin or carved wooden splint, made to fit the foot, is sometimes sufficient.

The apparatus I prefer is a simple contrivance of one of my pupils, Mr. H. K. W. Boardman, of Connecticut, which answers the purpose of *everting* a foot better than anything I have seen. The drawings exhibit the instrument as well as the mode of application. The foot and leg should be enveloped in a narrow roller, and then the instrument adjusted—when, to attach it to the leg, a second roller must be employed.

Fig. 191.



The splint itself is attached by means of a slot and movable pin, connected with the upper plate. The operation of this instrument is obvious; the upper pad forms one point of resistance, the lower is the fulcrum upon which the ankle is made to turn, and the pro-

jecting end serves for the attachments of the bandage, by tightening the turns of which, from day to day, the foot is brought into a line with the leg.

This simple contrivance has answered perfectly in my hands, not only for the cure of congenital varus, but also for those cases of this defect met with at more advanced ages, where it has been necessary to divide the tendons. I also employ it in valgus.

After, by the use of this measure, the foot has been brought to its proper position, it may be prevented from returning to its original shape, by a common high-quartered shoe, made stiff on the inside. This is to be worn until all tendency to relapse has been done away with.

Let us suppose, again, that you were called to a case of this degree of varus, in a person between the *first* and *sixth* year. The same indication still obtains, but the mode of treatment varies somewhat according to circumstances. If the child has never walked, the same apparatus, and the same general management will suffice, except in cases of extreme rigidity of the tibial tendons. Where the child is beginning to walk, however, we substitute for the splints, which are clumsy, a shoe, constructed upon principles derived chiefly from Scarpa and Delpech. You recollect the inclination of the foot here, is such, that it is impossible to force it into a shoe with a straight sole, or if we accomplish this end, the pain is so acute that the child will be unable to bear it, for any time. To obviate this difficulty, and to accomplish our object gradually, Delpech contrived a shoe with a sole divided near the centre, and so regulated by a rack, that it could be turned inwards so as to accommodate itself to the angle of the foot, and be there fixed. Every day or two, the angle was changed, until the foot was brought to its proper shape. In some cases this answered very well, but it was found to exert very *little force* in a given time, and the cases in which it was used, required a tedious treatment.

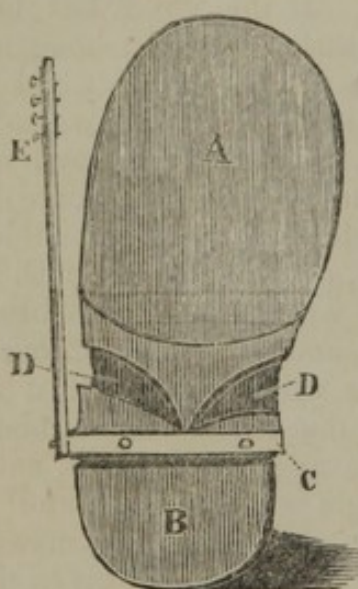
The celebrated Scarpa had also detected the principal indication in such cases; but instead of *dividing* the sole of the shoe, he attached to the outer leg-splint (with which these shoes are always furnished) a *spring*, which passed forward *obliquely* to a little beyond the point of the foot. Along its outer surface, there were hooks, or buttons, intended for fastenings to straps that crossed the foot from the inner margin of the sole. The spring was nearly on a level with the sole of the *foot*.

There is generally, in all cases of varus of the first degree, a tendency to walk upon the *toes*, and where the heel is at all retracted, the whole weight of the body is borne by the anterior and outer portions of the foot. To overcome this tendency, and to bring down the heel, Scarpa suggested the application of a *spring* within the sole, or upon it in some cases, which acted only upon the anterior parts of the foot.

The proper indications here seem, therefore, to have been clearly understood by both Scarpa and Delpech, but they employed different measures for their accomplishment.

I have, myself, made use of a shoe, in which the principles of both Scarpa and Delpech are combined, and have much reason to be pleased with its action. I wish you to understand, gentlemen, that I claim no great merit for this apparatus; it is not in reality an *invention*; nor do I claim to be the *first* to have so applied the *principles* of the surgeons just referred to; and I wish you to recollect, whenever you see a shoe constructed upon the plan which I now show you, that Scarpa and Delpech deserve the merit of the *principles*, although others may *modify* them as much as they please. The annexed cut represents the sole of the shoe:

Fig. 192.



A. Anterior portion of the sole, formed of a steel or iron plate, and covered with leather. Its angle of lateral inclination may be varied at pleasure.

B. Heel also of iron and leather.

C. An iron plate, the extremities of which terminate in the leg-irons, which extend sometimes as high as the knee, in others up to the thighs, and in others above the hips.

D. The tongue of the sole plate. This tongue is riveted to the heel-plate, but so loosely that it admits of free motion between the latter and the sole.

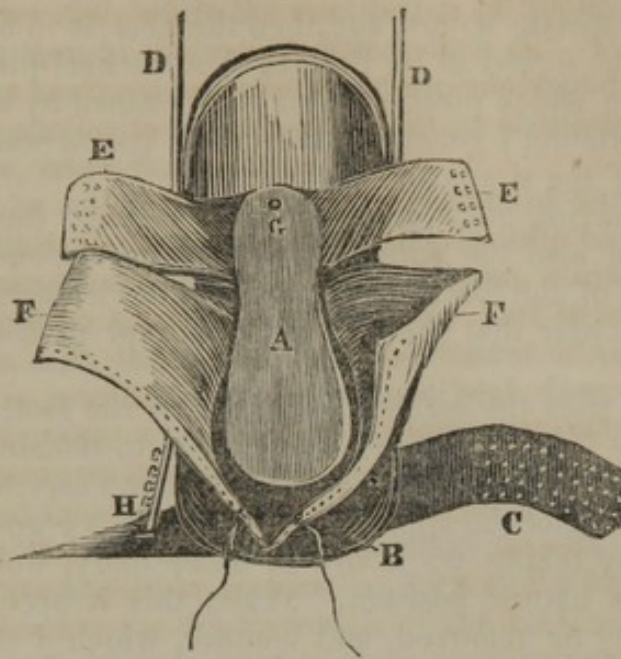
E. The lateral spring of Scarpa, furnished near its anterior extremity with buttons for the straps, which *everts* the toes.

In this instrument, you perceive, I have dispensed with the *rack* of Delpech.

It is important for you to recollect, that iron or steel sole and heel-plates are, in almost every case, essential to the proper action of the shoe. Unless they are employed, the leather, not being of sufficient firmness to resist the unnatural inclination of the foot, will warp, and the shoe thus becomes, in a short time, not only useless, but even hurtful. The front or upper portions of this shoe are shown in Fig. 193:

A. A steel spring, the width of the sole of the *foot*. It is riveted loosely, though *firmly*, to the heel plate, and may have its *lateral* inclination *varied at pleasure*. It does not, however, follow the motions of the sole, but requires a separate regulation. Its *angle* of elevation varies in different cases; about thirty-five de-

Fig. 193.



grees will generally give it force enough. Its *length* will also vary with the case; it should always be a little longer than the foot, but never so long as to touch the leathers of the shoe. A space of at least half an inch should be left between the extremity of the spring, and the point of the shoe, in order that the former may move readily upon its pivot.

B. Toe of the shoe.

C. A broad leather strap, stitched *strongly* to the sole, and furnished with four rows of holes. This is the everting strap, and is passed over the foot, and fastened to the spring on the outside of the shoe.

DD. Iron splints, which pass up the leg to any height it may be deemed necessary, and are connected by the transverse bar on the bottom of the shoe.

EE. Straps, about three inches wide, stitched firmly to the upper portion of the heel, and intended to lace across the instep. These are very important, inasmuch as they *fix the heel*.

FF. The upper leathers, divided down to the toe, in order to allow the foot to be properly adjusted upon the spring.

G. The rivet by which the spring is fastened to the heel.

H. Spring on the outside of the foot.

The heel of this shoe should reach above the tuberosity of the os calcis, and have a slight inclination *inwards*, as it rises, so that the tendency in the posterior portions of the foot, to slip upwards, may be guarded against.

To apply this apparatus, the child should be placed in a sitting posture, and the foot, covered with a stocking, then placed upon the spring of the shoe, the leathers having been previously widely

opened, as is seen in the cut. - The leg-splints are first to be fastened by their appropriate straps, and then the heel is to be attended to. This should be forced as far back against the heel-piece of the shoe as possible, in which position it may be retained by the straps. To prevent excoriation I generally place some cotton wadding between the lacings of the straps and the instep.

The heel having been properly fixed, we next *invert* the sole of the shoe, and also the spring, until they correspond exactly with the inversion of the foot. We then lace the leathers as closely as possible, in order that the foot may be kept in contact with the spring.

Lastly, we pass the *everting* strap across the foot, and fasten it. We allow the foot, for the first day or two, to remain at its original degree of inversion, in order that the patient may become accustomed to the use of the apparatus. After this, we gradually tighten the straps, by taking up a row of holes daily, until the foot is brought to its natural position. When this is accomplished, this apparatus may be removed, and another, which I shall show you directly, or even a common shoe, stiffened on its inner side, substituted in its place.

Like every other contrivance for the cure of club-foot, this shoe should never be removed, except for the purpose of bathing the foot in cold spirits and water, and using frictions. To be of any use, it must be worn night and day. The patient, of course, is not confined to any one position, but is allowed to exercise as freely as he finds it agreeable to do. When both feet are affected, and there exists any inclination inwards of the knee, it is necessary to attach the shoe to the leg-iron *obliquely*. This is accomplished by setting the stirrup-iron, or that which passes under the foot, at an angle, instead of directly across the foot.

But, suppose you are called to a person of an age more advanced? I do not hesitate to advise a division of the tibialis anticus tendon, and, if necessary, that of the tibialis posticus, in *all* such cases. You may, it is true, in persons from six to twelve, or fourteen, and even older, succeed in time in the accomplishment of a cure by pressure alone; but the treatment will prove both *tedious* and *painful*. In *adults* it will be but a waste of time and trouble to attempt this object, while the tendons just mentioned retain their original integrity; failure will, almost *to a certainty*, be the result.

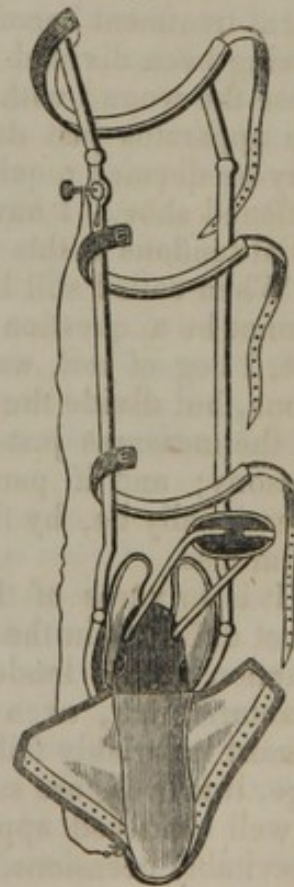
In cases of any standing, then, I advise you, *first*, to divide the tendons on the inner side of the foot, close the wound in the integuments immediately with a piece of adhesive plaster, then place the foot in the apparatus of Boardman, and after the member has been brought as nearly as possible to its normal position, put on a shoe stiffened on its inner side, which the patient may wear as long as it may be deemed requisite.

In varus of the *second* degree, the heel, you recollect, is always more or less elevated, while the contraction of the tibial tendons is always greater than in the variety just spoken of. The indications in its treatment are therefore a little more complicated, though they are essentially similar to those pointed out as obtaining in varus of the first degree, when the heel is elevated.

Should you be called to a case of this form of varus, occurring at birth, or within the first year, you will generally be able to effect a cure by means of the machine of Boardman, already described, aided by another to be employed after the foot is brought into a proper relation with the leg. This instrument is an invention of my own, and is intended for bringing the heel down to its proper position. It consists of a pair of leg-irons extending above the knee, or, in cases of double club-foot, to the pelvis, to which the instrument is attached by a circular band,—of a movable foot-plate of iron, in which there are several openings or slits; the posterior third of the plate should be elevated an inch and a half, and formed into a sort of socket for the reception of the heel, and in order to ascertain when the foot is in its proper position, an oval opening through which the finger may be passed is made in the elevated margin just described. There should also be attached near the anterior extremity of the plate a hook or button to which the cord intended for altering the angle of junction between the plate and leg-irons, is fastened; and again, to secure the foot, leathers similar to those of a common shoe are attached to the anterior portion of the plate. There is also an instep strap and pad intended for keeping the heel in its proper position; but the same end is often better accomplished by means of a gaiter, the straps of which pass through slits in the heel of the plate. Lastly, to change the angle of junction between the leg-irons and the plate, a ratchet and cord are attached to the outer splint near the knee.

The instrument is applied in the following manner. A narrow roller is first put on from the toes up to the knee, the leathers are then opened, and the angle between the plate and leg-irons made to correspond with that formed between the foot and leg. The straps of the leg-irons are then brought around the limb, and the sole of the foot placed in contact with the plate of the instrument;

Fig. 194.



the heel being set back as far as possible, and the pad of the instep strap placed upon the instep so as to diminish the pressure upon the integuments; next the leathers are laced so as to embrace the foot, and the cord of the ratchet attached to the catch on the side of the foot-plate. All being secured the ratchet is turned, and it is obvious that as the toe *ascends* under its influence the heel must *descend*.

The reduction is of course *gradual*, a few turns of the ratchet, from day to day, being sufficient, until the heel and toe are placed upon the same plane. This accomplished, the foot is placed in a stiff walking-boot and leg-iron, and the patient allowed to run about.

When the case has been neglected until after the first year, we find the difficulties materially increased; and although we may succeed in effecting a cure by the apparatus *alone*, a tedious and troublesome treatment is sure to be required. In consequence of this, I have been in the habit, especially when the child is five or six years old, of dividing the tendo-Achillis as the first step in the management of the case. By this measure I succeed, in the course of a week or ten days, in the accomplishment of what, *without* it, would require months to effect: namely, the depression of the heel. The elevation of the heel being the greatest obstacle to the reduction of the foot to its proper position, if we remove it, the subsequent treatment becomes exceedingly simple. The tendo-Achillis having been divided in the manner I shall show you directly, we close the wound with adhesive plaster, adjust the gaiter, and apply the apparatus just described. This is to be worn as long as it may be deemed requisite, when it may be succeeded by a common stiffened shoe. I have not as yet found it necessary to divide the tibial tendons at this age.

When called still later, say at any age after the sixth year, there cannot be a question relative to the nature of the treatment. Do not, I beg of you, waste time here in the employment of apparatus alone, but divide the tendo-Achillis *at once*. This done, make use of the measures just recommended for the same defect in younger persons; and if perchance you should be resisted, as you will occasionally be, by the tibial tendons and fascia plantaris, divide them also.

It is in varus of the *third* degree, however, that we meet with most difficulty in the accomplishment of a cure. Such is the contraction of the tendo-Achillis, the tibial tendons, and the fascia plantaris, that, even *at birth*, we find mechanical measures *alone* almost invariably failing to do any good. The tendons at this early age, it is true, are susceptible of elongation, from the operation of a well contrived apparatus, but the pain which such an apparatus inevitably occasions, and the length of time requisite for the attain-

ment of the object desired, but too often wear out the perseverance and patience of both physician and parent, and the child is frequently abandoned to its fate.

I wish you, gentlemen, to mark what I state upon this point. It has been said by some, who certainly could never have heard my opinions upon this subject, that I stated publicly to the class that cases of varus in the third degree could *not be cured*, even when treated immediately after birth, by apparatus alone. Such a statement I have never made; and for the simple reason, that I know cases of this nature *can be cured* by machinery alone. I have seen others effect this object by such measures, and I have often succeeded in the same thing myself.

But the *possibility* of making a cure by apparatus alone, is not the question to be determined. We want to know what plan of treatment is the *best*—what plan causes the *least suffering*—what plan results *most frequently* in cure? This is the question; and ample experience has proved most clearly to my mind, that a division of the tendons in fault is by far the *safest*, as well as the most successful method, even in the youngest subjects. A good rule, however, is this: try mechanical means for a week or ten days, and then, if the tendon resists, make use of the knife.

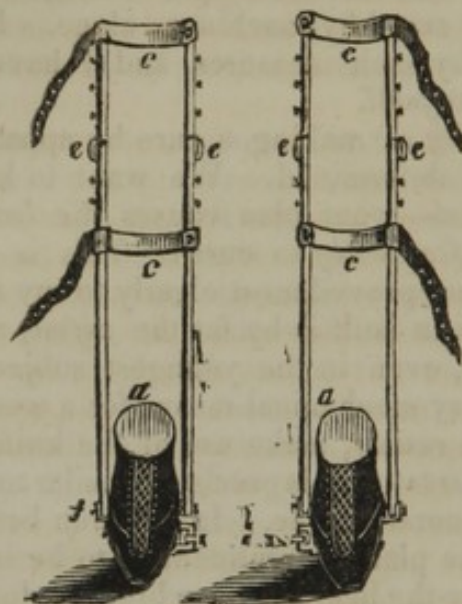
The mechanical treatment is precisely similar to that recommended for varus of the second degree. In children between the *first* and *sixth* year, the same plan of treatment is to be instituted, with this exception, that after the heel has been brought down, and the tendon united firmly, which generally occupies about ten days, the child, if old enough to walk, may put on the shoe constructed on the principles of Scarpa and Delpech; and after it has accomplished the object for which it was applied, a common stiffened one. It occasionally happens, however, in children, and sometimes even in adults, that the ankles remain for several weeks after the feet have been brought to their natural position, too weak to support the weight of the body; and in consequence of this weakness, there is a constant tendency in the *feet* to turn inwards, and even roll upon their outer margins. In such cases, I employ a shoe somewhat different from those usually recommended in similar cases.

The sole of this shoe is perfectly straight, and in order to give it *strength* and prevent its warping, a steel plate is stitched in between the leathers. Its *outer* margin, from the toe to the heel, for the distance of about half an inch, is thickened the fourth of an inch, by a simple strip of leather, the object of which is the prevention of the *rolling* of the foot upon its *outer* margin. It is also furnished with instep straps, which start from the heel and lace in front of the foot. The upper leathers of this shoe should always be divided down to the toe, so that the foot may be properly adjusted.

The leg-irons need not extend, as a general rule, higher up than

the bulge of the calf; sometimes, when the knee joints are weak, or when the inclination inward of the whole member is considerable, we carry them to the middle of the thighs, or even to the pelvis. This inward inclination of the legs and feet is, however, more effectually guarded against by setting the stirrup-irons *obliquely* instead of *directly* across the sole.

Fig. 195.



When the case has been neglected until the individual is advanced in life, the difficulties to be encountered in its treatment are of the most serious character. Here a division of the tendo-Achillis rarely, at least in my hands, proves sufficient; generally, the fascia plantaris, the tendons of the tibials, and often those of several of the toes, require the same operation. It is impossible, however, to lay down any positive rule with respect to which tendon requires section in such cases; you must be governed entirely by the peculiarity of the one under treatment, and divide every tendon that seems to prevent the accomplishment of our object.

You are not, however, to divide them all at the same time, for fear of exciting too much irritation. I commence always with the tendo-Achillis, as the depression of the heel is the chief object to be attended to, and place the foot at once in the extending apparatus. In the course of four or five days, if it seems necessary, I divide the tibialis anticus, and sometimes the posticus, which generally enables me to bring the foot nearly to a straight position. Should this not be accomplished in four or five days more, I cut the fascia plantaris, and act pretty forcibly upon the anterior portions of the foot, while the heel is firmly fixed, in order to prevent its reunion.

It is in these cases that we have to contend with excoriations from the pressure of the instruments; with irritation of the synovial membranes from a binding of the bones upon them; with œdema of the cellular tissue of the foot and ankle, from the action of our bandages or straps; with pains in every joint of the foot from the bones settling into their new positions; and often with cramps of the muscles of the leg. Great care, on the part of the surgeon, is required to overcome these difficulties. The instrument should be carefully padded, and daily removed; the irritation of the synovial membranes may be reduced by leeches and cold applications; the œdema of the ankle and foot, by frictions with stimulating liniments; the pain in the joints being dependent on a mechanical cause, can only be relieved by keeping the feet at rest; while the cramps may be treated by opiates.

I have never, as yet, seen the constitutional disturbance so great as to require much attention. I have never been obliged to bleed a patient, and very rarely to diet or purge him. Should any excitement take place, it must be treated on general principles. When the patient begins to walk, I either employ the shoe so frequently alluded to as that constituted on the principles of Delpech and Scarpa; or a common stiffened shoe, or the weak-ankle shoe, already described, may be substituted for it.

It is in such cases, too, that we have to contend with great muscular debility of the legs, the muscles, as I have already mentioned, being often reduced to mere ribbons. To promote their development, and overcome this debility, frictions, cold bathing, and as much exercise as possible, are to be resorted to.

In *Valgus*, the same general principles are to be pursued.

In the first degree, when it occurs at birth, Dupuytren's apparatus for fractured fibula may be applied (as in the accident for which it was contrived) on the *inside* of the leg, and the foot forcibly inverted; or we may use a machine similar to that recommended in *varus*, only placing the projecting strip of the splint on the inside of the leg. After the *eversion* of the foot has been overcome, we may apply a common shoe, stiffened on the *outside*.

In *valgus* met with between the first and sixth year, the same treatment will generally answer; but should the tendo-Achillis offer much resistance, which it sometimes does in those cases in which the heel is slightly elevated, it should be divided. The tendons on the outside of the foot usually yield without difficulty as soon as this is effected.

Although I have never met with a case of *valgus* of the first degree in persons advanced in life, the indications are so simple in all such cases, that the treatment would offer no difficulty to any one in the habit of managing similar defects. If machinery alone should prove inadequate to the proper inversion of the foot, the

tendons in fault ought to be at once divided, and the subsequent management conducted on general principles.

In valgus of the *second* and *third* degrees, we must be governed entirely by the peculiarities of the case. In infancy, machinery alone will generally prove sufficient to depress the heel and invert the foot. When the individual is between one and six, it is often necessary, especially in the third degree of valgus, to divide the tendons in fault. In persons still older, it will be useless to attempt the cure by mechanical measures alone; the tendons in *every* case should be severed. In all such cases I would employ the apparatus already alluded to, as being a modification of that employed in varus; and when the patient begins to walk, a shoe with the sole divided so that it might by lateral inclination be made to accommodate itself to the foot, might be employed until a common shoe could be worn.

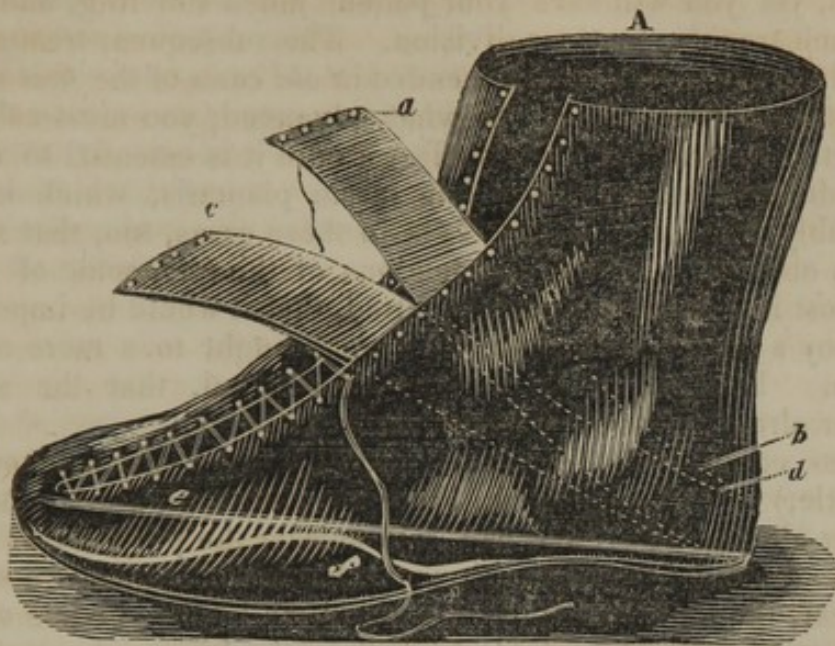
We have next to speak of the proper treatment in *Pes equinus*.

In this form of club-foot the indication is generally extremely simple; the defect residing almost exclusively in the tendo-Achillis, its elongation is nearly all that is required to effect a cure, except in cases of long standing.

The first degree, where the heel is but slightly elevated, when met with at birth, may always be cured in a short time, by the use of a properly contrived stretching apparatus, which should be worn day and night, until the object in view is attained. The instrument which I employ is the reducing plate already described, and there is nothing better.

In children between the ages of one and six, the same apparatus will answer in time; but I would not hesitate in such cases about the division of the tendon in fault. It should be severed at once, and in the course of twenty days the child may begin to walk, in shoes furnished with instep-straps, to keep the *heel down* in contact with the sole. When a person is advanced in life, and labours under this degree of *pes equinus*, he can only be relieved, *in a short time*, by a section of the tendo-Achillis. Cases are reported, in which the spring shoe of Scarpa, the sabot of Venel, and other contrivances have, with much suffering, and after a long time, brought down the heel; but do not, I beg of you, subject your patients to any such treatment; divide the tendon in all such cases. After its division, you may employ the simple stretcher just described, and when the parts are sufficiently united, and the heel down, give your patient a shoe such as I now show you.

Fig. 196.



A. A common high-quartered shoe, fitting closely around the ankle, and lacing from the toe up.

a b. Left instep strap.

c d. Right instep strap. These straps are stitched firmly to the heel of the shoe, and are intended, by lacing across the instep, to keep the *heel* down in its place.

e. A steel spring the width of the foot, and *nearly* the length of the shoe, which is riveted to the heel, and passes forwards at an angle of about 35 degrees.

f. A supporting spring, intended to give strength to the former; it may be introduced or not, as the surgeon sees fit. It is only in very obstinate cases that I have employed it.

We make use of these springs to keep up a continued action upon the *toe*, by which the disposition to retraction, always present to a greater or less extent, in the tendo-Achillis, is overcome.

The merit of having *first* employed a similar contrivance, for the accomplishment of this purpose, is due, I believe, to Scarpa; and I show you only a modification of his apparatus. In these shoes the patient may walk as long as it is deemed requisite; he may then resort to a common one.

In the management of the *second* degree of pes equinus, we have generally more resistance to overcome, and consequently our treatment is usually more tedious. I have never, as yet, found it necessary, when called early, to apply anything but mechanical measures; and in such cases, the treatment recommended as proper in the early stages of the *first* degree, will generally effect a cure.

In persons between the first and sixth year, I would advise you not to waste time in attempts to *stretch* the tendons; for although

this, sooner or later, will succeed in bringing the foot to a proper position, yet you will save your patient much suffering, and yourself much trouble, by their division. The subsequent treatment is precisely similar to that recommended in *old cases* of the *first degree*.

When called to a case somewhat advanced, you must calculate upon a tedious treatment. To effect a cure it is essential to divide the tendo-Achillis, and often the fascia plantaris, which is here remarkably dense and rigid. It is in these cases, too, that we are so often obliged to divide the tendons of the *toes*, some of which are almost invariably so much distorted, that it would be impossible to employ a proper shoe, until they are brought to a more normal position. In these cases, I have also found, that the simple stretcher already described, answers perfectly well.

In *pes equinus* of the third degree, (*talipes equinus* verus of Mr. Little,) occurring at birth, I advise you to employ the simple stretcher already described, as it will answer the purpose.

In the same defect, met with in children between the first and sixth year, the tendon should be divided, and in the course of two or three weeks the child made to walk in the spring shoes already described, until the retraction of the heel is entirely overcome. For the depression of the heel, the apparatus just recommended may be employed.

When the case has been neglected until the individual is advanced in life, the treatment recommended in similar cases of the *second degree* of *pes equinus*, must be employed.

In all these cases, the usual general treatment, such as frictions, bathing, &c., is to be pursued.

The treatment in *Talus* is governed by the same general principles which control us in the other forms of club-foot.

In the *first degree*, mechanical means are generally sufficient, at least in young persons; occurring in those more advanced we are sometimes obliged to divide the flexor tendons when the foot can be brought to its proper position.

In the *second degree* the same treatment is indicated, but generally, even in young persons, the tendons must be divided.

In the *third degree*, or where the deformity is as great as we ever encounter in young persons, mechanical means should first be employed, and then, if the tendons resist, they may be divided. In persons more advanced it is useless to waste time: the knife should be applied at once. The machine employed by myself in all these cases is the reducing plate described under the head of *varus*. The plate and leg-irons being attached by movable joints, it is obvious that we can place them at any relative angle we may desire. The plate is therefore brought up against the elevated sole, and attached to the foot by the usual straps, &c. But in order to work with more advantage the ratchet is shifted round to the centre of the transverse piece that passes from one leg-iron to the other, and the

cord is attached to the point of the plate, and made to pass along the sole and over the *heel*, which, to prevent friction, is furnished with a small rolling cylinder.

In *Talipes dorsalis*, the treatment is likewise the same, so far as regards general principles. The tendons to be divided, when this is necessary, are the tendo-Achillis and fascia plantaris, and the instrument employed is my reducing plate. The plate is carried much further back, of course, than when we employ it in the other forms of club-foot.

I have said a good deal about the division of tendons, but have not as yet explained to you *precisely* why we divide them; nor mentioned the changes which take place, not only in the tendons themselves, but also in the surrounding tissues, after the division of the former.

The first and most important indication in the treatment of club-foot, you have already been told, consists in the application of such measures as shall most *speedily* bring the shortened tendons (the chief cause of the defect) to their proper length. In the young and feeble, well *regulated* and *continued* extension will often prove sufficient to effect this object; but when, instead of such patients, we have to deal with the aged or robust, in nine cases out of ten it fails, and for the following reasons:

First. In the old and vigorous the tendons have become so rigid, that no common force will be sufficient to overcome the difficulty; and although they apparently yield for the first few days, the extending effort becomes so painful that the patient cannot bear it, and the operation is abandoned.

Secondly. In similar cases, this extension often acts as a *stimulus* to the muscles of the leg, producing repeated, and often violent spasms, or cramps, which create so much suffering, that the individual rarely submits for any time to our treatment.

Thirdly. In some cases it is *impossible*, from their extreme rigidity, to stretch the tendons, even although the patient be willing to submit to our measures.

It was to overcome these difficulties that the division of the tendons was proposed, and it would appear that veterinarians had long been in the habit of performing a similar operation in contractions of the feet of horses before it was attempted upon the human subject. You must not imagine, however, that a mere division of the tendons will be sufficient to effect a cure. On the contrary, were we to leave our patient without doing anything else, so far from benefiting him, he would be even worse off than before. The tendons are divided merely to place the parts in a favourable condition for subsequent efforts on the part of the surgeon.

The opinions of those who have devoted much time to this operation, differ materially with regard to the proper treatment after the division of the defective tendons. Some, with the celebrated Stromeyer at their head, recommend the extremities of the divided tendon to be at once placed as nearly as possible in contact, and retained in this position until they are reunited and healed, when the apparatus for modeling the foot may be applied. It seems somewhat paradoxical to advise the *division* of a part, and then its *immediate reunion*, for the accomplishment of a given object; but this apparent contradiction in practice is done away with when we recollect that the substance by which the tendon reunites differs materially in its nature from common tendinous matter. Being composed almost entirely, after the lapse of a day or two, of coagulable lymph, in a state of imperfect organization, the cicatrice yields from the application of extending force, like a piece of putty, and may be stretched to any desirable length. The extensibility of this new matter effectually prevents the transmission of force to the muscles of the leg, and thus spasmodic resistance is prevented. Although this practice has the sanction of high authority, and although it has repeatedly effected cures in my own hands, I am, nevertheless, from *experience*, induced to give the preference to the method introduced chiefly by Pauli of Landau, and Bouvier of Paris. Instead of attempting to reunite the tendon, they bring the foot down at *once* as nearly as possible to its proper position. Although these gentlemen have the credit of this practice, it was, nevertheless, employed by Lorenz and Reiche, long before; and has always been the custom among veterinarians, who cut the tendon and bring down the hoof at once. The objection urged against this plan of treatment, viz., that there is danger, especially in old cases, of no ultimate reunion of the tendon, is utterly untenable; because ample experience has proved that this union *invariably* occurs, even when the extremities of the tendon are separated one or two inches. In my own practice I have repeatedly seen this take place.

The great advantage which it possesses is in the saving of *time*; although there is also *less pain* when the heel is depressed, as far as possible, *immediately* after the operation, than where this is postponed for two or three days. I am fully convinced that I might have cured several of my patients in *one half* of the time employed, had I pursued the former instead of the latter method.

The process set up by nature for the restoration of the continuity of the tendon is precisely similar to that which she employs for the regeneration of any other tissue, with the exception, perhaps, of bone. In the first place there is an effusion of blood (caused by the operation) which soon coagulates between and around the extremities of the divided part, and sometimes is extravasated to some distance into the adjacent cellular tissue. In a few days the

colouring matter is absorbed, and coagulable lymph, the true bond of union in wounds, remains in its stead. In time this is converted into a *modification* of fibrous tissue, by which the tendon is permanently united; for there is never a reunion by proper *tendinous* matter. The cicatrice is sometimes larger and sometimes smaller in diameter than the tendon which it connects; but I have never as yet found it too feeble to serve all the purposes for which it is required. You will also find more or less adhesion between the tendon and the surrounding parts, so that when the patient begins to walk, he complains of *stiffness* in the ankles; and if you examine the part when he takes a step, you will perceive that, instead of gliding freely, as it usually does, in a sheath, the tendon is almost immovable. In proportion, however, as the tissues are relaxed by exercise, this inconvenience disappears, until at length it is not perceptible. Like all other cicatrices, there is a tendency in this to *contraction*, which, as I have already told you, must be carefully counteracted by appropriate measures. These remarks are applicable, not only to the tendo-Achillis, but also to every tendon that may be divided in the treatment of a case of club-foot.

The operation of dividing the tendo-Achillis is exceedingly simple, and productive of little or no pain; there is, nevertheless, considerable diversity relative to the *precise* manner in which it should be performed. Lorenz, who first divided this tendon, made a cut through the integuments and it, from *behind forwards*, closed the wound, and brought down the heel at once. Michælis also divided the integuments, but instead of severing the tendon completely, he cut it about *half* through, and left the rest to be gradually extended. Sartorius made an incision along the back of the tendon, opened its sheath, and then divided it on a director from *before backwards*, and immediately brought down the heel as far as possible. Delpech was the first to simplify the operation, by dividing the *tendon only* leaving the skin over it untouched. He passed a narrow knife, *before* the tendon, through and through the leg, so as to cut the skin for about an inch on each side; he then divided the tendon with a convex-edged bistoury. Instead of bringing down the heel, he *extended* the foot, so that the tendon might reunite, and postponed until the *twenty-eighth* day, the extension of the cicatrice. Stromeyer, who has probably done more for the operation than any one else, introduces a narrow knife about two inches long, with a convex cutting edge, about one or two inches above the insertion of the tendo-Achillis, between it and the bone, the edge of the knife being turned towards the *former*, and pushes it on until its point comes out on the other side; being careful to make the cutaneous wounds as small as possible. The heel is then forcibly depressed, the edge of the knife brought against the tendon, which separates with a *snap*, and the operation is completed. As soon as the snap occurs, the instrument is carefully withdrawn through the

wound made by its introduction. The tendon is then united, and extension commenced, on the tenth day in adults, and the fifth in children.

There are two objections, and as I think, serious ones, to this mode of operating; the first is, the danger of wounding the posterior tibial artery, which is often directly in the track of our incision; the second is, the risk we run of getting the point of the knife entangled in the fibres of the tendon, when only a portion of them can be divided. As the success of the operation depends almost entirely upon the *complete division* of the tendon, this is of course a serious objection to the Stromeyerian method. I must, however, in justice remark, that the operation performed agreeably to this plan, is preferred by many skillful operators to any other.

Mr. Whipple of Plymouth, operates as follows: "The foot being extended as much as possible, the integument *posterior* to the tendon is pinched up about two inches above the os calcis, in order to separate it from the latter, when a narrow-bladed knife, with a rounded cutting extremity, is passed from within obliquely downwards and outwards, between the integument and tendon; and as soon as the point of the knife is felt under the integument, and on the outer side of it, considerable flexion of the foot is made by an assistant, the point of the knife being at the same time depressed, so as to bring it in contact with the tense tendon, when by firmly depressing and withdrawing the instrument, the object is instantly effected. This is made evident by the sudden jerk with which the heel is brought down, in some instances two or three inches, as in cases of talipes equinus. The knife should be passed from the *inside outwards*, for this reason. Should you depress the point more than is necessary to divide the tendon, there would be no risk of wounding the posterior tibial artery, which would be the case were you to introduce your knife from *without inwards*; and it is essential to depress with some force, or you leave undivided some fibres of the tendon most remote from your puncture, and have to introduce the knife again, (not a little embarrassed at your own bungling,) for the purpose of dividing them. However, although the point of your knife be dipped some distance anterior to the edge of the tendon *externally*, in order to secure its division, this will not be necessary *internally*, as, the moment you feel your object effected, you discontinue the pressure on the knife, and withdraw it carefully, so as not to enlarge the integumental opening."

"By this means," continues Mr. Whipple, "you pass your knife across a relaxed tendon, which, when rendered tense, is brought up to meet the edge of the instrument, and therefore more readily divided than when you pass your knife between it and the deeply seated muscles. Another objection to the latter plan with me is, that the tendon is in such close contact with the integument, that you run a great risk of dividing, or partially dividing the latter,

which, from the years of contraction to which it has been subjected, is rendered exceedingly tense when the foot is flexed. In upwards of thirty cases which I have examined, I have found no exception to this. Again, where the toes are the points of support, the tendon will be found nearly embraced by the integument, as in the corresponding tendon in the horse, though certainly not to such an extent."

Mr. Whipple also divides the tendon *obliquely*, while most other operators cut it *directly across*. The reasons of Mr. W. for this practice, are ingenious; but ample experience has proved, that a *direct division* of the tendon is as frequently followed by a proper reunion, as when the *oblique section* is performed. Mr. Whipple assigns the following reasons in favour of the latter mode: "*First*, by so doing you have a larger surface for nature to carry on her operations on; *Secondly*, you have the obliquely divided tendon in nearer approximation, and thereby secure a firmer ligamentous bond than in the transverse division; and, *Thirdly*, the application of the instrument does not separate the lips of the wound; a desirable point, as the sooner it heals, so as to prevent the escape of lymph, the better." The puncture is closed by adhesive plaster, and the stretcher at once applied.

Bouvier of Paris, who received a prize of 6000 francs for his Essay on Club-Foot, divides the tendon by making but one opening in the integuments, and that on the inside, so as to admit a very fine probe-pointed bistoury, to pass across in front of the tendon, while the foot is moderately flexed. He then, with the convex edge of the knife, cuts across the tendon, and immediately applies the apparatus for maintaining the foot in a state of complete flexion.

Pauli, of Landau, a surgeon of considerable eminence, performs, I understand, the Stromeyerian operation; and after the wounds have healed, brings the foot down, and instead of using an apparatus similar to those usually employed for this purpose, makes a mould of plaster of Paris, around the foot, which he allows to remain undisturbed for several days; it is then broken and a new one taken, and in this way the foot by degrees is brought to its proper shape. The practice of dressing fractures in this way, to which your attention has already been called, originated with the Egyptian surgeons of centuries ago, and is not a modern invention, as some would have us believe; Pauli is the first who has employed it in cases of club-foot.

The operation which I prefer is precisely that of Mr. Whipple, with the exception, that instead of dividing the tendon *obliquely*, I cut it *directly across*. The latter method I prefer, inasmuch as it is more easy of execution, (although both are simple enough,) and the tendon when divided separates with an *audible snap*, which enables us at once to detect its complete division.

The patient having been prepared, when this is necessary, by

rest, diet, purging, &c., for the operation, it is performed as follows. If the individual be a child, he may be laid across his mother's lap; if older, he should be placed flat on his face upon a bed or table; an assistant steadies the limb, while the surgeon grasps the foot with the right or left hand, as the case may be, and forcibly extends it, so as to relax the tendon and the integuments covering it. He then passes from *within outwards* a narrow convex-edged bistoury, about one or two inches above the os calcis, and between the *integument* and *tendon*, until its point gets beyond the outer margin of the latter: the foot is then suddenly *flexed*, which brings the tendon against the knife, previously turned upon its edge, and with very little pressure upon the instrument the operation is completed, which is generally indicated by the *snap*, and by a *sudden jerk*. As soon as this is perceived, and not until then, the knife is withdrawn in the same way in which it had been introduced. The little wound is then closed by adhesive plaster, the stretching apparatus applied, and the subsequent treatment conducted, as I have already indicated. Whenever it seems necessary to divide other tendons, the operation is to be performed upon a similar plan; make but *one* puncture, and divide them directly across, and then begin to extend the parts gradually *at once*.

I might next say something about the *dangers* of this operation, but gentlemen, so far as I have been able to learn, there are *no dangers*. The opponents of the division of tendons to overcome deformities of different kinds, daily preach to us of tetanus, of sloughings, of erysipelas, and even of death, but their fears are idle. There is no case upon record, in which, when the operation has been properly performed, and *no other cause* operating to produce dangerous symptoms, serious consequences have resulted. In the case of the person operated on by Delpech, who was several months in recovering, it is evident that all the distressing symptoms to which he was subjected, originated in the manner in which the operation was performed. Inflammation may supervene, it is true, even when the operation has been properly performed, but in no case have I heard of its resistance, for any time, to the action of proper remedies. Tetanus has never, in any case reported, been present as a *direct* consequence of the operation. I have understood from a friend who performed the operation in one instance, that slight tetanic symptoms supervened; but in this case the boy was exposed to both *cold* and *wet*, and the probability is, that the tetanic affection was the result of the last-mentioned causes, rather than of the operation. The idea that this operation would be likely to bring on tetanus, has its origin in the well-known fact, that *punctures* or *lacerations* of tendons often occasion this disease, but the nature of the wound is here altogether different. Others have feared a division of the posterior tibial artery, but as I have already explained to you, there is no danger of this, provided the operation be properly performed. I

think, gentlemen, that I have a right to make these statements, inasmuch as I have divided for different affections, between three and four hundred tendons, and have *never*, as yet, *met with the slightest bad symptom of any kind*. I would, however, advise you in giving your prognosis in such cases, to leave some way of escape for yourselves in the event of disagreeable symptoms supervening. An individual may die, you know, from a prick of his finger, or from wounds equally trifling; you should, therefore, let such a *possibility* be borne in mind, when your opinion is asked relative to the dangers of the operation in question.

During my recent visit to London, Mr. Little mentioned to me a most interesting case of malpractice resulting in *non-union* of the divided tendon. The space left between the ends was something more than three inches, and then, as well as I recollect, a roller was applied in such a manner as to compress the space between them, and thus prevent the effusion of a sufficient quantity of blood or lymph.

The leg was of course entirely useless, and the case was sent to Mr. Little. Seeing at once the difficulty, and reasoning from analogy, he instituted at once a most ingenious, and, at the same time, most successful method of treatment. The difficulty here being a want of sufficient lymph to fill up the space, Mr. Little determined to cause the effusion of this fluid in the following manner. Placing the foot in a proper position he introduced a small scalpel, by a single puncture into the space between the ends of the tendon, and then feeling for each of them, he lacerated and cut it, as well as the surrounding soft parts, until he found a considerable quantity of blood effused. Then withdrawing the knife, he closed the wound, extended the foot so as to bring the tendons together, and treated the case afterwards as one of ordinary club-foot. Union took place and the patient was cured.

I have already told you that this operation is a very simple one; but you will occasionally be not a little annoyed after its performance, at finding the heel (when the tendo-Achillis has been divided), still forcibly resisting our efforts for its depression. This arises from the thickness of the *sheath* of the tendon, and before we can accomplish our object, this *must* be divided, especially if the patient is somewhat advanced in life. I have been obliged to perform the operation in three or four cases: the last one was a child of Mr. Creass, to whom I was called by the late Dr. Ruan, one of our most eminent practitioners. You can generally detect the existence of this condition of the sheath, by passing your finger along the back of the tendon until you reach the point of its division, at which, instead of meeting with a considerable depression, as is usually the case, you will find a *firm* and *resisting* substance; not, of course, as firm as the tendon, but sufficiently so to be readily detected. This may be divided by passing the knife generally employed for the section of the tendon, through the wound made in the integuments for

this purpose. I always examine the foot on the morning *after* the operation, when, if the sheath seems to offer much resistance, I immediately divide it. I make this statement, with a full knowledge of the importance set upon preserving the integrity of the sheath, by M. Bouvier, who contends that it is chiefly concerned in the reproduction and proper modeling of the new tendon. T. D. M.]

DIVISION OF THE MUSCLES IN CURVED SPINE.

It has been proposed, as I told you in speaking of deformities of the trunk, to divide the muscles of the back; and here is an instrument, long enough and big enough, in all conscience, to divide any tendon in the body from head to heel. It might be a highly dangerous instrument in the hands of reckless practitioners. I told you that in the majority of cases no good would result from the division of a single muscle of the back, although there might be a few cases where it was advisable to try it. There is no difficulty in the operation, but means must be afterwards taken to preserve the advantage you have gained. You see cases in which the muscles are very prominent and very much upon the stretch, in the concavity of a bad curvature, and if there is reason to think that the deformity is not of very long duration, and the bodies of the vertebræ are not much altered in form, diminished in the concavity, or expanded on the opposite side, then there can be no harm in dividing the muscles and taking means to keep the spine in a straight position till the muscles have reunited of a proper length.

So much, then, for *tenotomy*, as it is called. This is a part of surgery which every one of you ought to study. There is no difficulty in it whatever, and great advantage will often be derived from the proceeding. Every well-educated surgeon ought to be prepared for it. It is an operation unattended with effusion of blood, and if *carefully* performed, no bad consequences can possibly arise from it. I have heard of serious results from the division of tendons; inflammation and suppuration of joints have supervened, and it has been a question in some cases, I am told, whether the limb ought to be taken off to save the patient. I have heard, besides, of the tibial arteries being cut, and of nerves being interfered with; but with proper management and care there need be no apprehension of such accidents occurring.

[As the subject of tenotomy is still attracting much attention in this country, and as the character of the lectures of Mr. Liston prohibits his entering fully into its consideration, I may be excused for venturing to offer a few remarks in reference to some of the most interesting points connected with its history, and application to different deformities.

The term *tenotomy* has been applied to the division of tendons; that of *myotomy* to the section of muscles; while a similar operation upon fascia is called *aponeurotomy*. Inasmuch as all these operations, as now performed, are subcutaneous, Sedillot proposes the introduction of a generic term deduced from this circumstance, and he suggests the word *Hypodermatomy*, which signifies literally a subcutaneous operation; if generally adopted, this would probably answer better than any other.

This class of operations may with truth be considered as modern, for the isolated cases of tendon-cutting reported by Minius in 1685, by Jæger in the seventeenth century, and by Meckran, Roonhuyssen, (see Heister,) Blasius, Tenhaaf, (see Chelius,) and Cheselden, were in reality mere attempts, and cannot be considered as having influenced in any way the introduction of these operations into general practice. The same may be said of those of Laurentz, published in 1789 by Thilenius, (who, by the way, is receiving the credit of originating this surgical novelty, and in honour of whom it is sometimes called the '*Thilenian operation*,') of Sartorius, reported in 1806, of Michælis, performed in 1811, and even of that unfortunate case of Delpech, an account of which was published in 1816. It was not, in truth, until the year 1833, when the extraordinary success of that most accomplished surgeon, Stromeyer, of Hanover, directed in earnest the attention of the profession to the subject, that hypodermatomy can be said to have fairly arisen. Since this period almost every surgeon, at home and abroad, has performed it; and in proportion to his success, do we find him its advocate or its enemy. So far as this country is concerned, Dr. Dickson, of New York, was the first to perform the operation for club-foot, but it was not until the publications of Dr. Detmold, of New York, and myself, that the question came fairly before the American profession. To Dr. Detmold is due the merit of the first tangible information on the subject.

The peculiar deformities for the relief of which hypodermatomy has been performed, are *club-foot*, *contracted joints*, *old luxations*, *fractures of the patella and olecranon*, followed by *permanent separation of the fragments*—*stammering*, some forms of *torticollis*, *strabismus*, *facial palsy*, *rigid jaw*, and the *contractions of the fascia of the hand and foot*, so well described by Dupuytren.

In no deformity has hypodermatomy been performed more frequently than in club-foot and contracted limbs—and notwithstanding the mass of testimony in its favour, we still find a few who adhere to the *old* practice of treating such cases by machinery alone, or, as it is termed, the '*mechanical method*.' It has been well said by a recent writer, Dr. I. Parrish, 'that much of the evidence on both sides of the question lacks that certainty and philosophical accuracy which should distinguish medical testimony.' (*Retrospective Address on Surgery, Transactions of the College of Physi-*

cians, Philadelphia, 1842.) And why is this? It originates in the crying sin of the age, the desire of being known as a discoverer, or, at least, an apt follower.

The advocates of both plans of treatment have been too eager to publish their cases, and too prejudiced, as a general rule, to listen to the arguments or the facts of the opposite side. Many, also, totally unfit for observations of any kind, have attempted to solve the difficulty, and hence have only made 'confusion worse confounded!' The great error here, as in almost everything else, consists in exclusivism. No surgeon who has studied the subject will think for an instant of separating the two plans; they are so closely connected that they must ever be considered as 'bone of one bone, and flesh of one flesh.' But much remains for us to accomplish in the effort to establish a correct code of rules by which surgeons are to be governed. The indications under which tenotomy is required, and those which point out the employment of mechanical measures alone, the *when* and the *where*, have not as yet been fully explained. Time, and further careful unprejudiced observations are required to place each method in its true position. But in the present state of our knowledge to discard either, to confine ourselves to one mode of treatment alone, would be in truth a casting away of the gem because *we* are ignorant of its value. It is much to be regretted that the *dangers* of tenotomy have been so much magnified, for in truth, if properly performed, it is accompanied by none. I cannot do better, however, to convince one of the position it holds abroad among those who have given it a fair trial, than to quote the following extract from the excellent retrospective address of Mr. Dodd.

"The relief," he observes, "of contracted joints by the division of tendons, is now finally fixed upon the basis of an extensive experience, and the fears formerly entertained for the injury of the tendons entirely dismissed!" Again he remarks—"It is seldom that an axiom shall be struck out in practice of so simple a nature, and of so general application. The fears which used to be entertained of injuring tendons, and which, till very lately, entirely regulated this branch of surgical practice, having by the successful issue of one part of the inquiry, been dispelled, we now find scope for the application of the principle to an extent that its first promoters never dreamed of, and from the progress which has recently been made in the relief of deformities by this means, it is difficult to predicate the limits of its application. Already has it been brought to bear on all the principal joints, the spine, the neck, and the eye. It is gratifying at all times to witness the accomplishment of an important and palpable relief to human suffering, and in this, as in every other case, the amount of our admiration is much proportioned to the simplicity of the means, contrasted with the magnitude of the result."

Nor is this the opinion of one individual alone; almost every surgeon in Europe, and many of those at home, while they caution us against unnecessary and too frequent operation, yet state, *distinctly* and *positively*, that *hypodermatomy* is, and should be considered the least painful, least dangerous, and most useful of all our means for the relief of deformities of various kinds. The most eminent authorities who at this time are advocates of the operation, are Stromeyer, Dieffenbach, Scutteten, Franz, Græfe, Von Ammon, Guérin, Bouvier, Velpeau, Roux, Duval, Liston, Lawrence, Stanley, Phillips, Fergusson, Brodie, Syme, Whipple, Little, Cooper, and Baird. The late Sir A. Cooper and Sir C. Bell were both its supporters. My friend, Prof. Meigs, who has just returned from Europe, tells me, that all the leading surgeons with whom he conversed on the subject are still its most ardent advocates, and this after having given the measure a fair trial for years. In our own country many of our best surgeons have given it their decided sanction, and that such will be the case with all who candidly and without prejudice give the operation their attention, I verily believe. But while I remain a firm uncompromising advocate of hypodermatomy, it must not be supposed that I advise its employment in all cases, or with the recklessness of some who hesitate not to operate on children *three* days old for squint, (Dieffenbach, *British and Foreign Review*, Jan., 1840,) or who divide the muscles of the spine in cases of long standing curvature, or who divide forty-two muscles in the course of twenty-four consecutive hours (Guérin), or who cut the tendons in club-foot at birth, or who nearly cut out a man's tongue to make him speak plainer! All this ardor operandi is to be condemned, unequivocally condemned. I contend for nothing of the kind, and caution the young surgeon against giving way to the temptation.

A very ingenious modification of tenotomy has been proposed by Stromeyer, to be employed in cases of paralysis of the different muscles of the body, but especially in those of the leg. It consists in *cutting out* a piece of the elongated tendon, and then uniting the divided extremities at once. It is obvious that by such an operation we shorten the organ, and hence stimulate the muscles to healthy action, and enable them, to a certain extent, to perform their natural office. This operation has been performed by Dr. Blackman, of New York, and in two cases by myself, and with decided benefit in all.

In the treatment of dislocations *myotomy* or *tenotomy* has been employed by Dieffenbach in the management of those of long standing. By the application of the Stromeyerian operation he succeeded in reducing a dislocation of the humerus of two years standing. In this case he divided the tendons of the "pectoralis major, the teres major and latissimus dorsi, and afterwards the bands of fascia by which the bone was held in its abnormal posi-

tion; the bone then went into its place with little difficulty."—(*British and Foreign Review*, 1839.)

In the present state of our knowledge it would be unsafe to hazard an opinion as to the practical utility of this operation. Cases, and well substantiated results are still wanting, to enable us to say whether it is in reality an *improvement*, or merely an *innovation*. At first sight it seems contrary to our present views of the injury, to suppose that either the head of the bone or the cavity to which it naturally belongs, should, notwithstanding the lapse of two years, preserve their surfaces in such a state of perfectness as to render them suited to each other when brought into contact. We know very well that this is not usually the case. All unreduced luxations of long standing prove, that not only the head of the bone, but also its articular cavity undergo changes by which they are rendered totally unfit for each other. And not only is this the case, but nature has endeavoured to supply the loss of the original joint by the establishment of a new one, in many cases almost as useful as the first.

Before resorting to the section of the muscles, then, we should always assure ourselves that these changes have not taken place to an extent forbidding the proper apposition of the bones; and also, that nature is not disposed to make any compensation for the loss of the joint by the formation of a new one. That tenotomy has been of service in certain cases of luxation there cannot be a doubt; and hence, the measure deserves our attention.

Reference has already been made to the subject of *stammering*, but the history of the operations performed for this defect I deferred, in order to introduce it here.

It appears that this, like almost every other operation in surgery, was known to the ancients, that is, if the "researches" of M. Jobert are to be relied on. According to him, Galen, Ætius and Paulus Egineta, not only understood the nature of the defect, but also that they performed an operation very similar to the one considered a "modern discovery," for its relief. It is very certain that in all these writers we find a good deal relative to the treatment of the *mogilali* or *stammerers*.

Several centuries elapsed after the time of these authorities before the attention of the profession seemed to be directed again to the subject, and it was not indeed until the beginning of the fifteenth, when F. Hildanus undertook to cure the stammerer by an operation, that we find the matter referred to. In 1672, Dionis proposed something of the same kind, but it was not in reality until Dieffenbach, in 1841, made public his cases, that modern surgery gave the defect the slightest consideration, and to him, therefore, is due the merit, if merit there be, of resuscitating a measure long since forgotten.

He proposes three plans of operating. In the *first*, he divides

the root of the tongue *transversely*, the incision extending through nearly its whole thickness. In the *second*, he divides the root of the tongue in the same direction, but leaves the mucous membrane uncut except at the point through which the knife is passed. In the *third*, he makes a transverse section of the root of the tongue, and then excises a triangular piece throughout its whole breadth and thickness, and this process he prefers to either of the others. That any surgeon of acknowledged ability should propose an operation so unphilosophical, so cruel, and so dangerous, naturally excites our surprise; but this feeling is converted into one near akin to indignation when we learn that he recommends it, after its repeated application had failed to afford relief, and even after it had been followed by fatal results. It has not, I believe, been attempted by any American surgeon, and I trust it never will be.

Other operations in which the *frænum linguæ*, and the *genio-hyo-glossi* muscles are divided, have been introduced by Amussat, Baudens, Velpeau and others, for the relief of stammering, and each operator has a method of operating peculiar to himself. It matters very little, however, how the operation is performed, inasmuch as it is almost uniformly attended by failure. That it has occasionally been productive of benefit there cannot be a doubt, but in every successful case the patient had laboured under positive "tongue tye," a defect easily recognized, and for which the remedy is well known. But that it ever cured a case of purely functional stammering, unaccompanied by defective organization of the tongue, as some would have us believe, it would be difficult to prove. Compared with the operation of Dieffenbach, it has the merit of being much less painful, less dangerous, and sometimes successful.

Dr. Detmold, of New York, has proposed *acupuncture* in those cases of stammering in which the tongue is well formed, and the measure has been frequently put into practice by Mott and others. So far, additional experiment is required to ascertain its utility; but for my own part I can only say that in all my cases it has been productive of no benefit whatever.

Myotomy has likewise been employed in cases of rigidity of the masseter muscle, and here with decided effect. In the *American Journal of Medical Sciences* for 1839, will be found the details of a case of locked jaw of some years standing, for the relief of which I divided this muscle and with perfect success. In the same journal there is another case reported by Professor Ferguson, and recently others have been published by Dr. Smythe, in all of which the cure is attributed to this operation.

Torticollis, or wry-neck, is another deformity for which myotomy has frequently been performed. Indeed, it is more than probable that in the time of Hippocrates the utility of the operation here was clearly recognized, and we know that it was performed long before the general application of either myotomy or tenotomy in

modern times. Mr. Liston, it will be recollected, strongly recommends the operation.

A very ingenious application of the principle under discussion has recently been proposed by that most inventive of all surgeons, Dieffenbach, who seems never to rest satisfied with what has already been done in any department of our art. Struck with the inutility of the usual methods employed for the cure of that distressing defect, facial hemiplegia, he conceived the idea of curing, by some surgical operation, the deformity to which it gives rise. His first operation consisted in "the excision of an elliptical portion from the paralyzed cheek, the long diameter of the ellipse being parallel to the perpendicular diameter of the face, and then uniting the edges of the wound by suture." The experiment was partially successful, the wound healed in a few days, and the affected cheek, shortened by the loss of its substance, was rendered sufficiently strong to antagonize, to a certain extent, the muscles of the opposite side, "though the actions of speaking, eating and laughing, were sufficient to destroy the equilibrium!" Although the benefit derived from this operation was decided, yet it was not deemed sufficient to warrant its repetition, and Dieffenbach, from numerous experiments, having discovered that "by the loss of their natural antagonists, healthy muscles are wont to become more firm and contracted," was led to draw an analogy between the consequences of the present affection and the contraction of muscles in certain cases of club-foot which takes place at the expense of their paralyzed opponents. From this analogy the idea of a similar operation suggested itself, and the success which attended its execution justified his anticipation of its utility. The operation consists in dividing the muscles of the sound cheek, at least all concerned in the defect, by means of a small knife passed directly under the skin and introduced through a small puncture. Two incisions, one through the muscles of the upper portion of the cheek, and the other through those of the lower part of the jaw, are generally required. The punctures are dressed with a little adhesive plaster, and the parts kept at rest by the dressing for fracture of the lower jaw.

This operation is comparatively slight, the pain, hemorrhage, and subsequent inflammation rarely amounting to anything of importance, and three or four days are sufficient to complete a cure. In one case of Dieffenbach's, however, erysipelas and suppuration of the wound occurred, and the patient was under treatment for several months; nor does it invariably succeed. While, then, I consider this a beautiful, most ingenious, usually safe, and sometimes successful operation, one that from authority we are justified in performing, the possibility of its proving of no avail to our patient should constantly be borne in mind.

Division of the muscles has also been employed to correct the distortions of the spinal column, and in spite of its want of success

the origination of the measure has been claimed by several. It is a matter of little importance to whom the merit belongs, but Guérin of Paris has generally received it. He is certainly its most ardent advocate, and has unquestionably put it into execution more frequently than all the surgeons of Europe and this country combined.—Guérin's theory is simply this:—according to him “all spinal distortions should be classed with club-foot, wry-neck, contracted knee, &c., and as the muscles of the foot, leg, or knee, by their contractions, produce certain deformities, which, arising from the same cause, perverted muscular action, present the same general character, and require for their relief the same operation, division of the contracted muscles; so also curvature of the spine may be considered as the club-foot of the back, depending on the contracted state of the muscles of this region, and requiring for its cure their division!” Time will not permit me to enter upon the discussion of the arguments in favour of and against this operation, but I agree entirely with Bouvier in the opinion that it is still “anceps remedium,” and rarely if ever productive of the slightest benefit. Guérin, on the other hand, declares it to be a safe, easy, and almost certain means of affording relief. Time and future observation must decide the question; for my own part I have no confidence in it whatever.

In a certain form of spasm of the muscles of the thumb, produced by excessive exertion of these muscles in writing, myotomy has also been resorted to, but the cases reported are too few and too hastily drawn up for us to say whether the measure is to be relied on or not. From the fact that the disease is confined to those who, like scriveners, write a great deal, it has been called “scriveners' spasm.”

The operations for strabismus have already been considered in another place. T. D. M.]

CALCULOUS COMPLAINTS.

We have now to turn our attention to calculous complaints, and their management. It is scarcely my province, however, in this part of the course, to enter at great length into the consideration of the origin of stone in the kidneys or bladder, the deposits from the urine, and the derangements in the digestive organs leading to these. You have been elsewhere told all about the composition of the urinary secretion; that it contains, in a healthy state, a substance called urea, in a state of combination; and besides that, a free acid, and a great many alkaline and earthy salts, containing organic and inorganic acids. You also know that, in disease, its solid constituents are often increased in quantity, so that, instead of

the specific gravity being 1020, it is sometimes as high as 1040, and may then contain either an unusual quantity of urea, uric acid, or some of its ordinary salts; and that it sometimes becomes alkaline, or contains a new substance—such as albumen, oxalic acid, or sugar. In a state of health, the urine continues perfectly transparent after it is evacuated; but from derangement of the digestive organs, or suppression of the secretion from the skin, a slight deposit takes place, on its cooling, either in an amorphous or crystalline form.

You are aware that the state of the urinary secretion depends very much on the condition of the stomach, and the nature of the food. If that most important organ be deranged, an excess of acid often appears in the urine, in which certain decompositions and precipitates then take place: so, too, if the functions of the skin be not properly performed, on which good health so much depends,—if the surface of the body be habitually dry, and the insensible perspiration be suppressed,—a great load is thrown on the kidneys, and the urine becomes cloudy, and deposits of various kinds appear in it. The most frequent urinary deposits are those consisting of uric acid or urate of ammonia; the former is usually reddish, and minutely crystalline, and is seen at the bottom of the chamber utensil, adhering to the side in the form of a crust. There is often, also, a quantity of uric acid entangled in mucus, forming a sort of purple sediment. When it is in greater quantities, crystals are found floating about in the urine. The urate of ammonia sediment is usually pale-yellowish in colour, and forms an amorphous powder. These uric deposits may depend, not only on disordered digestion and cutaneous action, but on habitual excesses in diet, and on high living, both as regards food and drink; and also on a constitutional tendency, called the *uric acid diathesis*. Deposits of the oxalate of lime, or even of oxalic acid, are generally dependent on imperfect digestive powers, and those of the various phosphatic salts appear to be connected with impairment of the nervous energy of the system, on spinal disease, or local affections of the urinary organs. For an accurate description of these various deposits, their crystalline forms and their chemistry, and also for the various theories regarding their causes and chemico-pathological relations, you must consult the writings of Prout, Liebig, Golding Bird, and others.

From one cause or other, then, these deposits take place. They sometimes occur in the kidneys, in consequence of a deficiency of water being exhaled from the uriniferous tubes: they pass along the ureters, causing sometimes pain and annoyance, and get into the bladder. If there be a great quantity of deposit, perhaps the patient suffers pain in voiding the urine; there is heat in the urethra; this continues for a time, then passes off, and reappears upon any derangement of the digestive organs. This disposition to deposit in the urine is generally combined with gouty symptoms;

and the same mode of life, the same excess in diet, and the same indolent habits that lead to the one disease, produce the other. When gouty deposits, lithate of soda, take place in various parts of the body, deposits of various kinds take place from the urine. Uric acid is frequently combined with earthy matter. Here is uric acid pretty pure, and a brownish concretion formed by it. Here is the lithate or urate of ammonia. These are most commonly primary deposits. Here, again, is the oxalate of lime which Dr. Prout has attributed to patients using water containing lime, and at the same time indulging in acid beverages and acescent diet, eating salads, fruit-tarts, &c. That is the dark deposit. Besides these, you have a combination of uric acid with urate of ammonia. Sometimes there is lithate or urate of soda deposited—a white sediment. There are also earthy sediments—phosphate of lime, phosphate of ammonia, and magnesia. These are often combined in the fusible calculus. These earthy deposits generally take place in patients who have been much worn down by mental or bodily fatigue, who have suffered from irritation of the urinary organs a long time, who have had disease of the coats of the bladder, or have had stone of one kind or other, causing long-continued irritation. They often take place in patients who have been much dosed with mercury, with a view to correct the state of the digestive organs.

There is frequently a deposit of one kind for a time, and then, again, from a change of diathesis, other deposits take place. You will often find uric acid in the first instance, then oxalate of lime, and outside that, commonly enough, a white deposit. Not unfrequently, instead of a solid centre, there is a cavity. A nucleus has been formed, consisting, perhaps, of a small clot of blood or mucus, which has afterwards become shriveled, but successive coatings occur till the stone attains a considerable size. Here is a calculus consisting first of a hollow, then urate of ammonia, then oxalate of lime, and lastly, uric acid. Here is an alternating calculus—a white substance is deposited, then successive layers, some white and some brown, the uric acid alternating with the fusible deposit. You may have the centre uric acid, then oxalate of lime, then urate of ammonia, outside, in successive layers, and then, over all, a white layer, the earthy deposits being almost uniformly, as I have said, secondary.

These deposits cannot increase in the kidneys to any great amount, and come to the bladder, without causing some symptoms. It is the business of the surgeon, then, to look to these, and to endeavour to prevent by every means in his power the formation of stone, or if it has formed, to get quit of it with as little suffering to his patient as possible.

How are you to prevent the formation of stone? By attention to the general health, by getting the stomach right, and keeping the skin in good order; by dieting the patient properly, preventing him

using acids, or such articles of diet as form them. If he labours under acidity, you must correct it by alkaline medicines, by carbonate of potass given an hour and a half or two hours after a meal, either alone, or combined with tartrate of potassa and soda. By this means you may often correct the stomach, and clear the urinary system. Small doses of blue pill will often speedily correct the red deposit. It is of the utmost consequence that the skin should be kept clean and perspirable. The patient should take exercise, and have the skin well washed after it. If he cannot take sufficient exercise, he should frequently indulge in vapour and warm baths, and previously to washing the skin, he may use the flesh-brush, or horse-hair gloves. It is well that he should have powerful friction employed, and get well curry-combed first, and then well washed, and this should be repeated from time to time,—indeed, it cannot be done too often.

Sometimes, instead of the urine showing the prevalence of acidity, it will become alkaline, and then there is a risk, if alkaline remedies are continued, of white deposits taking place. When the phosphatic diathesis prevails, then you will exhibit the mineral acids—the nitric and muriatic acids, alone or combined—and continue them according to circumstances. There are various acid medicines that may be given with a view of combining with deposits from the kidneys.

There are two other calculi which I should have spoken of, but which are comparatively rare. One is the cystic oxide, which differs remarkably from all other calculi, by containing a large quantity of sulphur in a state of chemical combination. It is a peculiar stone, and not often met with. It is crystallized outside, and has a radiated texture and a waxy appearance on a section being made. You can at once ascertain that the stone is of this character by scraping it and exposing it to heat. It emits a sort of very fetid and sulphurous smell, a stench that you will never forget when you have once perceived it. There are not a great many preparations of it to be met with in collections of calculi. We have a large collection of calculi here, and there are only two cystic oxides in it. I have removed about one hundred and fifty stones from the bladder—I should rather say, stones from about one hundred and fifty bladders—and here is the only one of this character which I have met with. Here are some small fragments of a still more rare stone, what is called xanthic, or uric oxide, which differs from uric acid in containing less oxygen. It is so rare, that it is scarcely worth saying anything about it. It is all very well to analyze it, and for chemists to speak about it, but to the practical surgeon it is of no importance. These portions are obtained in exchange for a section of this cystic oxide calculus. There have been only two or three described—one by Dr. Langenbeck, and one by Dr. Marcet.

Sometimes deposits take place primarily in the bladder, though

rarely. The carbonate-of-lime calculus has been formed there. This occurs only when the urinary organs have been long in a state of disease. Supposing, however, that a stone forms in the kidney, it may attain some size. It may fill up one of the infundibula, and acquire such a magnitude that it cannot pass through the ureter to the bladder. Remaining there, it causes great annoyance to the patient, and renders him exceedingly uncomfortable. It has now and then happened that a stone there has given rise to an abscess, and it has been discharged from the loins. An abscess of the kidney, however, presenting in the loins, is by no means common from any cause.

Generally when a stone is formed in the kidney, it descends along the ureter to the bladder, or it may be detained in the ureter and there cause great suffering. Sometimes a concretion becomes entangled in the extremity of the ureter, and gives rise to sickness, to great pain in the kidneys, stretching along the course of the ureter, and the urine is often bloody. Sometimes the secretion is entirely arrested for a time. When the stone gets to the bladder, the patient is immediately relieved, and it may be of such a size that it passes out after a short time, without any great pain. He has, perhaps, a little difficulty in making water, he finds something come along the urethra, and the stone drops into the chamber utensil.

But if the stone does not pass off in this way, it very soon begins to increase in size, deposition of one kind or other takes place, and then it attains a size that prevents its passing by the urethra. When a stone is lodged in the bladder, it generally gives rise to symptoms of such an urgent character that you are speedily led to make some examination. As soon as it begins to assume some considerable size, it impedes the flow of urine; the patient finds that the water comes away freely at first, and then suddenly stops. This may be the only symptom for some time. As it increases in size, and perhaps becomes rough, crystallized on the surface, he has considerable pain after the water is voided, and the pain is complained of as affecting the point of the penis. These symptoms may continue with some intensity for many weeks; there will be a little mucus in the urine; but by and by they disappear, and the patient then continues somewhat comfortable for a time, till he has another fit of stone, as it is termed. Perhaps, after taking exercise, his water is slightly tinged with blood; there is a considerable deposit of mucus, and all the symptoms of pain during and after making water, and the stoppage of the urine, again present themselves. This may continue for a considerable time before he applies for advice. Frequently a patient, with a large stone in his bladder, does not suffer so much pain as if there be a small one with an irregular surface. A large stone often becomes water worn, and is retained without inconvenience. But he is liable to a recurrence of the symptoms,

because the lithic or other diathesis may become very strong ; crystals may take place on the surface, rendering the stone again rough, and by moving about the bladder, as it must do from a change of position, irritation is produced.

Fig. 197.



The symptoms arising from an oxalate-of-lime calculus are generally much more severe than those arising from any of the others. The stone is sharp, jagged, covered, as you observe, with spines, and even a very small stone of this kind will cause great pain to the individual. It occurs at all periods of life, but more frequently in infancy.

A frequent desire to make water, pain at the point of the penis after voiding it, and a sudden stoppage of the stream, will warrant you, in any case, in proposing an examination of the bladder. You must be aware, however, that these symptoms very often arise without stone being present. You find irritation in young subjects occur from a derangement of the digestive organs, from worms or sordes in the bowels, and sometimes the symptoms will disappear on clearing the bowels out by the exhibition of a good dose of calomel and jalap, or of balsam of copaiva ; the worms or sordes are thus got quit of rapidly, and the irritation of the urinary organs ceases. Symptoms of stone in the bladder very often exist in consequence of the disordered condition of the kidneys ; they often, too, arise merely from the acrimony of the urine, from its containing a great quantity of saline matter. But from this latter cause the symptoms are generally of short duration ; they have, perhaps, existed only a few days or a few weeks, and although they are very strong, yet you know that stone cannot form in so short a time. It is only when the symptoms are of considerable duration, when the patient has had repeated attacks for some months or some years, that you will be warranted in examining the bladder. I have said that the state of the kidneys will give rise to the symptoms of stone. In the granular degeneration of these organs, there are often many well-marked symptoms of stone. I have, over and over again, been called upon to sound a patient, when, upon an examination of the urine, it was found injudicious to do so, and there was every reason to believe that there was this disease of the kidneys. In the latter stages of disease, when abscess has taken place in the kidney, the symptoms of stone in the bladder are often very well marked. There is a mucous, purulent, bloody discharge, a frequent desire to make water, a pulling out of the penis in young subjects, and pain at the point, without the presence of stone in any

part of the urinary passages. I have examined the bodies of patients who had, during life, suffered severely from all these symptoms, and found one of the kidneys, perhaps, completely filled with purulent matter, and perhaps only a little portion of the other in a condition to carry on the secretion of urine. You must be careful, in all cases, to examine into the symptoms before you propose to sound the patient.

Suppose that you discover the presence of a stone, what is to be done? Is it possible to dissolve it? It has been thought that stone of the bladder could be dissolved by medicines taken by the mouth, or by injections thrown into the bladder; but I rather think that when once fairly formed, there is no mode of getting rid of it but by some operative proceeding. My friend, Dr. Willis, entertains a strong opinion on the subject: he thinks that even large stones are acted upon by the patient taking alkaline medicines, and that the waters of Vichy, and other mineral waters, have a powerful effect in these cases. It was thought at one time that calculi had been dissolved by Mrs. Stevens, who exhibited soap and egg-shells, and for disclosing her secret obtained a reward from Parliament, but the patients afterwards died of their original complaint. It is of no use to have recourse to injections, except in very rare cases, as where there is an accumulation of earthy matter in the mucus of the bladder; their use, in most cases, would add much to the irritation. If you introduce a strong solution to act on the concretion, it must also act, more or less, on the coats of the bladder, and make matters worse instead of better. Depend upon it, there is no way of getting quit of a stone after it has attained too large a size to come away by the urethra, without the application of instruments.

[The danger, suffering, and frequent want of success attendant upon all mechanical methods of removing stone from the bladder, have induced several modern surgeons to reconsider the question of medical treatment by solution. The waters of Vichy, those of Recoaro, the various alkaline waters of England and this country, the administration of weak acids by the stomach in cases of alkaline calculus, and of alkalies in acid stone, and even the injection into the bladder of dilute acids, have all been recently recommended; but there are few instances in which the temporary relief that they sometimes afford, has been followed by a permanent cure. That the pain usually accompanying stone in the urinary passages has been relieved for a time, and the formation of calculous matter checked, by a judicious administration of these agents, there cannot be a doubt, but that a stone once formed has been *dissolved* through their exhibition, I do not believe. The cause of relief has been variously explained. Some, as Leroy d'Etoilles, account for it by supposing that the feeble solvent dissolves the outer laminae of the stone, and is then checked in its action by the layer of animal mat-

ter which is found between all the concentric laminæ of a calculus. This layer of animal matter being less irritating than the hard, rough, stony one, the sufferings of the patient are diminished, and he fancies himself perfectly cured.

Others suppose, that by changing the characters of the urine, we render it less irritating. The mucous coat of the bladder—for example—being intolerant of an alkaline fluid, may possibly bear with perfect comfort the presence of an acid one, and *vice versa*. In alkaline stones, therefore, give acids; in acid ones give alkalies.

Others attribute the benefit to the influence these agents exert in strengthening the whole system, especially the stomach and bowels, in consequence of which every organ performs its function correctly, and there is no secretion of sabulous matter.

Whatever explanation we adopt, it should be borne in mind, that in the use of these remedies, especially the strong alkalies, we may do a great deal of mischief by producing diseases of the stomach and bowels, and even of the urinary passages themselves.

T. D. M.]

OPERATIONS FOR STONE IN THE BLADDER.

I. WITH COOPER'S FORCEPS.

It has been proposed to seize small stones in the bladder, and bring them out through the urethra. Sometimes instead of one there are a great many small ones; there may be dozens, perhaps, the size of split peas. Their surfaces become adapted to each other, and they are impacted close in the bottom of the viscus. With the view of seizing these small stones and extracting them, a variety of instruments were contrived some twenty years ago. Here is one, contrived by the late Mr. Weiss, for this purpose, and called Sir Astley Cooper's forceps. This operation, however, is now entirely abandoned. A good many patients were so far relieved by this means, but it was attended with considerable suffering; a great deal of pain was caused by pulling the stone through the neck of the bladder, which is surrounded by a tolerably unyielding ligament, and then through the anterior part, and orifice of the urethra. We are now able to seize a stone by a more efficient instrument, and if it will not come away easily, it can be broken to pieces and be brought out in the form of detritus. The instrument—a sort of scoop with a second and sliding blade—may be used without any screw, but it is better that you should have some means of reducing the concretion to fragments, when you lay hold of it, for you might find, otherwise, a difficulty in either extracting the instrument with the stone, or disengaging it if it should not come away. The instru-

ment is introduced without difficulty into the bladder, and the stone is generally easily enough caught in it. If it is too large to be extracted, you have nothing more to do than to crush it by forcing the blades together with the hand, or by applying the screw. Some of the small fragments may tumble into the bladder, and remain there till they are washed away by the urine, or become small enough to pass the neck of the bladder. The stone may be so large that you are under the necessity of breaking it down piecemeal by repeated operations, and by a more powerful instrument than the one I have now shown you; or the symptoms may be such as to induce you to prefer the cutting of it out.

II. LITHOTRITY.

Now I shall not enter into the history of lithotritry. The operation was suggested long, long ago, and was undertaken with very inefficient instruments. Some persons had operated upon themselves by introducing a sort of file through an elastic catheter, and rubbing on the stone. It was supposed that some patients were cured in this way. I recollect seeing the identical file used by a Col. Martine, in India, about whose cure a great fuss was made some fifty years ago, and it was supposed that he had freed himself by it, but he died afterwards with symptoms of stone, and a large stone was actually found in his bladder after death. But the operation has taken some sort of form within the last twelve or fifteen years. It first assumed some importance in the hands of Dr. Civiale, but he began his experiments on the urethra and bladder with a view of contriving some means by which he could hold the stone, and enclose it so as to apply a solvent without affecting the bladder. He found that this plan would not answer, and then, after many trials with much ruder instruments than this, he contrived the one I now show you—the three branch lithotrite—which is in all ways dangerous enough. In the commencement of lithotritry practice, a great many cases occurred in which the instrument was entangled with the stone, and became so fixed that it was impossible to get at either one or the other, so as to disentangle and remove them. Operators were under the necessity of making incisions, bending the blades, and pulling out the instrument in the best way they could. Many people lost their lives in consequence of that ill-advised proceeding. This instrument, however, was a great improvement upon those first employed. It has three branches, and is capable of seizing the stone, and reducing it by the application of a drill. A few small stones were, I have no doubt, destroyed in this way; but it was even then maintained, that all stones could be thus treated, and

Fig. 198.



that lithotomy, in consequence, would fall into complete disuse. I tried this plan in several cases, took the trouble of going to see Civiale operate, procured his apparatus, and tried the operation. Here [presenting a calculus] is the first stone which I attempted to reduce by this means. All these holes were bored through the stone in three or four sittings, but you perceive that very

little ground was gained in its reduction, and I might have gone on boring up to this present period without getting quit of it entirely. The patient became very soon tired of the proceeding, and insisted upon having the stone cut out forthwith. He was wise in doing so, for he suffered a great deal less by lithotomy than he did at any one of the sittings he had endured. There was no possibility of breaking a large stone such as this, unless some enterprising operator had put a charge of gunpowder into one of the holes and blown it up. The operations with such instruments signally failed in the great majority of cases; there was no encouragement to go on with them.

But then the apparatus came to be vastly improved. Mr. Weiss had contrived and constructed an instrument for the late Sir Astley Cooper, for extracting the stone, and for reducing its bulk, if necessary; it was something like what is called a screw-wrench, on a diminutive scale. Baron Heurteloup (who, by the way, when he came to this country, pretended to be able to destroy many stones by branch instruments similar to those of Civiale, and by a drill that scooped out the interior of a stone, "*evideur*," the shell afterwards to be reduced to fragments by a "*brise coque*,") took up, it is said, the notion of Mr. Weiss, and had an instrument made much after the same fashion, the blades of which he put in motion by means of a hammer. Here is one of the original instruments by which the stone was to be seized and crushed. But there were required besides, a strong table, or rectangular bed, as it was called, and a vice attached to it; this instrument was then fixed in the vice. I practised the operation, too, in this manner repeatedly. I was determined, in fact, to try everything at all feasible, in order, if possible, to prevent so severe an operation as lithotomy being so often had recourse to; but, at the same time, the attacks made on those who performed lithotomy were not a little amusing; the accounts of patients being tied up in order to enable the surgeon to make the proper incisions, and extract the foreign body. The attacks were penned by the friends and supporters of those who at the same

time were in the habit of introducing this horrid coarse instrument into the bladder, fixing the patient, by means of it and the vice, to the table, and then hammering in the bladder till the stone was broken into large fragments, which had to be acted upon again in the same manner. But, happily, that sort of proceeding is all but abandoned, and we are now able to attack *stones of a certain size, where the organs are pretty sound*, by a very simple apparatus, and thus easily reduce them to a powder. The instrument is still somewhat of the same shape, but very much simplified and improved. There is now no longer any table or vice required. The patient is placed on a bed, or couch, with his buttocks a little raised. This

Fig. 199.

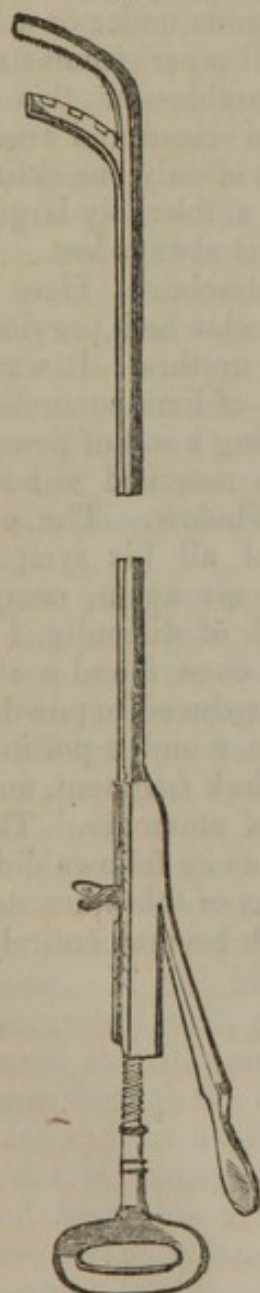
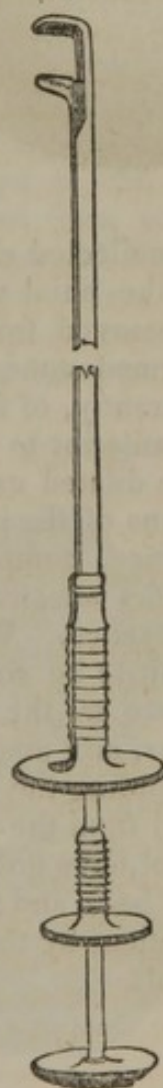


Fig. 200.



instrument is then gently and carefully introduced; the stone is found; the bent part of the instrument is depressed, so as to occupy the posterior fundus of the bladder; it is opened, and the concretion falls within its grasp. The two blades are then brought into contact, crushing the stone without any force except that of a simple hand-screw. It is an instrument easily applied, and perfectly efficient for any purpose of the kind. By this apparatus you can with great propriety attack a stone of moderate size, and the fragments

Fig. 201.



of it are, in a few days, passed off by the patient. If there are large bits, they may be reduced by a succeeding operation, either with this instrument or with a properly-constructed screw-scoop. A stone under or a little above the size—all other circumstances being quite favourable—of this specimen, may be thus seized and crushed. Here is the result of only one sitting; it must have been a tolerably large stone, as

the detritus collected shows, and much is always lost. I think the contents of the phial weigh fully two drachms. Here is another. This was removed from a gentleman who had previously had a curiously-formed stone taken out of the urethra. It was an aggregation, apparently, of five or six oxalate-of-lime concretions, which had lodged anterior to the prostate, making a sort of pouch for themselves in the dilated canal. They were removed without any cutting, by means of the instrument shown below. The patient was, in consequence, completely relieved of all his symptoms. But twelve months afterwards he came to me again, complaining of urinary annoyance. With a great deal of difficulty, I persuaded him to submit to be sounded, and I at once found a stone in the bladder. Here are the fragments partly reduced to powder by several operations, and among them is to be found a portion of stone, closely resembling the original one—a dark fragment, and very different indeed from the rest—the urate of ammonia. This piece of stone may not have got into the urethra as its fellows did, or it may have passed back and formed the nucleus of this other stone. However, the patient by this means at length became entirely free from his complaints.

LECTURE XIX.

LITHOTRITY AND LITHOTOMY.

GENTLEMEN—I have already spoken of various kinds of concretions found in the urinary passages. There are some, however, of rare occurrence, which I did not mention—those, namely, of the carbonate of lime, and of the phosphate of lime. The most common concretions are those of the urate of ammonia and uric acid. These occur in perhaps five cases out of six. The oxalate of lime occurs next in frequency, and then the secondary deposits—the ammoniaco-magnesian phosphates, &c. I told you about the increase of stone in the pelvis of the kidney to a great size. Here is the representation of a calculus which lodged in the kidney. It looks like a large cauliflower. The patient from whom it was obtained was under the care of Mr. Dalrymple, of Norwich, who kindly sent me the drawing many years ago. Here is another, almost equally remarkable, and here is a preparation of one about a fourth part of the size, yet large enough to have put the person who carried it to much and lengthened suffering. It seems to consist of uric acid and urates internally, with phosphates upon the surface.

Fig. 202.



I called your attention yesterday to the improvements which have been made in the instruments used in performing the operation of lithotrity; and the greatest, perhaps, is the opening in the fixed blade, to do away with all risk of the detritus being retained, so as to choke it, and prevent the perfect closure of the instrument. If the blades cannot be accurately shut, great pain is caused in withdrawing the instrument through the neck of the bladder and the unyielding orifice of the urethra. The neck of the bladder is damaged, the verumontanum, &c., bruised and pinched, and from this used to arise violent irritative fever, abscesses in the pelvis, inflammation of the rectum, of the testes, &c., very often ending fatally. All this used to happen frequently some

years ago, and even worse than this. It chanced, occasionally, that the instrument became so clogged or bent, that it could not be withdrawn at all, and then came all sorts of incisions and rude attempts to bend and disengage the apparatus. It is now so contrived that no such accidents can arise. If there were any such risk, I could demonstrate to you a very easy method, by which the instrument and stone could be taken away by simple incision of the perineum and neck of the bladder.

In performing lithotrity, you place the patient, as I have told you, in a recumbent position, with his pelvis a little raised, and glide the instrument smoothly along the passage. There is no difficulty in getting its beak under the pubes and through the prostatic portion of the urethra, unless the prostate be enlarged. You must make very sure, indeed, that the bent part of the instrument is fairly carried into the bladder before you attempt to open or expand its blades. You cannot always succeed by passing it downwards, and depressing the handle, as you do with other instruments. But by pushing it backwards, towards the promontory of the sacrum, you make the urethra straight on the instrument, and thus slip the beak entirely into the bladder, and then find that you can move it about freely, and turn the point to either side, or even make it sweep round in the posterior fundus. Assuming that the stone lies in the position represented by this diagram, you raise the handle of the instrument, open its blades in the most dependent part of the cavity, and the probability is, that the stone will at once fall between them. By this means you will often detect stones, of the existence of which you might otherwise remain ignorant. A common sound may have been used repeatedly without anything being felt, and yet by this instrument you will at once, and without pain to the patient, detect the foreign body. The first evidence you have of the presence of a stone often is, that you cannot shut the instrument. You then raise up its point to the middle of the bladder, and press the blades firmly together, so as to secure your hold. There is a gauge upon the instrument, by which you can ascertain the size of the stone in one diameter, at all events, probably in its smallest. The screw is then applied, and the stone crushed easily and safely. The feeling for the stone and seizing it cause slight pain and uneasiness, the crushing none. There is no difficulty in using the instrument to break the fragments. Having the urethra straight, you can turn the instrument in any way to each side, and into the fundus of the bladder, open it, take up the fragments, and break as many as you can in the first instance, crushing bit by bit. You then withdraw the instrument, give the patient a dose of hyoscyamus, advise him to use the hip-bath, and let him drink plentifully of bland fluids. In a few days, when the irritation has ceased, and the swelling of the lining membrane of the neck of the bladder and urethra has subsided, he will pass the detritus readily, and continue perhaps to

do so for a fortnight or so. At the end of that time, or perhaps earlier, you examine the bladder again, and may find that nothing remains, or if there then does, you break any fragment or fragments, and in this way you relieve the patient of his disease, and that without the loss of more than a few drops of blood. You saw the operation performed in the hospital very satisfactorily in several cases last session. Patients may be able to go about their ordinary avocations during the time they are under treatment. Great care must be taken to ascertain that the bladder is completely cleared of all fragments. If even the smallest portion be left, you must be aware that accumulation of one sort of deposit or another will speedily occur, and if several portions should be left, the patient will thus make but a bad exchange, of perhaps one tolerably smooth and water-worn stone for half a dozen irregular concretions. Here is the half of a concretion, one of four, removed from the bladder of an old gentleman, who was treated years ago by one of the professed stone-crushing gentry, when the branch instruments and evideurs and shell-breakers were in use. The patient lived in great suffering for a year after his alleged cure. This stone, of a white colour, is formed, as the others were, on a fragment of a brown colour, a portion of the original stone, for the supposed removal of which he had paid dearly in all ways.

Fig. 203.



But this proceeding will not do where the stone is of large size and of firm consistency, where the urethra is diseased and contracted, and where there is any great irritability of the bladder. It will not answer very well when there is reason to think that the kidneys are in an unsound state, if the urine contain a considerable quantity of albumen, and you believe that degeneration of the kidneys has commenced, that they are granular, large, soft, and flabby. In this condition of the organs, inflammatory action is very apt to be set up in them, and the patient is liable, from this cause, to perish very rapidly. In cases where the stone is above a certain size, where it approaches to anything like some of the specimens before you—and you sometimes meet with a stone three or four times larger than these—it will be better at once (the patient being in a proper state to submit to it safely) to have recourse to lithotomy—to cut the stone clean out at once. Lithotrity is not very applicable to children; the parts are very irritable, and there is a difficulty in getting away the fragments. Besides, the stone is often of a very dense consistency; very frequently in children it is, in a great measure, composed of the oxalate of lime. I believe that under the age of puberty it is almost always the better plan to have recourse to lithotomy, for in good hands the operation is then attended with scarcely any risk.

Lithotomy is not, certainly, by any means so frequently required

as it used to be, and if adults would but apply in sufficient time, it might even in them be almost entirely disused. But still it is an operation that you must study, because whatever improvements may be made in the instruments for crushing, lithotomy must very generally, I think, be performed on children; and many adults are so careless about themselves, that they allow the stone to attain a very large size before they make application to the proper quarter for relief. You must give no heed to the rash boastings and misstatements of professed lithotritists, if any such yet exist, of those who were acquainted with only one mode of operating for stone, and some of whom, from ignorance of the first principles of surgery, understood even this method but imperfectly. They used to assert, and perhaps do so still, that cutting for stone was a barbarous and totally unnecessary proceeding in these days: I, for one, devoutly wish it were never necessary.

The performance of lithotomy, though much less frequently required than heretofore, must yet be had recourse to in many cases, as being the safest proceeding for the patient, and therefore must be studied and understood by all who mean to practice the higher branches of the healing art conscientiously, and with satisfaction to themselves; I should rather say, by those who qualify themselves, and are likely afterwards to have the opportunities of treating surgical cases; for in this department we may well say, *Multi vocati pauci electi*. You must be aware that it is not by three years' study, nor by five that you can qualify yourselves to undertake the management of surgical cases; on the contrary, it is only by constant practice of the science and art, and by constant dissection and the study of pathology, that you can acquire and retain knowledge and fitness in this department.

It will be the duty of the surgeon to decide—after a careful examination of the case, and a consideration of all the circumstances, the age of the patient, the state of the urethra and bladder, the size of the stone, and the probable condition of the kidneys—which operation affords the best chance of a safe and a speedy recovery. It does not answer well, rely upon it, to attempt first one operation, and, finding it inefficient, or thinking it imprudent to proceed further, to adopt another.

Many patients have perished from the combined effects of two operations, who might have recovered without a bad symptom from one dextrously performed. Lithotomy, depend upon it, is undertaken to great disadvantage after the functions of the parts have been disturbed by an unsuccessful attempt at lithotrity. This subject on the table could not have been subjected to lithotrity; he has an almost impassable stricture, and there is so much difficulty in getting the sound into the bladder, that it looks as if a false passage had been made. Many stones, again, are of such a consistency, that there is no possibility of acting upon them by means of such an

instrument as this—one of the most powerful and well contrived I have met with. There are, besides, foreign bodies sometimes introduced even into the male bladder, which cannot be safely broken down, and must be cut out. Here is a portion of thick glass tube, for instance, of some two and a half to three inches long, which a stupid old Irishman had picked up in the street, about twelve months before he came to the hospital. He had, for some purpose best known to himself, pushed this up his urethra, from time to time, pulling it out by a string, which he had attached. But the string got worn, and one day broke short off. The piece of glass got back into the bladder, from which it was, without much difficulty, extracted through an incision of the perineum and neck of the bladder. This foreign body could not have been otherwise extracted entire, and you can guess the consequences of breaking it in the bladder. Many of the concretions met with are of such a size, that although you can lay hold of them, the blades cannot be closed, and you cannot apply the screw so as to crush them down. If you should catch a stone too large to be broken, by opening the instrument you can easily disentangle it, and shake it out again. If you ascertain that the stone is large, and of dense consistency, it is better not to try to break it. Other stones—some of the phosphatic ones, for example—are so soft that, though of large size, you may attack them at once. Some of them, composed of urate of ammonia, are formed in concentric layers, so slightly cemented together, that the slightest tap will break them down. Mr. Thomas Blizard was in the habit, now and then, of breaking such calculi down by the common sound. Some of them are so soft that where there are more than one they will often break by rubbing against each other, and by the contraction of the bladder. Patients often pass pieces of stone—portions of the layers of stones—without any operation being performed; the stone breaks up spontaneously; and if solvents had been used, such effects would, no doubt, have been attributed to their action. There are, in the College of Surgeons, a bladder and urethra taken from the body of a medical man with whom I was well acquainted, and whom I had seen in consultation on the morning of the day on which the accident that proved fatal to him happened. He had been called hurriedly, to a labour, I think, and ran down a very deep street; he was suddenly seized with a desire to make water, but could pass only what appeared to be pure blood. He reached home with great difficulty, was attended by a medical man of eminence, but died in a few days of intense inflammation of the entire urinary apparatus. His kidneys were quite black, his bladder thickened, bearing marks of violent inflammatory action, and contained a stone, reduced to fragments, which must have weighed nearly a couple of ounces; his urethra was also crammed full of broken pieces of stone. He had known of the existence of this stone, and had sounded himself.

ten years previously, but he had never mentioned it till the seizure here spoken of. He might possibly have had a chance of recovery even after this, had the orifice of the bladder been opened, and the broken stone taken away by the scoop, within a few hours of the accident.

[One of the most striking characteristics of our nature is that which leads us to doubt the value of every project or scheme originating with another. We cannot realize, at once, the fact, that some one else has discovered and brought to light something of which our own faculties have never taken cognizance; and hence we admit its importance with hesitation, or boldly declare the statements of its advocates to be false, and contrary to reason or experience. Probably no operation in surgery more fully illustrates the correctness of these remarks than lithority or lithontripsy. From the period of its introduction into practice by Leroy d'Etiolles, Civiale, Heurteloup and others, it has had to contend with fierce, violent, and most unjust opposition; and even down to the present moment, you will find surgeons decrying both the grinding and crushing processes, and declaring them to be, in the majority of cases, of no avail, while in others they are positively murderous.

With the view of ascertaining the precise estimate placed upon the measure in Europe, I took especial pains to inquire of the surgeons in London and Paris, as to what was the real condition of the operation in their respective cities. In both I found it in high repute, but more especially was this the case in Paris. In the latter city the dextrous and excellent surgeons Civiale and Leroy d'Etiolles, perform it almost daily, and while they acknowledge that *lithotomy* is still the operation best suited to many cases, they yet contend that it is far more dangerous, and gives rise to much more suffering than lithontripsy. This is certainly correct, and no one who gives the operation a fair trial can hesitate for a moment to arrive at the same conclusion. No one contends that it is to supersede the use of the knife, but it is obvious that it must ere long be considered by far the safest and least painful mode of removing stone from the bladder of an adult, unless the case be complicated with lesions of other organs in the vicinity. The original operation of *lithotrity* or *grinding* has given place almost entirely to the more modern one of *lithontripsy* or *crushing*.

In this country the establishment of its utility is unquestionably due to Dr. J. Randolph of this city, a surgeon who deservedly ranks among the first of the age, and a gentleman whose social virtues have endeared him to a large circle of friends. It is certainly as preposterous as it is ungentlemanly, for any one to deny that he was the first to bring the operation into anything like reputation among us, and yet there are men who from year to year make the attempt to deprive him of this merit. Other surgeons among us have also contributed largely to the establishment of its value, and

among these I take great pleasure in naming my friends Professors N. R. Smith of Baltimore, Valentine Mott of New York, and J. C. Warren of Boston.

The instruments usually employed are those of Heurteloup, with various modifications, aided, when the stone is very hard, by the hammer. The instrument of Jacobson, at one time much employed, has passed almost entirely out of use.

Many are still much opposed to the operation, and among them is that excellent surgeon Prof. Dudley of Lexington, who has probably operated oftener for stone than any other man in this country. For my own part, I think it safest to be governed by the circumstances of the case, and, as Mr. Liston advises, perform that operation which seems best calculated for the patient before us. The following *conclusions*, which close a most admirable essay on calculus, by Mr. Lee of England, may, I think, be considered as the best resumé of the advantages and disadvantages of lithontripsy that has yet appeared.

1st. [That lithotomy is still, in the present state of the art, the operation most suited to the majority of cases of stone in the bladder—inasmuch as about one-half of the number of stone patients consist of children, to whom, with a few exceptions, it is more particularly adapted.

2dly. That, as far as adults and elderly persons are concerned, lithotrity is most applicable to an equal, if not to the greater number of cases.

3dly. Lithotrity is preferable in the great majority of female cases

4thly. Other circumstances being favourable, lithotrity is more especially suited to calculi of small size, even when hard.

5thly. Lithotrity is less applicable than lithotomy to most cases, where the bladder contains several calculi, especially if they be hard.

6thly. Lithotomy is the preferable, and often the only admissible operation, in cases of large calculi; as also in those cases where the stone, though only of moderate size, is yet of considerable density, and irregular on its surface, as in the oxalate of lime variety.

7thly. Where there exists much irritability of the urethra and bladder, which cannot be allayed by preparatory treatment, lithotomy would be the preferable operation; especially if the irritability appeared to be chiefly dependent upon the presence of the stone.

8thly. Lithotrity is applicable in some cases of deranged health, or disease of parts, which would contraindicate lithotomy, or would render its performance most likely to be attended with failure.

9thly. The degree of pain from the performance of lithotrity is not great in many cases, and is mostly diminished after the first sitting; but, on the other hand, in some instances, the operation is

very painful, and the pain becomes increased in subsequent sittings, though, perhaps, never so acute in lithotrity as in lithotomy, yet, as the pain in the latter operation lasts only for a few minutes, whereas in the former it recurs, though less in degree, on each sitting, the patient frequently suffers by lithotrity a greater amount of pain.

10thly. The duration of the treatment is generally longer by lithotrity than by lithotomy, though sometimes it is shorter; and after the stone has been removed by the latter operation, the patient, though confined to his bed, may, during the greatest part of the period, be considered as convalescent; whereas, when lithotrity is performed, there is always risk, so long as any fragments remain in the bladder, of circumstances arising to prevent the completion of the operation, and the patient cannot be regarded as out of danger.

11thly. When lithotrity is applicable, the method by pressure is, in the great majority of cases, infinitely superior to that by percussion.

12thly. Lithotrity exposes more to the risk of a relapse than lithotomy, on account of the greater probability of a portion of stone having escaped detection, and remaining in the bladder after the operation.

Lastly. Sufficient data do not as yet exist whereon to form any accurate estimate of the average amount of failure and mortality after lithotrity, the accounts hitherto furnished being of a very contradictory nature: some representing lithotrity as more successful in its results than many slight operations; others stating the number of failures to be very great. The circumstance of several unsuccessful cases, which were not adverted to by the operators, having been subsequently brought to light, both in England and on the continent, tends very much to discredit some of the statements of success which have been made: though, as far as the results are concerned, much must depend upon the operator's being accustomed to the use of the instrument, and knowing when to desist from persevering in the attempts, as also upon the selection of proper cases. It is, however, satisfactory to know, that since the instruments have become more simple and perfect in their construction, and the operation better understood by the generality of practitioners, the proportion of failures is much less than at an earlier period.

T. D. M.]

III. LITHOTOMY.

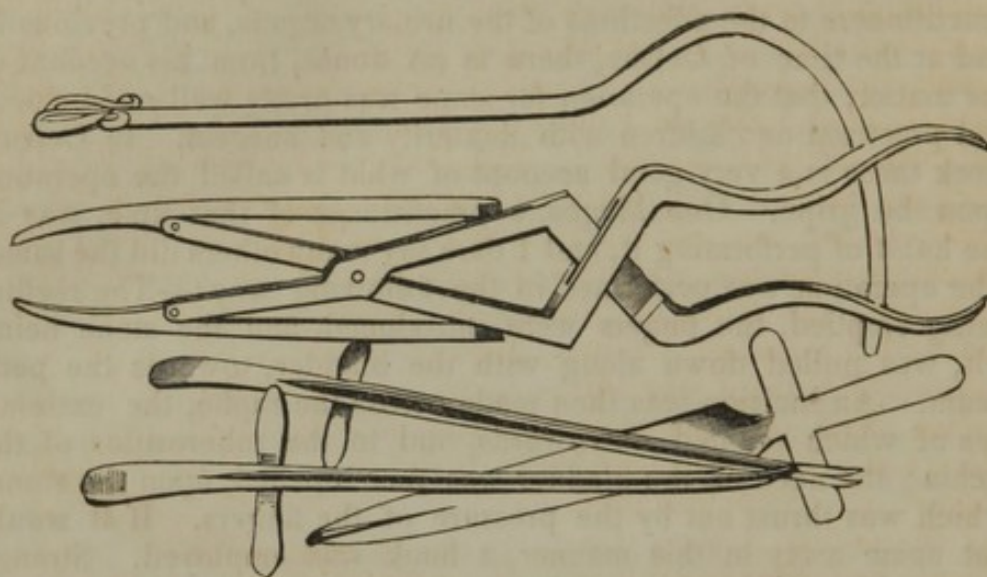
Cases, as I have said, are occasionally met with, in which lithotomy must, of necessity, be performed; and it is an operation which must be well studied and thoroughly understood by the

well-educated surgeon. It was forbidden by many of the ancients, and Hippocrates strictly enjoined his pupils not to interfere at all with the urinary organs. It was considered by some of his successors as highly improper to meddle with the diseases of the genital organs, and it was said that this branch of surgery was only fit to be practised by slaves. They would not even attempt, by instruments, to relieve a man of retention of urine. We find, however, that at a later period some attention was paid by educated practitioners to the affections of the urinary organs, and previous to and at the time of Celsus, there is no doubt, from his account of the matter, that the operation for stone was pretty well understood, and practised on children with dexterity and success. In Celsus' work there is a very good account of what is called the operation upon the gripe. One Meges, a practitioner of that time, was in the habit of performing it, and I dare say many others did the same. The operation was performed in the following way:—The rectum being emptied, the fingers were introduced, and the stone being felt, was pulled down along with the bladder, towards the perineum. An incision was then made across the raphé, the extremities of which pointed downwards, and to the tuberosities of the ischia; the neck of the bladder was then opened upon the stone, which was thrust out by the pressure of the fingers. If it would not come away in this manner, a hook was employed. Strange to say, this precise plan is still practised by the natives in some of the mountainous districts of India. They cut down in this way upon the stone, and if they cannot disentangle it by the fingers, they do so by means of a crooked deer's horn. This plan may answer in young subjects, but it is impossible in an adult to get the finger round the prostate even to feel the stone, or ascertain its size, as some people have recommended.

Many centuries later—viz., in 1520, another proceeding was proposed by Johannes de Romanis, an Italian surgeon, and it was practised by his pupil, Marianus Sanctus, who dedicates his book to him. This continued to be performed by various operators on the continent. In Italy and France, for a long period of time, by Octavius de Ville; by the family of the Callots, lithotomists, for successive generations, to the Kings of France; from Henry II onwards, by Toletus, &c. They operated in this capacity in the public hospitals, but afterwards it was also undertaken by the surgeons-in-chief to these institutions. This proceeding, in consequence of the number of instruments employed in it, went under the name of "The operation by the great apparatus." A grooved instrument was first of all introduced as a guide into the bladder: here is one of those crooked tools, which was, I believe, re-invented by an old hospital-surgeon in this city some time ago; but it has been said, that after having his machine made, he could not, by hook or by crook, get it into the bladder. An incision was made

on the perineum, at the nearest point at which this staff, or grooved director, could be reached; then a male dilator, as it was styled, was passed along the groove of this first instrument into the bladder, and a female dilator was passed along that; the blades of the two were then forcibly separated. This was all done in accordance with the aphorism of Hippocrates, who thus states the danger that

Fig. 204.

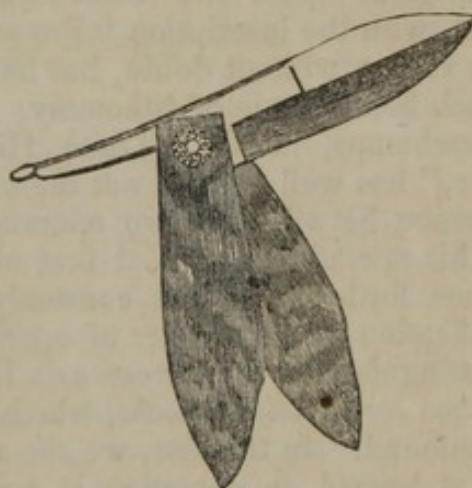


arises from wounds of the bladder, in other membranous parts and internal viscera: "Cui persecta est vesica, aut cerebrum aut cor, aut septum transversum aut aliquod ex intestinis tenuibus, aut ventriculus aut Hepar, Lethale." The ancients regarded the bladder, and rightly too, as being the most dangerous viscus to interfere with; there can be no more certainly fatal wound than that of the side of this viscus; they accordingly would not cut the neck of the bladder, but tore it up. Having got it dilated so far, they introduced another instrument, which was called a gorget—a large canula, in fact. This was thrust into the neck of the bladder, and then along that the forceps were passed. Sometimes this was not sufficient, and some of the successors of Marianus contrived this very powerful instrument, called the compound dilator. This was in its turn introduced, and, by bringing the handles together, the neck of the bladder was (easily enough, by tearing) made as large as there was occasion for. This tearing up of half the urethra, bulbous, and membranous portion of the neck of the bladder and prostate, was, as we can readily understand, a very unsuccessful proceeding; for, as Mr. Pott used to state, in his *Surgical Lectures*, "The incision, you see clearly, was to be made in the *bulbous part* of the urethra, and the neck to be dilated by instruments, which always made a lacerated wound. From this dangerous practice, inflammation and fever came on, with all their violent symptoms;

then mortification, in a very short time. Those who fortunately escaped this, however, sooner or later experienced other disagreeable mischiefs: not unfrequently an incontinency of urine, abscesses in the prostate gland, abscesses making their way upwards into the pelvis, and pointing just above the os pubis, &c. You see, then, their aim was, to terminate their incision merely in the urethra, on this side of the neck of the bladder, and by instruments to dilate the neck. Infants sometimes recovered from this operation—adults seldom, if at all, and at best laboured under some disagreeable disease ever after.” It was owing, at last, to a sort of itinerant lithotomist, that a death-blow was given to this operation, by the “grand appareil,” and that the foundation was laid for the present “lateral method,” as it is called. This “very ingenious” quack, Frère Jacques de Beaulieu, suddenly appeared in Paris about the year 1697, as we are told by Dionis, and despising this complicated machinery, the use of which, I dare say, he did not understand, attempted the relief of patients labouring under the tortures of stone, by thrusting an in-

strument, without any director at all, into the bladder, (a sort of double-edged dagger, an instrument used by Mareschal, Collot, Lédran, and Garengéot, in making the external incision, as in our day the operators with the gorget have used Cheselden’s knife,) and introducing the forceps, drew out the stone forthwith. This instrument was fully opened, and kept steady in its handle by means of tow wrapped round that and the blade to

Fig. 205.



within an inch and a half of its point. Frère Jacques had observed, that in the operation, as commonly performed, the neck of the bladder was much torn, and to this he attributed the dreadful mortality, and thought that by cutting, instead of tearing, the danger might be lessened. He thus cured some few patients very quickly, but it was found that he lost a vast proportion of those who came into his hands. It is said that, at an early age, Jacques de Beaulieu, a private in a cavalry regiment, made the acquaintance of an empiric named Pauloni, who traversed the country, “*taillant du Boyau et de la Pierre.*” He traveled with him and learnt the various operations which his master practised. He donned a monk’s habit, and, in 1690, confined himself to the cutting for stone, “the

extraction of the testicle, in the other operation, having always shocked his delicacy!" In some of those who were subjected to post-mortem examination, his instrument was found to have gone everywhere besides into the bladder; sometimes this viscus was transfixed, and the bowel wounded; sometimes it had passed across the neck of the bladder, separating the urethra from it; sometimes betwixt the rectum and bladder, and, again, betwixt this last organ and the bones of the pubes. In fact, as Cheselden has pithily said, "There is no place that he did not cut, one time or other, and therefore he may have a sort of right to be called the inventor of any operation for the stone that can ever be performed in these parts." Some anatomists, Felix, Duchêne, Duverney, and Fagon, however, took him by the hand, and taught him something of the anatomy of the parts, and persuaded him to use a grooved staff. After this, he traveled into Holland, and operated upon several hundred patients with good success. He was a man of great benevolence, and refused money for his services; all he would receive was barely as much as would enable him to pay for the sharpening of his instruments and the mending of his shoes. In Holland, he was in great repute; he received a present of gold sounds, and a medal, with the inscription "Pro servatis civibus." He did much harm at first, without doubt, but he certainly laid the foundation for a much better mode of lithotomy.

Deschamps, in his "*Traité Historique et Dogmatique de La Taille*," has well pointed out the merits of Frère Jacques, and the difference betwixt his two operations. "The results," says he, "of his operations, were at first almost always unfortunate; they became forthwith almost constantly successful, especially after the modification of his manner of operating. It is therefore necessary to distinguish, in the career as a lithotomist which Frère Jacques ran, *two very distinct epochs*, which an impartial historian ought not to confound. In the first, we see a man, perfectly ignorant, undertake at hazard an operation in parts, the structure of which was unknown to him, with the temerity usual in those who do not appreciate the dangers, and sacrifice, so to say, the greater part of his patients. In the second epoch, we see the same man submit his operative procedure to a reform, which gave it the character of method, and which was followed by success the most extraordinary. In the one and other epoch, in spite of their difference, we see always in Frère Jacques a man upright, sincere, disinterested, and a friend of humanity."

Rau, an anatomist at Leyden, and a good surgeon, imitated Frère Jacques in his mode of proceeding, and possibly improved upon it; he operated very successfully, but, to his shame be it said, he died without describing his operation. He even kept his assistant, the celebrated Albinus, in ignorance of the exact parts which he cut. It is a curious fact enough, that a good many lithotomists

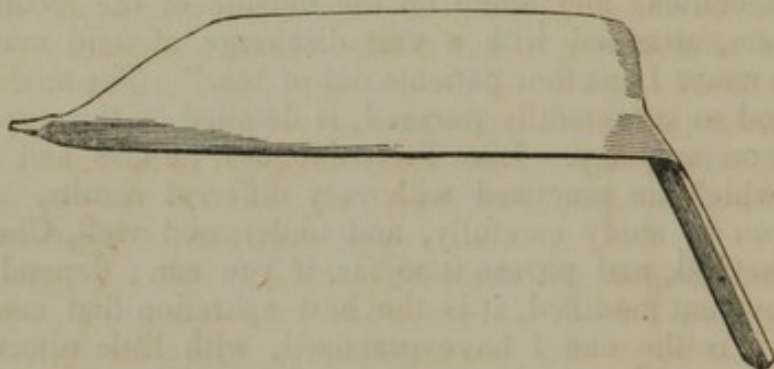
have concealed their mode of proceeding. There is a singular MS. note, by the late John Bell, upon the fly-leaf of "Dease's Treatise on Stone," in which he recommends the employment of a certain conductor and lithotonic. "Curious," he says, "that there has been no lithotomist, from Rau down to Dease, who has not concealed his operation. Here is Dease's book, and yet I have reason to doubt whether he did not cut with the knife."

We then come down to the time of Cheselden. He was, it seems, misled, in the first instance, by the account given of Rau's method by Albinus. Cheselden introduced a grooved staff, cut by the side of the prostate, tried to push his knife into the side of the bladder, and to cut this to a sufficient extent, without implicating the gland, the true neck of the bladder, or the urethra. This proceeding was very unsuccessful, by his own straightforward and manly account. The patients for some days seemed out of danger; "but the urine which came out of the bladder continually lodging upon the cellular membrane on the outside of the rectum, made fetid ulcers, attended with a vast discharge of fetid matter, and from this cause I lost four patients out of ten." The mode he ultimately and so successfully pursued, is detailed in the appendix to his work on anatomy. Like Frère Jacques, he also had two operations, which he practised with very different results. I would advise you to study carefully, and understand well, Cheselden's second method, and pursue it so far, if you can; depend upon it that, somewhat modified, it is the best operation that can be performed; it is the one I have practised, with little alteration, for many years, and in not a few cases, and I see no reason to change it for any other. The instruments are simple in the extreme, and few. You must learn thoroughly how much is to be cut of the various tissues, superficial and deep, and then you must endeavour to acquire dexterity in the management of the tools.

After the death of Cheselden, the operation came again to be complicated. Sir Cæsar Hawkins, a surgeon of St. George's Hospital, "in order, perhaps, to supply want of dexterity," tried to get by an easier way into the bladder than with the knife. He had an edge put upon the old blunt gorget of the apparatus major, which even Cheselden used as a conductor for his forceps, and perhaps also for the purpose of *dilating* the tissues at the neck of the bladder to the necessary extent. He cut down into the perineum, not caring, perhaps, very much at what part he exposed his staff. His followers, at all events, in this operation with the gorget, I have often seen not over-scrupulous about opening the urethra at the nearest possible point. The gorget, a crooked piece of iron, was then thrust along the groove of the staff, and into the bladder, if possible. The forceps were carried along the groove of the instrument, and the stone was seized. This was not the worst of it: for the operation has been performed well, and may be again, with

a plain cutting gorget, not too large, that had an edge and a point, such as this; in fact a good surgeon could, on an emergency, cut into the bladder with anything; but the successors of Sir Cæsar Hawkins, not content with this simple gorget, must have new ones, and every man who attempted to perform lithotomy adopted some modification. Here are scores upon scores of these instruments, still leaving a groove for the introduction of the forceps, but shaped many of them most fantastically: some with one edge only, but pointing in various ways; some calculated to cut laterally, others to divide the neck of the bladder upwards and outwards; some to divide it to a limited extent, others apparently intended to sever the prostate, and to divide the side of the bladder to the entrance of the ureter at the least. Here is one with a blade about an inch and a half wide. I cannot conceive what this was intended for

Fig. 206.



cutting; one thing is certain, that before it could possibly have been made to reach the neck of the bladder, it must have grated pretty hard upon the ramus of the ischium, the tuberosities being only about two inches and three-quarters apart. It is more like an implement for cutting turf—"a flaughter spade"—than for performing a delicate surgical operation. It must assuredly have been the contrivance of one of the advocates for free incisions of the prostate, neck of the bladder, and all that opposed their getting into the viscus at once.

Then, again, you have plenty of double-edged gorgets, intended, no doubt, for the bilateral section, which has been, of late years, called the operation of the Baron Dupuytren. This is another proof of the correctness of the monkish saying, "*Omnis novitas nihil aliud est nisi oblitio*." The learned Baron, in his latter operations, adopted the preliminary incision of Celsus, and dovetailed into it the double section of the prostate of some of the lithotomists of the end of the last and beginning of the present century. Here you have, too, the complicated double gorgets of Bromfield, Monro, Secundus, and Jeffrey, and the no less complicated "compound, cutting, dilating gorget" of Le Cat.

Some surgeons, at last, ashamed, perhaps, of these frightful-looking instruments, took to inventing little gorgets, gorgerets—beaked knives, as they were called—of which there are some dozens specimens before you. Here is that of the late Sir Astley Cooper; that of the late Mr. Gibson, of Manchester, the best of the lot; that of my excellent master, the late Mr. Thomas Blizard; there, an American instrument, that of Mr. Stevens, of New York. Here, again, is one which Sir Benjamin Brodie was in the habit of using for this purpose, also, double-edged and blunt-pointed; and though last, not least, I show you one recently invented by Professor Syme, of Edinburgh, which has neither groove nor beak. I shall have something to say of the Professor's operations for stone by and by, for he, too, has had his two operations, differing essentially from each other in principle, so far as I understand them. On some future Deschamps must devolve the task of detailing the comparative results of these two methods. Then, again, the internal incisions have sometimes

Fig. 207.



Fig. 208.



Fig. 209.



been made by a concealed knife, "bistouri, or lithotome caché;" and I believe that when patients labouring under stone present themselves at one of our smaller metropolitan hospitals, they are cut by this instrument, which I now show you, the instrument of another priest, Frère Cosme, used by him, I believe, in the hypogastric section; Scarpa, indeed, states that he saw him so use it. It was a modification of this instrument, such as I now present to you, that Dupuytren used in his bilateral method. It would appear that this was not the great Baron's first method either. He, too, had his early operation, which consisted of incision of the triangular ligament above the urethra, and of the fore part of the neck of the

bladder, behind the symphysis; a plan based, like many others, on no very good anatomical grounds. Great difficulty must have been experienced in finishing the procedure of getting out the stone, and there must have been a tolerable certainty, besides, of extravasation of urine of the worst kind. Of the division of both sides of the band surrounding the neck of the bladder, which is sometimes necessary, I shall speak presently.

Variations have been made, also, in the form of the grooved staff, and in the position of the groove upon it. Here is the one commonly used in operations: the groove is on the convex part. I think that Sir Charles Bell used one with a groove on the side. The instrument I employ has a deep groove betwixt its convex aspect and its side; this is managed in bending the instrument, for the groove is cut when the rod is straight; I think it is better than having the groove on the convex part. There is here a well-defined and deep groove presented to the point of the knife as you push it in. Many surgeons prefer what is called a straight staff, a staff with only a slight and very short bend at the end, which is introduced so far whilst the incision is made upon it. The knife is pushed at right angles upon it, and the handle of the staff being then depressed, it is carried along with the knife into the bladder. This seems to answer very well, and some of my friends cut very rapidly into the bladder thus, but to me it appears to be much more suited to the cases of children than to adults. If you use a straight staff there is great risk of wounding the bulb, and of cutting up the urethra very considerably; the artery of the bulb, too, is in no slight danger of being wounded; and you cannot tell how much of the neck of the bladder you open—a point of great importance.

I shall now say a few words on the mode of performing the operation of lithotomy as I would have you do it, by means of instruments equally simple as those which that great master, Cheselden, employed. I shall tell you to what extent I would have you make the incisions, and my reasons for restricting you in them at some points. In the first place you must make very sure that there is a stone in the bladder; that is essential, whatever the operation you mean to practice. You may be astonished at my giving you so evident a caution, and may, in your simplicity, think that nobody in their senses would set about cutting into the bladder unless there was a stone or some foreign body in it; but it has been done over and over again. There are people who have not once, but repeatedly, opened the bladder under these circumstances. There was an operation performed some five or six years ago, within a few doors of this institution, in which two hospital surgeons were concerned. These gentlemen cut into the bladder and found—nothing; but this has been done again and again, not only in private practice, but in public hospitals. You must make very certain, indeed, then, that you are not led into error; you must feel the stone distinctly, and

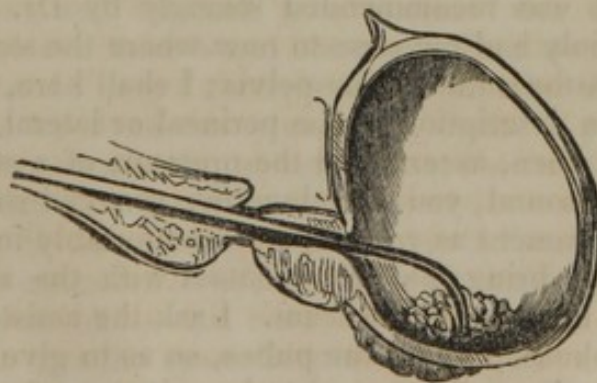
not feel it only, but hear it. You must make the sound impinge on the stone to hear the noise emitted; and it is desirable that other people should be satisfied that they hear it as well as you.

I shall read you one case only (I could give you twenty such), in which, possibly enough, the bladder might have been cut into to no purpose, by some one on the look-out for distinction, and not overburthened with common sense or caution.

Master W——, aged fourteen, complains of frequent desire to make water, and is obliged to make it instantly on the call, sometimes as often as twelve times a day. Has pain in the region of the bladder after fast exercise; there has been sometimes blood in his water, and it has occasionally stopped suddenly. The symptoms appeared after bloody urine, nine months before application to me. The symptoms were so well marked, that he was sounded carefully, but nothing was discovered in the bladder; the point of the sound grated on the fasciculi of the bladder. He was ordered a large dose of balsam of copaiba, which next day brought away sordes and quantities of ascarides from the bowels. All these symptoms left him as by magic.

Now, there is considerable art required in sounding for stone in searching the bladder. I have already spoken to you fully of the symptoms which will warrant you in taking this step, and I have told you that, more especially when the stone is small, it can be best detected by the use of the lithotrite, or screw scoop. But when the symptoms have endured long, when there is reason to think, from their intensity, that the concretion has attained a considerable size, then the operation can be performed very properly with the sound, or "key of the bladder," as it has been called by some of the old surgeons. You will generally sound the patient in the recumbent position, so that he may suffer less, and may be saved the annoyance of getting sick and faint. You place yourself on his right side, and use a staff with a short beak, much of the shape of the lithotritic instruments, perhaps not quite so sharply bent, and in preference to those of the old fashion, like the grooved staff in form.

Fig. 210.



Well, the stone will, in nineteen cases out of twenty, or in a much greater proportion, be found occupying the posterior fundus of the bladder. It can be here touched with the convex part of the curve of the instrument, or the beak may be turned thus, so as to strike the stone with its point. But when a patient has suffered long, when the bladder has become very irritable, and holds but little water, then the concretion may lodge at the upper fundus, may be there held firmly, and can only be reached by depressing the handle of the instrument, as I now do. Occasionally the stone lies in front of the entrance into the bladder, behind the symphysis pubis, as has

Fig. 211.



been said, and is reached by pulling the instrument out, so as to bring the concavity in contact with it.

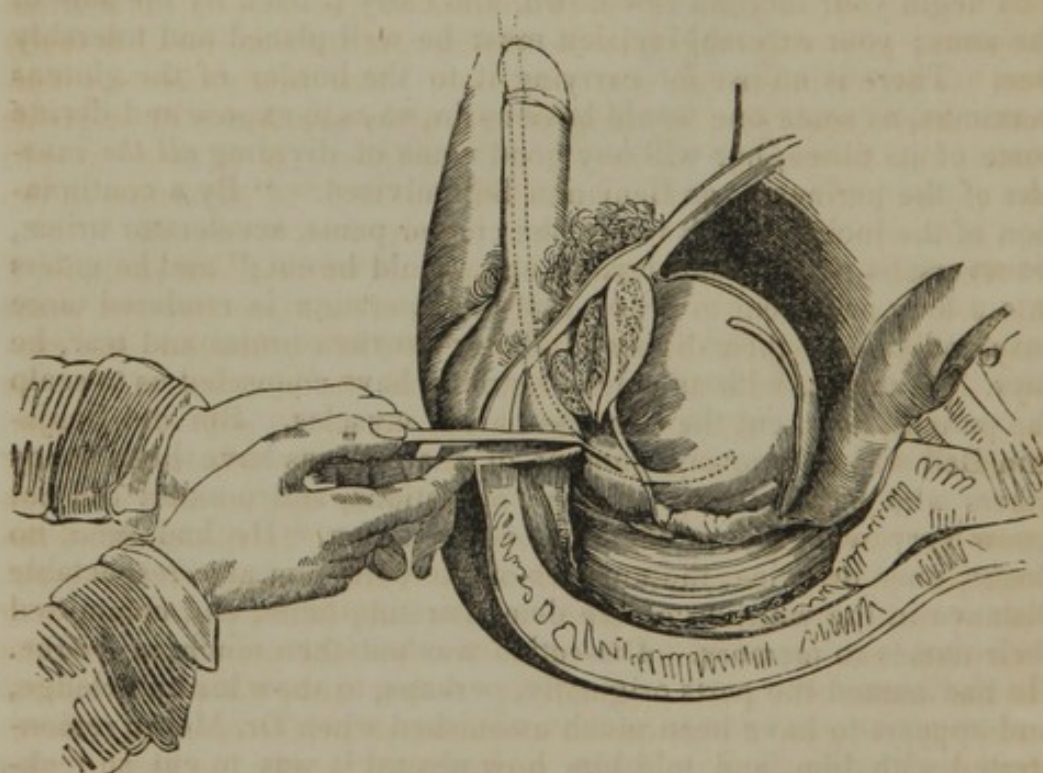
When you have determined to cut into the bladder to extract the stone, the proper plan of doing so is by the perineal section. It has been proposed to cut it out by a division of the rectum, but this mode is now abandoned. The operation was followed by disastrous consequences; many of the patients who submitted to it had a constant running out of water through the bowel. Then it has been proposed, also, to cut above the pubes, and this plan is still adopted in Paris, but only by a few surgeons. This was an operation which at one time was thought would do away with the perineal incision. It was practised in this country before the time of Cheselden, and even by this great surgeon and lithotomist at one time pretty extensively; and it was recommended strongly by Dr. Douglass and others. It is only had recourse to now where the stone is too large to pass through the outlet of the pelvis; I shall here, therefore, confine myself to a description of the perineal or lateral operation.

Having first, then, ascertained the presence of a stone by the introduction of a sound, you introduce the grooved staff or director, as large an instrument as you can get comfortably into the urethra, and you perhaps bring that into contact with the stone. This is given into the hands of an assistant. I ask the assistant to hold the staff firmly hooked up under the pubes, so as to give as much room as possible for the incision, and to keep it away from the rectum.

Your external incision is to be made in the space between the anus and the tuberosity of the ischium, in such a way that you shall avoid, on the one hand, the rectum and the bulb of the urethra, and, on the other, the pudic artery. The incision should be commenced about opposite the bulb, and carried down in this ischio-rectal fossa, as it is now the fashion to call it, towards the border of the gluteus maximus, on the left side. It is in this incision, and not in cutting the deeper parts, as novices imagine, that there is any risk of wounding the bowel. Should you be able to use the left hand firmly and well, if the operation has been performed on the left side some time previously, and any stone, or portion of the stone has been left, you may cut on the right side of the perineum, although this is not absolutely necessary. Well, then you carry the incision through the skin, the fatty matter, and the superficial fascia, at once. By this incision, probably the transverse muscle of the perineum, if present, will be cut across, as well as some superficial arterial branches. You begin your incision low down, and carry it back by the side of the anus; your external incision must be well placed and tolerably free. There is no use for carrying it to the border of the gluteus maximus, as some one would have us do, so as to expose and divide some of its fibres, nor will any good come of dividing *all the muscles* of the perineum, as Benjamin Bell advised. "By a continuation of the incision," says he, "the erector penis, accelerator urinæ, transversalis perinei, and levator ani, should be cut;" and he enters into a long argument to prove that the operation is rendered more easy and safe by their division. Better cut than bruise and tear, he says. He might, with as much propriety, have counseled us to scalp the patient, as to cut the two first-named muscles. But old Benjamin Bell was notoriously ignorant of anatomy, as have been many others who have attempted stone operations, and possibly did not know very well the subject under discussion. He had seen, no doubt, once or twice, the muscles of the perineum at a respectable distance in the whirling of the demonstrating-table, and committed their names to memory. Dissection was not then much in vogue. He had named the parts originally, perhaps, to show his knowledge, and appears to have been much astonished when Dr. Monro remonstrated with him, and told him how absurd it was to cut so recklessly. He seems to have been, however, obstinate in error. Your great object must be to get cleverly to the membranous portion of the urethra, and by all means to avoid the bulb. If you were to cut open the urethra extensively, as many, from their style of operating, must do, this may be attended with unpleasant consequences, and the patient may be annoyed by perineal fistula for some time afterwards. You must endeavour, before interfering with the canal, to get as near as possible to the neck of the bladder; you therefore pass your finger into the space betwixt the erector penis and accelerator urinæ, so that its point rests on the deep fascia. Thus you

make a sufficient opening into, and also slightly across, the muscular fibres behind it, (for very few indeed of the fibres of the levator ani require to be divided,) the membranous portion of the urethra is then laid bare, and you feel the groove of the staff distinctly through it; into this you press the nail of the forefinger. In dividing the deeper parts, the greatest possible caution must be used, and the edge of the knife must on no account be turned upwards, lest the artery of the bulb should be interfered with. You then, if operating upon a fleshy or corpulent patient, introduce a dissecting knife, the same with which the preliminary incisions have been effected, with the blade and handle a little larger than usual, over the back of the finger and nail, into the groove of the staff, the *back* of the knife being directed towards the groove. Sometimes the perineum is so deep that there is difficulty in getting the finger to

Fig. 212.



the point at which it should be entered, and if the knife were not long enough you would not reach the bladder. Children, and patients under puberty, and thin adults, can be cut, as you have seen me constantly practise, with the ordinary operating scalpel. Well, then you push the knife into the groove of the staff at this place, and not before. You should not, in fact, enter the knife into the groove of the staff till you feel the apex of the prostate. Your object now is to cut the neck of the bladder to a very limited extent, and to notch, as it were, but very slightly, the prostate. This

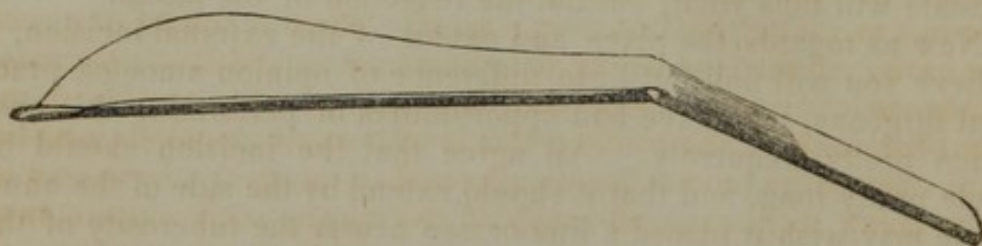
is done by carrying the knife onwards, the edge being directed downwards and outwards. Remember well that you cannot cut the prostate to any great extent without endangering the doubling of the pelvic fascia. You cut the gland in the direction here represented, downwards and outwards, for about half an inch, or a little more. The direction of the two incisions—that of the superficial, and this of the deep parts—corresponds, so that the extraction of the stone may be easily accomplished; and the external opening being lower than the other, the escape of fluids is not interfered with. The boundary, which must not be overstepped, is seen beyond the point of the incision in the gland. You then withdraw the knife carefully back over your finger, and are able, without difficulty, to pass the finger into the cavity of the bladder. By operating in this way, you plug up the opening, and prevent the urine from escaping with a gush, as happens when the gorget is used. My excellent colleague, Mr. Cooper, I recollect well, not having seen this mode of proceeding, imagined, in some of my first cases in this hospital, that I had somehow missed getting into the bladder, at the time that I actually had my finger in contact with the stone. The prostate is very dilatable after slight incision; it is a firm structure, but still it yields before the finger, and perhaps it splits a little. It is safer to split the prostate thus, than to cut it freely, because the substance of the prostate will thus yield, but not the reflection of the fascia.

Now as regards the place and extent of the external incision, I believe you will find but little difference of opinion amongst practical surgeons, who have had opportunities of performing this operation pretty frequently. All agree that the incision should be made pretty long, and that it should extend by the side of the anus. Some may wish it placed a line or two nearer the tuberosity of the ischium than others; but all are not quite so well agreed as to the direction and extent of the opening to be made in the neck of the bladder; and there are some who still advocate strenuously the making of free and unbounded incisions not only of the prostate, but of the parts beyond its base. "Cut the prostate gland through the whole extent of its left lateral lobe;" "cut fairly through the prostate," is, or was, the advice of a celebrated professor in the North. "Make your incision through the left side of the prostate," says another hospital surgeon. "Are we not justified in inferring that the advocates for a small opening are promulgating the worst advice that can be offered to the practitioner? for," argues Mr. Cooper, "a clean and large incision is by no means so dangerous as a bruised wound;" and he quotes the high authority of John Bell in support of his opinion. This is all very true as a general principle, but to all rules, as you know, there must be exceptions. Let the division of skin, cellular and muscular tissue, be as free as possible, here and elsewhere, but beware how you interfere, by free incisions, with hollow viscera, with the serous cavities, and

with the fasciæ bounding and protecting regions, occupied by loose filamentous tissue.

If worth while, authorities of great weight might be quoted in favour of small incisions in the neck of the bladder, as, for instance, Le Cat, Payola, Pelletan, Callisen, and Scarpa. The latter truly admirable anatomist and surgeon advises that the gland should, in adults, be cut to the extent only of five lines, and of two in children. He has shown, that after this limited incision, the parts can be made to yield, and without any force, without any such dilatation as practised in the Marian method, so as to allow stones of the ordinary size to be brought away easily. Scarpa reprobates the division of the base of the gland, and any interference with the neck or side of the bladder, as likely to be followed by infiltration, gangrenous abscess, and probably death. Whilst he is thus particular as to the cutting of the glandular substance, he does not seem to have been aware of the part from the division of which danger really resulted. If he had, he would assuredly not have had his gorget fashioned so as to cut upwards and outwards. But there is no occasion for referring you to authorities, to the names of great surgeons of past days, for a con-

Fig. 213.



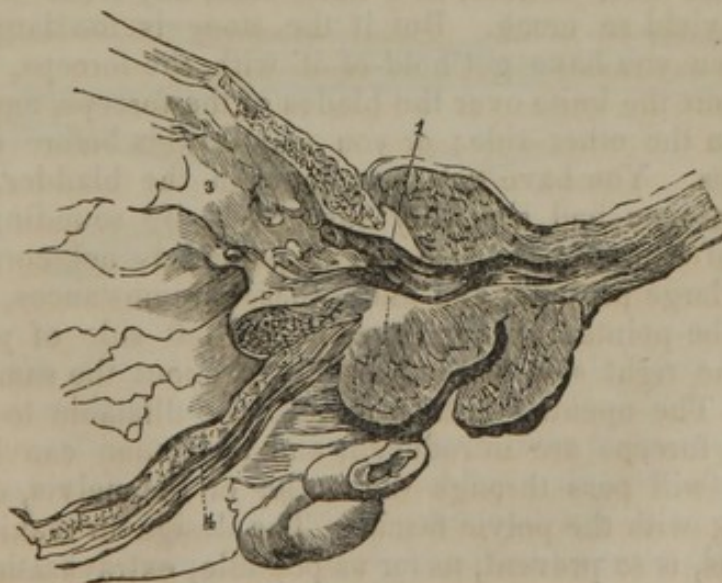
firmation of the propriety—nay, absolute necessity—of making limited incisions into the orifice of the bladder. Look to nature; dissect the fasciæ of the pelvis; examine the reflexions of the fascia from the inside of the os innominatum upon the levator of the anus, and the turning of a layer of this back over the body of the bladder. See how it comes down upon the base of the prostate before it splits, leaving the posterior and lateral part of that gland much more exposed than its upper and fore part. Look on this fascia, in all aspects, from within the pelvis, after separating the loose filamentous tissue which connects the bladder to the inner and fore part of the pelvis. See where this space is bounded and how. Look again at the side of the bladder, prostate, and rectum. See the layers which are furnished to the gland and bowel by that part of the fascia after it has split to send back this layer upon the bladder, and to form this most important boundary betwixt the external parts, and the loose and fine filamentous tissue about the side of the bladder. You will at once see the mischief

that would arise from the breaking up of this boundary, from the admission of blood and still more of urine within the pelvis and behind the peritoneum. If the base of the prostate is cut, this reflexion of the membrane must also be divided. It is the destruction of this boundary, not the cutting of the glandular structure, which causes the mischief and danger.

But we find that the orifice of the bladder is capable of dilatation to a certain extent, and after slight incision of the base of the prostate, say to no greater depth than half an inch, that by the gentle and gradual introduction of the finger, or of a blunt gorget, a space can be obtained through which a stone of moderate size can be extracted without the least violence, and without any bruising of the tissues.

But I have said that the orifice of the bladder is capable of dilatation to the extent of five or six lines in diameter. It will admit the point of the little finger readily in the dead body and in the living. I have, without force, introduced my forefinger, none of the smallest, into the cavity of the bladder. But dilatation cannot be carried further without bruising and laceration of the tissues and dreadful suffering to the patient. What, then, let us inquire, offers the resistance? The late Mr. Tyrrell demonstrated, in the bladder of the horse, what he called an *elastic ring* surrounding the neck of the bladder. This I have examined carefully. He was in error in describing the tissue as elastic. There is, under the mucous lining of the bladder, both in man and in the lower animals, abundance of elastic tissue with the real peculiar curling fibre. About the neck of the bladder this is still more abundant, and no doubt fulfils an important function in closing perfectly, by the folds of the lining membrane, the neck of the viscus—this closure only

Fig. 214.



overcome by the action of the muscular fibres of the bladder, assisted by the muscles of the chest and belly, resisted by the levator ani. The circular muscular fibre, the true sphincter of the bladder, is only, it would appear, called into powerful action under extraordinary circumstances. This elastic tissue would afford no resistance to efforts at dilatation. But there is, at the base of the gland, a firm and dense *fibrous* or *ligamentous* band surrounding the orifice of the bladder, (1 and 2; 3, orifice of ureter; 4, descending muscular fibres, with transverse ones towards the cavity,) into which the muscular fibres of the organ are inserted. This it is which cannot be overcome by means employed to dilate the part. It must be torn in the efforts continued and pushed to extremes. If this band is cut, the other tissues yield at once readily and to an inconceivable extent, without any danger of injury to the ileovesical fascia.

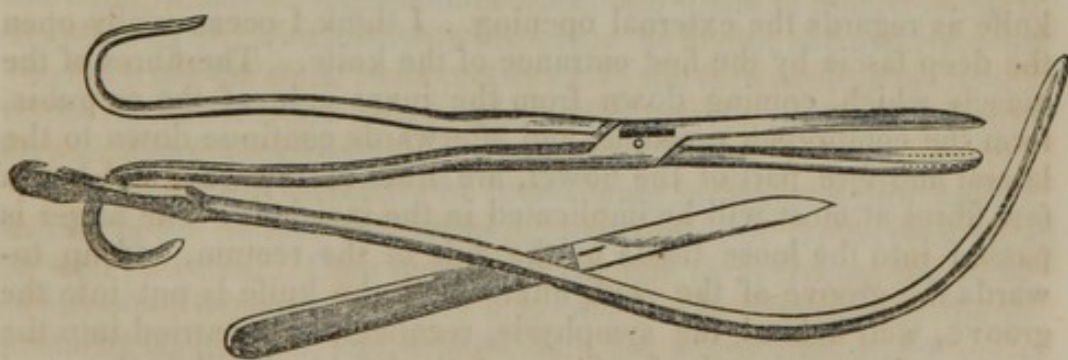
In young subjects of both sexes, this band of tense fibrous tissue is very apparent, and the orifice of the bladder, and commencement of the urethra is very unyielding. As individuals advance in years, the fibrous tissue seems to be replaced so far by a more elastic material, and we find, accordingly, that the parts are much more dilatable. For this sketch, and for much valuable assistance, I am indebted to my friend, Mr. John Marshall.

Well, then, this limited incision being made, and the prostate and neck of the bladder dilated gently and gradually, you pass in your finger with facility, and where the perineum is not over deep, you are able at once to feel the stone, whatever may be its size. If it is lying across, you can turn it about, and put it in a more favourable position. Through the opening made with a common knife in running it along the groove, without any attempt to cut in withdrawing it, dilated gradually and gently by the finger, you are able to introduce a common pair of forceps, and take out a stone of considerable size, without, as I have said, any force whatever, as the parts yield so much. But if the stone is too large to come away, when you have got hold of it with the forceps, you pull it down, insert the knife over the blades of the forceps, and notch the prostate on the other side; or you may do this before introducing the forceps. You have got your finger in the bladder, and made sure—what you had shrewdly suspected—by sounding, that the stone is of considerable size. The patient is not corpulent, and has not a large prostate, and under these circumstances, you pass a sharp probe-pointed bistoury over to the left side of your finger, and cut the right side of the prostate to about the same extent as the left. The opening is then found to be dilatable to a great degree, the forceps are introduced, and any stone can be brought away that will pass through the outlet of the pelvis, and without interfering with the pelvic fascia. The design in making this incision thus, is to prevent, as far as possible, extravasation of urine.

It may become extravasated in the external cellular tissue without doing any great harm in the end, but if the division between the external and the internal parts is broken up, and the urine escapes into the loose tissue in the pelvis, the patient is almost inevitably lost. You guard against this by the mode in which you make your incision, and you ensure it still further by introducing a proper tube. This is by no means a modern practice. You find the use of a metallic tube recommended by Paré, by Francois Callot, Dionis, Le Dran, Scultetus, and others. It was used to allow blood, urine, and matter to escape. It was also found useful in cases of hemorrhage, the wound being stuffed, whilst the discharge of the urine was not impeded. I have uniformly, from the first time I cut for stone, employed a gum elastic tube long enough to enter the bladder fully, and to its use I attribute a good deal of my success. It is retained in no case more than forty-eight hours, and in children may be withdrawn in twenty. It causes by its presence not the slightest annoyance or danger, and assuredly obviates many accidents, such as retention from lodgment, or extravasation of blood from inflammatory swelling of the wound, from premature adhesion of it, and above all, it gives the urine no apology for passing into the cellular tissue.

I will now demonstrate the operation on the male subject before us, into whose bladder a stone has been introduced. My house-surgeon, Mr. Heath, has passed a staff into the bladder, and I shall cut down and try to get the stone out. The apparatus, as you see, is very simple; there are the staff, the lithotomy-knife, and the forceps. You must have forceps of different lengths, suited to

Fig. 215.



the size of the stone to be removed. If you endeavour to take out a large stone with a pair of small forceps, you will find yourself in a sad scrape. I have seen attempts, more than once, made to seize a large stone with small forceps; they have slipped off, over and over again; and after both patient and operator have been worn out, the stone has been, in the end, removed by some other person,

who has employed an instrument sufficiently long, and of sufficient grasp. I have seen patients treated in this way become so exhausted as almost to die on the table, and some of them have died within a few hours afterwards. Patients do die, depend upon it, from the effects of protracted and blundering operations. Mr. Allan, who wrote on surgery, after relating some unfortunate cases, has said—"Hence, you see, patients do not die from tedious and improperly performed operations, but always from inflammation"—a sort of salve to his own conscience, I suppose; but inflammation does not kill in twenty-four, or twelve, or six hours. You must also be provided with a scoop, in case the stone should break, or in case there should be a number of small stones, and you must have a tube of proper length, to put into the wound afterwards. A young subject can, as I have said, be very well cut with a small scalpel, and may be held, without any tapes, in a good position on the lap of an assistant. An adult must be, of necessity, properly secured, so that there may be no change of position, and the patient ought to be well cautioned beforehand to offer no resistance, so that there shall be no interruption on his part to the proceeding. In making the first incision, if the skin of the perineum is not sufficiently stretched by the position of the patient's limbs, you apply the fingers of the left hand for the purpose. You enter the point of the knife deeply, and cut down, dividing, in the first place, the skin, the fatty matter, and the superficial fascia of the perineum.

You will have, probably, divided the transverse muscles of the perineum in the first incision, and the union of the superficial with the deep perineal fascia; if not, this must be done of course, so as to remove all stricture from the lower corner of the wound. You immediately divide the deep fascia, the fibres of the levator ani, as I have already directed, and then you have no more use for the knife as regards the external opening. I think I occasionally open the deep fascia by the first entrance of the knife. The fibres of the muscle which, coming down from the inner side of the os pubis, form the compressor prostatae, and afterwards continue down to the lateral and fore part of the bowel, are little in the way, and but a few fibres at most will be implicated in the incision. The finger is passed into the loose tissue by the side of the rectum, and up towards the groove of the staff, after which the knife is put into the groove, well behind the symphysis, recollect, and carried into the viscus. On passing the forefinger of the left hand still further, and along the blade of the knife, the stone is felt distinctly; the knife and then the staff are withdrawn, and the forceps introduced, guided by the finger. Instead of having forceps made with teeth upon them, as is generally the case, I have had a bit of linen sewn into the mouth of the blades; and I advise you to follow this plan. I have used them satisfactorily so, for the last twenty years, and see no reason to change. If you get hold of the stone, the linen being

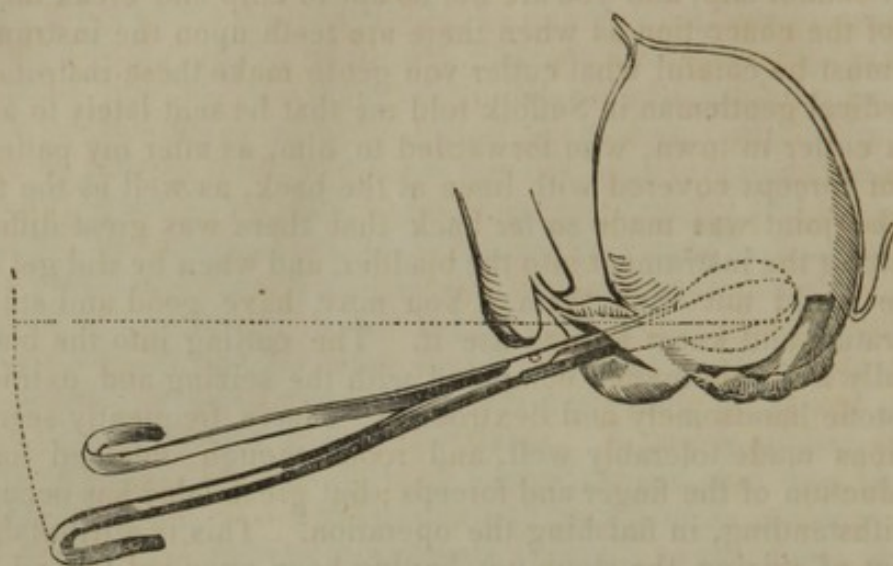
wet it cannot slip, and you are not so apt to chip and break the surface of the concretion as when there are teeth upon the instrument. You must be careful what cutler you get to make these instruments. A medical gentleman in Suffolk told me that he sent lately to a very crack cutler in town, who forwarded to him, as after my pattern, a pair of forceps covered with linen at the back, as well as the front, and the joint was made so far back that there was great difficulty in getting the instrument into the bladder, and when he did get them in, he could not open them. You must have good and suitable apparatus, and know how to use it. The cutting into the bladder is really a simple matter compared with the seizing and extracting the stone handsomely and dextrously. I have frequently seen the incisions made tolerably well, and room enough obtained for the introduction of the finger and forceps; but great delay has occurred, notwithstanding, in finishing the operation. This is attributable to the act of seizing the stone not having been attended to and carefully studied. I recollect well a queer, crooked, dwarf of a creature, and irritable withal, who, by some chance—by his right, in fact, as a member of a college of surgeons—was allowed to act as surgeon to a large hospital for a few months. He was unlucky enough to have a patient with stone apply for relief. He got into the bladder by some chance, but being unable to discover the calculus, he flew into a dreadful passion, and swore that now he had performed lithotomy most satisfactorily, but “that he could not catch the accursed stone,” little recollecting that the safe extraction of the foreign body constituted the essential part of the operation.

Having cut into the bladder, difficulty is often, as you will find out, experienced in seizing the stone. The forceps must be slipped in closed, so as to feel the calculus, and then by a cunning motion of the hand, a sort of legerdemain trick, one blade is placed under it, the other over. You forthwith introduce the finger, and ascertain that you have got the stone in its proper axis; you then depress the handle of the instrument, and by a gentle motion moving the handle slightly forwards and backwards, you extract the foreign body.

The stone will generally be found lying in the posterior fundus, and in order to feel and grasp it, the handles of the forceps must be well elevated. Care must be taken not to overshoot the stone, as has often happened. After it is caught, the direction of the instrument is changed, and brought into the widest part of the outlet of the pelvis.

If you cut in a proper manner, it is very seldom, indeed, that you will be troubled by any bleeding. In order to avoid interfering with the artery of the bulb, you must, as I have already inculcated upon you, never direct the knife upwards after the first incision, and not even in that. All the incisions are to be made downwards and outwards, or rather, backwards, and laterally towards the sacro-sciatic ligaments. The artery lies immediately above and in con-

Fig. 216.



tact with, the finger, as it is placed in the wound. If there are any superficial vessels that bleed, you may tie them with great ease, if it should seem necessary. Sometimes, more especially in old subjects, the veins about the neck of the bladder and prostate bleed freely after the stone has been extracted.

Cheselden seems to have met with many cases in which troublesome hemorrhage followed the incision, and he gives most stringent directions as to the tying of the vessels with a crooked needle and ligature. He blames F. Jacques much for neglecting his patients, and not looking to the stopping of the blood. Cheselden may, very possibly, have cut the artery of the bulb occasionally; and we find, indeed, that he had cut the side of the bladder, and, at an after period, its neck, by directing his knife from behind forwards and *upwards*, as Frère Jacques had done before him. I have seen two or three annoying bleedings in cases operated on by others; one or two fatal; but I have had but one troublesome case of hemorrhage in my own practice, and that in an old patient, where the vessels were rigid from earthy deposit, and did not contract. I never find vessels divided in my incisions requiring ligature; and, in fact, I do not recollect an instance in which any have been applied. In confirmation of this statement, I may read to you a quotation from Mr. Barlow's book. He practised at Blackburn, in Yorkshire, I think, and enjoyed a good reputation and practice in his own district of the country. "I have never seen," says he, "a patient exposed to danger from hemorrhage, nor have I had occasion to tie a vessel with a ligature, either during or after the operation, in the last thirty cases in which I have operated."

[With all deference to Mr. Liston, it must be confessed that hemorrhage is sometimes very alarming, and that patients have died from this cause alone. Last spring I cut a lad and removed the

stone without the least difficulty. About twenty minutes after the operation and the patient had been placed in bed, an enormous gush of blood took place, and it was with the greatest difficulty I succeeded in arresting the flow. On opening the wound and looking far back, I could distinguish an oozing from a thousand little orifices, but there was no vessel of ordinary size wounded. The patient had probably a hemorrhagic diathesis, and the bleeding originated in this cause. It was arrested by thrusting the silver canula of Dupuytren, a most invaluable instrument in such cases, into the bladder and then filling up the wound around it with pledgets of lint saturated with creasote. T. D. M.]

In order to ensure the water coming away freely, you put in this elastic tube, but it must be taken away before the healing process commences. Your object is not union by the first intention, but to allow the water to come through the wound for a good many days, till it gradually contract. If oozing of blood from the veins about the prostate should occur, you push lint along the tube to compress them; they soon become closed, and the cellular tissue in the track of the wound becomes consolidated. In young subjects this may occupy twelve hours; in adults, twenty-four or thirty-six; and then, generally, everything goes on favourably. The tube is then withdrawn, without dread of infiltration or of bleeding. Bleeding sometimes occurs at a late period—the tenth or fifteenth day—from abscess and ulceration, and often, I have had reason to suspect, from venereal excitement.

[The operation for stone as described by Liston is unquestionably the most simple, and I believe myself the best method. In this country, however, we find much difference of opinion on this point. For example, in Philadelphia, the neck of the bladder, from time immemorial, has been divided with a gorget, and that usually employed was invented by Dr. Physick. Dr. Dudley of Lexington also employs the gorget, and it is probable that his pupils follow the example of their distinguished preceptor. Dr. Mott, Dr. Cheesman, Dr. W. Parker, and I believe Dr. Kearney Rogers of New York, use the knife and staff alone. Dr. Stevens of the same city, uses a double-edged gorget which divides both sides of the prostate. I am unable to say what is the practice with the other eminent surgeons in New York. Drs. Warren and Hayward of Boston use the knife, I believe, and of course those educated in their school will do the same. Dr. N. R. Smith of Baltimore employs a guarded gorget and staff of his own invention, while the other operators in that city make use of the knife or simple gorget. At the south I am told, the gorget is generally preferred, although the knife is occasionally employed.

The *Bilateral* operation is occasionally performed. Prof. Warren of Boston has recently given it his commendation, while Dr. Stevens of New York, Dr. Ashmead of this city, and some others in different

sections of this country also prefer it. My excellent as well as distinguished friend Prof. Mussey of Cincinnati has likewise adopted it in some cases, and as his method of operating is peculiar, I beg leave to introduce an extract from his paper on the subject recently published in the Boston Medical and Surgical Journal.

"Within the last fifteen months I have operated by this method upon five patients, all of whom recovered speedily. The last, a gentleman of 38 years of age, was able to leave, by boat, for his home, 150 miles distant, on the 19th day after the operation.

"With a scalpel rather narrow, I make the superficial incision crescentic, with its convexity anterior, and cut upon the staff at the usual place, the membranous part of the urethra. I then pass a straight, probe-pointed, narrow bistoury, its edge turned towards the left side, along the groove of the staff into the bladder, and slide the point of the left forefinger upon the back of the bistoury, pressing it upon the prostate to cause a division of that body sufficient to admit the extremity of the finger into the bladder; the staff is then withdrawn by an assistant, and the prostate further divided, if necessary. The finger is then rotated, so as to bring the palmar surface of its point to rest upon the right side of the prostatic portion of the urethra; next the bistoury is turned, and the right side of the prostate divided, *ad libitum*, under the guidance of the finger. The stone is then extracted; if small, with the scoop—if large, with the forceps.

"This mode of making the section of the prostate is to be preferred to that which is done by Dupuytren's double-bladed, concealed bistoury, as the blades of that instrument are so slender as to yield considerably, making a section of the parts less in extent than the distance between the edges of the blades when projected from their grooves, and still narrower if a little dull than when sharp. If, previously to the operation, a satisfactory estimate of the size of the stone has been gained, the deep section of the parts with the straight, probe-pointed bistoury, guided by the finger, may be made in conformity with that estimate. When a large stone, in being extracted, hangs in the prostatic or muscular opening, the latter of which is probably the most common, a narrow, straight, sharp-pointed bistoury may be carried along each blade of the forceps in succession, and the tension relieved. I am in the habit of leaving a piece of elastic gum catheter in the wound for two days, to give a sure outlet to the urine.

"The bilateral operation for stone has an advantage over the lateral in giving greater security against injury to the rectum and the pudic arteries; and in exposing not at all the vesiculæ seminales and the plexus of veins at the neck of the bladder, as the lateral does, when the deep-seated section of the parts is made to correspond in direction with the superficial incision. On the whole, I

regard this operation as far more safe than any other operation in lithotomy which has yet been invented." T. D. M.]

IV. LITHECTASY OR THE EXTRACTION OF STONE FROM THE BLADDER BY SLOW AND PAINLESS DILATATION.

[A novel method for the removal of stone in the bladder has of late been proposed by Mr. James Arnott of England, to which he has given the term "*Litnectasy*;" as yet we have scarcely experience sufficient to warrant an opinion as to its merits, and I therefore merely introduce the remarks of Mr. Arnott himself, and leave others to judge of the merit his suggestions deserve. T. D. M.]

"The idea is very generally entertained that the operation for stone is not so fatal as heretofore, owing to the improvements of it in recent times, and particularly by continental surgeons. But the most recent statistical report of lithotomy and lithotrity, quoted in one of the last numbers of "*THE LANCET*," from a French medical journal, and referring to the principal hospital of Europe, the Hôtel Dieu, of Paris, shows that of thirty cases in which these operations have been performed there during the last six years, twelve have died, or two in five; and of these a considerable number were children, in whom the operation is comparatively safe. Allowing that this is above the average rate of mortality, and estimating it at only half the amount, it is still frightfully great, and affords abundant reason for further investigation with the view of discovering a less fatal plan of treatment than any of those in use.*

* Dr. Willis, who is our best authority on the statistics of the operations for stone, states that the mortality, after forty years of age, is "certainly not less than one in four." Amongst the numerous summaries given in his work "*On the Treatment of Stone*" of the results of operations at public institutions and in private, the following statement, by M. Velpeau, merits particular notice, as well on account of the importance of the facts related as from the character of the distinguished reporter:—"In a grand total of 1003 patients who have come under the hands of lithotritists, 616 only have been delivered of their calculi, and 387 have died, or have not been relieved." We learn from another statement by the same writer, that of 206 patients upon whom M. Civiale had performed lithotrity, 80 died (or nearly 2 in 5 die the same mortality as that reported above, as having occurred at the Hotel Dieu), and eighteen retained the stone, who would probably eventually be lost. An erroneous impression is too apt to be made on the public mind respecting the mortality from lithotomy, by the often vaunted success of some fortunate operators; and he performs an essential service to humanity who, by accurate inquiries into the records of hospitals, removes this baneful delusion. The records of private operations, or those published by individuals of their own success, are far from being of equal weight with those of public institutions. That of Mr. Martineau, for instance, one of the most celebrated English lithotomists of late times, is declared by him to have included every case brought for operation, and it is affirmed "that no selection of patients was made;" whereas we are informed by a witness, during many years, of this surgeon's practice, and who is himself an eminent operator, that "he carefully selected his patients." Highly dangerous as these operations are proved

The latter operation of lithotomy has now been practised for about one hundred and fifty years. The Marian operation, or lithotomy by the apparatus major, which preceded it, and of which dilatation of the more important parts, instead of cutting, was the professed principle, had been in use during a similar or greater period.

The Marian operation fell into disrepute because the laceration produced by the instruments intended for dilatation was supposed to be much more dangerous and painful than the division of the same parts by the knife.

In the estimation of the dangers of the old operation and the advantages of the new, there was doubtless much exaggeration. Le Dran mentions that of sixteen operations by the apparatus major, which he performed before numerous witnesses at the Hôpital de la Charité, in Paris, in the years 1728 and 1729, every one was perfectly successful, notwithstanding that in many of the cases the stones were unusually large, weighing from six to eight ounces. The average mortality from cutting has been already mentioned.

The original lateral operation, in which there was extensive incision of the inner parts, has fallen into disuse, principally from the circumstance that such incision permits the ready infiltration of urine into the cellular membrane surrounding the neck of the bladder, which becomes the source of violent and often fatal inflammation.

The present most approved operation of lithotomy, although still called the lateral operation, approaches more nearly, in all essential particulars, the old proceeding by the apparatus major. The main distinction between the two methods does not consist in the number or form of instruments employed, but in the purpose they are calculated to accomplish. The great object is to make a sufficient opening into the bladder, and this may be done either by cutting or by quick dilatation. Whether the sudden distention and laceration are made by a steel dilator, by a blunt gorget or wedge, by the finger, or by the forceps singly or while grasping the stone, is really a very immaterial circumstance. There is, indeed, a small incision made in the present operation, previously to the stretching, which determines the direction of the laceration, just as a notch is made in a piece of cloth previously to tearing it; but so was there also, latterly, in the Marian operation, under the name of "*coup de maitre*." By some operators this incision was not carried farther than the prostate gland (Bromfield cut the fore

to be by such statistical details, there cannot be a doubt that if their remote results were ascertained as well as those that are immediate, it would be found that many apparent recoveries were only alleviations of misery, and that death has followed the operation at a later period. Such an investigation would, I apprehend, afford too much foundation for the opinion which M. Richerand has expressed, that "we cannot promise life with final recovery, to above one half of all who are subjected to lithotomy." (*Hist. des Progres Recens de Chirurgie*, 1825.)

part of it, while others extended it along the whole of the prostatic urethra.) The operation of lithotomy must, at any rate, be acknowledged to have retrograded to its state of transition between the old and new methods, and this has, perhaps, been wisely done; for it may be better that it should partake slightly of the evils of both than exclusively possess that of either in a great degree.

From what has the mortality in consequence of lithotomy and lithotrity principally proceeded? From inflammation, caused either by violence in opening a passage for the stone; or by the infiltration of urine; or by rudely acting with instruments on the sensitive and irritable coats of the bladder.

The sudden stretching and laceration produced by the apparatus major, when it was the ambition of the surgeon, as we are told by Le Dran, thus to remove stone within the minute, and that produced in the present day by operators who only slightly cut the prostate, and are yet anxious to put a period to the patient's torture by finishing the operation in the shortest possible time, are instances of violence. Large incision and the repeated operations of the lithotritist are not less calculated to excite inflammation in the other ways mentioned.

Can stone be removed without violence, infiltration of urine, injury to the coats of the bladder, hemorrhage, exhaustion from long-continued and severe pain, or other causes of death from the operations now and heretofore practised?

It can be so removed. And this may be effected by really doing that which the operators by the apparatus major only professed to accomplish, namely, by dilating the neck of the bladder and contiguous part of the urethra. But this must be done in a very different manner from that which they adopted. Instead of the dilatation being quick and consequently painful, it must be slow and unattended with pain; and to accomplish this a very different means must be employed from any which they employed. Such dilatation cannot be made unless the pressure by which it is effected be perfectly equal, or applied to every part of the surface; unless it be of a continued nature, as from elasticity, and unless it be in the power of the surgeon or the patient himself to increase or diminish it immediately, and without irritation, according as the feelings of the patient or other circumstances may require. This combination of desirable ends cannot be attained otherwise than by a dilator constructed on the principle of fluid pressure.

The operators by the Marian method were not unacquainted with the fluid dilator. They at least were aware of the report by Prosper Alpinus, that some means of the kind had been used in Egypt; but, not understanding the principle of fluid pressure, they appear to have regarded the report as fabulous. Colot, the last cele-

brated operator by the apparatus major, in alluding to this reported Egyptian practice, says "there is no inflation, however painful it may be, capable of dilating the neck of the bladder sufficiently, for the extraction of stone." The fact that a similar objection was at first made, even by surgeons of some note, to fluid pressure, as a means of dilating strictures in the urethra and other canals, and this, too, long after the invention of Bramah's hydraulic press, will prevent any surprise at the incredulity of the Marian operators.

It was in the year 1819, while engaged with the subject of applying fluid pressure to the removal of strictures in the different canals of the body, and after ascertaining its vast superiority for this purpose to bougies and other ordinary measures, that the idea occurred to me of gradually opening the male urethra by the same expedient for the extraction of stone. I had, a short while before, witnessed the tortures of a friend who was labouring under stone, for which he had been unsuccessfully cut by an eminent provincial surgeon, and I had sent him a copy of my recently published work on the various applications of fluid dilatation. He came to London, and soon afterwards, as has been related elsewhere, one of the suggestions in my work was acted upon under the liberal sanction of Sir Astley Cooper, who had the principal charge of the case; and a stone of considerable magnitude was extracted by dilatation, without his having endured pain, and without being followed by a longer confinement to the house than nine days.

In some remarks appended to the published account of this case, the principle of the operation was stated to be to dilate slowly, and without causing pain or irritation, to such extent as can be safely done; and then, if necessary for easy extraction, to break the stone or otherwise reduce its size.

I have traced, in another publication, the effects which the announcement of this extraordinary operation had in France (in this country it was not appreciated by those who had the opportunity of practically continuing the investigation), and only advert to the subject here for the purpose of remarking that, although M. Civiale in his *first* publication upon the removal of stone without cutting, recommended, as the first stage of the proceeding, the distension of the urethra by a *fluid dilator*, he soon dropped this first stage, and with the other French surgeons who simultaneously applied themselves to the subject, confined his attention to the second stage, or the mechanical diminution of the stone.

Whether this abandonment of dilatation arose from a misunderstanding of the nature of the instrument for fluid pressure, or from other reasons of a less reputable character, it is needless to inquire; but it is certain that by the rejection of the first stage the improvement was much deteriorated, and rendered only applicable to a minority of the cases of stone which occur.

Having expressed the opinion that the discovery of an adequate

means for fulfilling the indication of slow dilatation was the great desideratum, and that this can only be done by an instrument constructed on the principle of fluid pressure, I proceed to notice the successive improvements this instrument has undergone, with a view of fixing the reader's attention on particulars in its construction which I conceive are essential to its perfect use.

Fluid distension was, as the Arabians employed it, in its first and rudest condition. We are told by Alpinus that an extensible cartilaginous tube having been passed along the urethra into the bladder was inflated by the surgeon's breath, so as to open a passage for the removal of the calculus by suction. A tube, consisting of a piece of gut (and such probably was its nature) would soon yield where there was least resistance, and could not exert sufficient power.

The first and most obvious improvement consisted in giving the distensible tube another coat of firm and unyielding texture. A silk tube enclosed the piece of gut, prepared by stripping off its mucous and muscular coats, and this tube may be made either by sewing together the edges of a bit of rubber, or (as I have lately ascertained) by weaving it of the required dimensions. A silk tube of this description may be rendered sufficiently impervious as well as smooth by varnish, instead of a lining and covering of gut, and if covered with a little adhesive matter and rolled upon itself (as a sheet of paper is rolled), it has the size and resistance of the smallest bougie, and may be passed through the narrowest strictures. This modification is the last improvement the fluid dilator has undergone, as respects its strength and bulk, but in the extraction of stone it is not necessary that it should be smaller in its empty and compressed state than a large-sized catheter or bougie. Both ends of the distensible tube must for this use of it, be tied upon a narrow silver tube or catheter, in order that there may be no impediment to the evacuation of the urine, the distending liquid being injected by a syringe through a separate tube soldered to the catheter.

Notwithstanding the care taken in the construction of the instrument, and particularly that the gut should be well supported by its silk tunic, much annoyance and discouragement were often experienced by the escape of the injected fluid, under considerable pressure, from the distensible tube or the different joinings; and when used for the extraction of stone, much irregularity of an injurious tendency was likely to result from this. After many years the idea occurred to me of substituting thick mucilage for air or water, and I found that this viscid substance will hardly escape through openings which would render the instrument useless were the other liquids employed.

The last improvement was a means of easily regulating the pressure. Injecting more fluid at intervals, and retaining it or allowing it to escape by closing or opening a stop-cock, is an imperfect mode of accomplishing this. By using a syringe, which has a piston-rod

made in the form of a screw, the pressure can be regulated with the greatest ease by the surgeon, or in some cases by the patient himself. In cases of stricture of the rectum such a syringe may be conveniently attached to the fluid dilator by a long flexible impervious silk or caoutchouc tube, which prevents any motion of the syringe being communicated to the dilator, indicates by its hardness the degree of distension, and allows the syringe to be kept in a vertical position, in order that the air in it (which is necessary to keep up the elastic pressure), may be prevented escaping from the joinings or tubes. In dilating for stone the syringe should be of large size, or a vessel, serving as a reservoir of air and mucilage, may be attached by the medium of the flexible tube to the dilator.

The fluid pressure dilator, in its present perfect state, is an instrument which, with respect to the number and importance of its applications to surgery, is only second in value to the knife. Wheresoever the indication is to remove constriction from any of the larger canals of the body which can be reached by an instrument; or completely to fill their cavity, as for the suppression of hemorrhage; or to increase their natural diameter, as for the passage of large bodies through them,—there the fluid dilator comes into use, and far excels, both as to certainty and quickness of operation, the various means hitherto employed to answer the same purposes. Appropriate forms of the instrument are, of course, required for its different uses, and no little pains have been taken in devising these; but our present inquiry being confined to the employment of fluid pressure for the extraction of stone, I shall restrict myself to this, and for the sake of brevity place the remarks I have to make on the subject before the reader without much regard to order or method.*

The opening in the perineum in lithectasy does not require to be larger than is necessary for passing the empty and condensed dilator into the membranous part of the urethra. The outward parts will yield to fluid pressure at least as easily as the neck of the bladder; and any advantage that might be gained in removing the depth of the perineum by a large incision is more than counterba-

* For the construction of perfect fluid dilators, where the bulk of the instrument and nicety of workmanship are of essential importance, the assistance of the instrument-maker will be required; but any surgeon possessing a common enema-syringe and a tourniquet, may make for himself a useful fluid dilator for purposes not requiring a very neatly-made apparatus, such, for instance, as the treatment of stricture of the rectum. The band of the tourniquet must be firmly tied to the syringe, so as to keep the screw over the piston-rod. The membranous coat of the gut or œsophagus of a small animal, as the hog, sheep, or calf, will serve both as an impervious lining and smooth covering to the silk; and the tying on of this (one end on the flexible tube and the other on a piece of wire entering the tube, between two knobs formed on it by sealing wax) is the work of five minutes, and not more difficult or troublesome than many adjustments of instruments which must often be made by the surgeon himself. Ample instructions for making the nicer forms of apparatus are given in my work on Strictures of the Urethra, &c.

lanced by the suffering it would occasion, the risk of hemorrhage, and the period that would elapse before the recovery is complete. If difficulty should be experienced in extracting the stone through the outer parts, it would be time enough to remove this opposition by the knife when it occurs. Nor does the case of making an opening into the urethra require a large incision; but if any difficulty were apprehended here, it could be obviated by the use of the double staff recommended by Sir James Earle, and extensively employed in France by M. Guérin. The introduction of the dilator might be facilitated by passing the canula forming its axis over a long ball-pointed wire previously introduced along the groove of the staff into the bladder. If the ball at the extremity of this wire were made of sealing-wax, it could be then broken off, and the wire extracted.

In these remarks upon the mode of opening the urethra, an opinion is expressed, with reluctance, different from that of the distinguished professor of surgery at King's College, as it may be inferred from his late operation. But Mr. Ferguson's great success as a lithotomist, while it gives weight to his observations on every question connected with the extraction of stone, may, perhaps, bias him in favour of certain practices which, however excellent they may be as respects lithotomy, are not so applicable to the new operation.

An important question respecting the dilatation is the time it should occupy. That it should not be so rapid as to produce pain or severe irritation is an indispensable condition of the process; and much must depend upon the age of the patient, the hardness of the parts to be dilated, their irritability, &c. There would, I conceive, be less risk from prolonging this to too great an extent than from the contrary extreme. In the instances where the urinary organs have been relieved of stone by a natural process, the dilatation has been very slow. In the original operation, more than four-and-twenty hours elapsed between the introduction of the dilator and the extraction of the stone through an opening of very moderate size, although, during this time, there was a considerable interval in the dilatation. Whether there should not always be some temporary cessations of distension, and whether the operation may not, with advantage, still more nearly resemble those spontaneous efforts of nature in which the parts are gradually adapted to the increasing distension, are questions which can only be determined by further experience. As bearing upon this, a remarkable case, related by Le Dran, may be adverted to. He kept open a large wound in the perineum, after lithotomy, for seven weeks, without injury to the patient, at the end of which he extracted a stone that had been confined in the ureter, and could not sooner be removed.

Another part to be ascertained is the degree to which the neck of the bladder can be safely and slowly distended without injury of its power of retention. In the successful and very interesting case of

lithectasy, related in the "Edinburgh Medical Journal" for January last, by Mr. Elliott, of Carlisle, it is stated, that on withdrawing the dilator (although a very badly constructed one had been sent to the operator), "two fingers could be introduced into the bladder with the greatest ease along with the scoop," and that a stone of the size of a hen's egg, might have been easily extracted. The extraordinary extent to which dilatation of the female urethra has been carried both by the slow efforts of nature and the quicker measures of art, imperfect as these have hitherto been, without injury, would remove any apprehension of such loss of power under ordinary circumstances. The enclosure of the commencement of the male urethra by the prostate gland would probably tend to restore it to its natural condition in this respect. But with so great a variety of excellent stone breakers as have been introduced and revived by the lithotritists, and with so wide and short a channel through which to apply them, there would be no necessity, in the case of a large stone, for dilating to a very great extent. The lithotrite employed by M. Amussat, consisting of blades enclosing the stone, drawn within a tube by the force of a screw, and thus breaking the stone against the end of the tube, would be a convenient means, because when the fracture of the stone was unnecessary, the instrument would answer as a forceps, and is, indeed, only a modification of that called Hunter's forceps. With such an instrument there would be no temptation to use force in the extraction, than which nothing can be more opposed to the principles of this operation. If a stone be discovered to be larger than what the opening which has been made will allow easily to pass, it must either be broken, or the dilatation with or without an interval, must be resumed. It would be much safer to cut the distended prostate, on the finger introduced as a director, and so to enlarge the opening, than to use force. If a mere notch be thus made, the opposing substance will give way by tearing; but from this there will be less danger than from bruising.

In a case operated upon in the new way by Dr. Wright, it was found advisable to go through both stages of the operation; after dilating to a certain extent he broke the stone, and extracted it piecemeal. And although the case is represented as having been one very unfavourable for any operation, it nevertheless proved perfectly successful.

If the distension be steadily maintained, there will be little danger of the instrument slipping out of the bladder, but this can always be guarded against by a proper bandage. The distension will be of a continued description, if air constitutes part of the injected fluid; or in some cases it might answer to make distension by the weight of a column of liquid. A current of cold or hot water might be applied in this manner as explained in my recent paper in *The Lancet* upon strangulated hernia. In applying the dilator, for the suppression of hemorrhage in any cavity or canal, the dis-

tending of it thus with very cold water would materially assist its remedial power.

Instead of two or three distensible membranous tubes of different sizes, tied upon different catheters, or upon the same in succession as they were wanted, they may be all tied at first on the same, each having its own injection tube. It is highly important to avoid unnecessary irritation from the passing and repassing of instruments. Yet when the neck of the bladder is sufficiently opened to admit the forefinger, it will generally be proper to introduce this in order to ascertain the size of the stone and other important circumstances.

The dilatation may be facilitated in many cases by the adoption of similar means to those employed by the accoucheur for diminishing rigidity and irritability in parts under this process. In the original case the operation of lithotomy had been performed some nine months previously, which had the effect, probably, (and this I find by a marginal note in the account of the case was the opinion also of Sir Astley Cooper,) of rendering the prostate gland harder and more unyielding. Great irritability of the parts, resisting the remedial influence of wearing a catheter and other usual methods, would be an objection to the adoption of this operation.

In some cases it might be advisable for other purposes as well as the removal of irritability, not only to accustom the parts to the presence of instruments, but to dilate the posterior part of the urethra by an instrument passed along the whole canal, having, like the stricture-dilator, a distensible tube of a few inches in length.

The irritability of the parts, however, which might oppose the continuance of instruments occupying the whole canal, would, of course, be much less were only the last two inches of it so occupied; consequently the introduction of instruments in the ordinary way would hardly be a sufficient criterion.

If the dilator be kept constantly distended to the degree which the patient can bear, and care be taken that the urine has an unimpeded passage through the hollow axis of the instrument, no increase of irritation can arise from the action of the urine on the wound; and, as has been remarked by Dr. Willis, before the dilator is again withdrawn, the cut surface will have acquired a coating of coagulable lymph to protect it from infiltration.

As the urinary bladder has been cut in different parts for the extraction of stone, so may it be dilated in different parts. The principal objection to the operation of lithotomy above the pubes has been the risk of fatal inflammation from the infiltration of urine; but with the fluid dilator, acting as has just been explained, and the use of the syphon catheter (originally recommended in my tract upon stone, and since adopted in France) this objection would be removed. Where there is much disease of the prostate gland its dilatation would be injurious, though, from the equal action of fluid pressure, not to the same degree as its incision in lithotomy.

The fundus of the urinary bladder is probably as dilatable as any texture in the human body.

While, by the substitution of lithectasy, conducted on these principles, the sufferer from stone will be relieved by an operation comparatively without danger or pain, the surgeon who is unpractised in operations will also find an advantage in the change: for the simplicity of the method, and the ease with which it may be performed, brings it within the reach of every surgeon not deficient in manual dexterity. At present the greater number of surgeons decline the treatment of stone. The successful execution of the operation of lithotomy, with a degree of anatomical knowledge which every one does not retain, demands a presence of mind and boldness of hand which can hardly be acquired but by long experience. But this operation only requires a patient attention to the progress of the case and a familiarity with the use of the necessary apparatus. The dextrous lithotomist, indeed, would lose a much-prized opportunity for display; but this loss will not be regretted by the honourable and conscientious surgeon if it prove a gain to his patient. No opposition, therefore, need be apprehended to the general introduction of the operation on this account. Besides, there would be as much credit to be gained by removing a stone without pain (to say nothing of the diminution of danger), as in shortening the exquisite torture of the present operation to the smallest possible space. But were it otherwise, were the surgeon's reputation to be preferred to the patient's ease and safety, it is too much to expect, if less painful and dangerous measures are accessible, that any patient would be found "*curieux* (to use an expression of Le Dran) *d'être la victime du ridicule honneur dont se picquerait un lithotomiste de faire cette operation en une minute.*"

Even after the operation of lithectasy has been commenced, should any circumstance occur preventing its being completed, no harm can ensue to the patient; on the contrary, by the opening in the perineum allowing a short catheter to be easily introduced and retained, the excessive irritability which might cause such a result, and which might render other operations unsuccessful, would be more certainly reduced than by any other measure; and, as respects the unpractised surgeon, the operation of lithotomy (in the event of this being determined upon) would be thus divided into two distinct stages, with an interval well calculated to insure or restore his composure; for how often does it happen that a greater difficulty than was anticipated in making the opening into the urethra discomposes the operator, and seriously and injuriously influences the more important remainder of his proceedings. If the dilatation be carried so far as to admit the finger into the bladder, a still greater advantage of the same kind is obtained; for could the finger be used as a director, the most inexpert surgeon must succeed in terminating the operation of lithotomy in the best way its nature admits. Would

not, in fact, such a combination of dilatation and cutting be a safer mode of extracting stone than the operation in present use? The slightest notch of the now thin and extended prostate (made by a very narrow knife, prevented from cutting beyond a certain definite extent by being kept close to the finger, or even fixed to it) would be sufficient to make what remained of it give way, and so remove all difficulty, for the membranous part of the bladder would yield with ease to the required extent. But a slight incision or notch of any point impeding the dilatation, and this discovered by the finger, might be sufficient to allow of the slow dilatation being resumed and accomplishing all that was required.

In closing these remarks on lithectasy, I will take the opportunity of stating, that I shall deem it an honour to be referred to by any of my professional brethren who may have difficulty in procuring the necessary apparatus or in understanding this imperfect description of the mode of using it."

[STONE IN THE URETHRA.]

It is by no means an uncommon occurrence for small calculi, or fragments of stone, when the operation of lithontripsy has been performed, to lodge in the urethra. Usually, they are met with near the neck of the bladder, or at the external orifice of the urethra, but they may be arrested at any point along the canal. The symptoms developed by the accident vary with the size and location of the stone. If large, and lodged in the internal orifice of the urethra, all the symptoms of retention of urine are developed, and, unless the patient is speedily relieved, the most disastrous consequences may be anticipated. Sometimes, as in the case reported by Mr. Crosse of Norwich, England, the retention is not complete, a small quantity of water being voided several times a day; but notwithstanding this, so much is retained in the bladder as to cause retention in the ureters and kidneys, which produces enormous enlargement and disease of these organs, and ultimately destroys the patient. In this situation the presence of the stone can only be detected by the introduction of the sound.

When the stone lodges in any part of the urethra in front of this spot, the same symptoms of retention of urine, more or less complete, are developed, but we can detect the location of the obstructing causes by simply passing the finger along the canal.

Occasionally large masses of calculous matter are deposited in the prostate gland or urethra, and give rise to difficulty in passing water, inflammation, suppuration, and even extensive ulceration, with sloughings of the part. I have met with several such cases, and a few years since my friend, Dr. E. Peace, removed from a

lad in the hospital a mass of stone, which had been deposited in the perineum, that weighed several ounces.

One of the most singular cases probably on record, occurred in my own practice in the spring of 1845. A young man, some twenty years of age, was brought to me by Dr. Baker of Bucks county, who had suffered for several months under all the symptoms of stone in the bladder. When Dr. B. was called in, he attempted to introduce a sound, but found it impossible to accomplish his end, *and detected the presence of a cylinder of stone reaching from within an inch of the external orifice of the urethra to the neck of the bladder.* On examination I found this cylinder smooth, or water-worn, (for the urine had been passed in small quantities several times a day,) as hard, and about the diameter of an ordinary pipe-stem, and immovable in the urethra. The patient's general health was very feeble, and there were also indications of chronic inflammation of the bladder. I at first determined to open the urethra about midway, and then break the stone, so as to get it away in two pieces, but, on reflection, fearing the possibility of a fistula, I undertook its removal by a different process, a little more tedious, it is true, but perfectly safe. I had constructed a pair of small, slightly curved, strong, and sharp-cutting forceps, and with this instrument I daily *cut off* as much of the stone as the patient would permit. The urethra being very irritable the operation was attended with a little pain, but nothing of any consequence, and in the course of a short time the entire cylinder was removed, and a sound passed into the bladder, when a small fragment, apparently the *butt-end* of the pipe, was detected. The weather being very warm, and the patient's general health much weakened, I sent him to the country for a time, previously placing him upon an appropriate system of treatment. This case was seen by Dr. Jewell, Dr. John Neill, and several other physicians and students.

The treatment to be pursued under ordinary circumstances, will depend upon the location of the stone, and its degree of mobility. If situated at the *neck of the bladder*, and *loose*, it should be pushed back into the cavity of this viscus, from which it may subsequently be removed by an appropriate operation. If firmly imbedded in the part, and the retention of urine is complete, a sound should be passed until it comes in contact with the stone. It may then be held in this position while the surgeon cuts by the ordinary lateral incision through the perineum and urethra. The stone then usually falls out, or it may be removed with a pair of small forceps. If the retention is only partial, a few days may be allowed for the stone to change its position by the dilatation of the parts, or by ulceration. Should it remain after the lapse of a week, the operation just described should be performed. When the fragment lodges along the canal of the urethra it may often be removed with a pair of small and slightly curved forceps, or even a piece of strong wire, or a

silver probe, bent into a hook. The best instrument, however, for this purpose is that invented by Leroy d'Etiolles, and with the operation of which nearly every one is familiar. When the stone cannot be thus removed, the urethra must be opened directly over the foreign body, and then after its removal a catheter should be passed into the bladder, and the wound closed with a stitch and adhesive plaster. In a few days the cut usually heals, when the catheter may be withdrawn. Should it fail to unite, recourse may be had to some one of the various operations for fistula of the urethra.

When the stone lodges in the external orifice of the urethra, or near it, a pair of forceps, or a bent probe, or the instrument of Leroy d'Etiolles, may be employed for its removal, and when such measures fail the orifice may be slit up with the point of a lancet or bistoury; generally the little wounds heal without difficulty, and there is no necessity for the introduction of a catheter.

When large masses are deposited in the perineum, they must be removed by free incisions, and then a catheter introduced into the bladder until the parts are healed, or nearly so. T. D. M.

STONE IN THE FEMALE.

Although stone in the female bladder is occasionally met with, its occurrence is by no means so frequent as in the male. This is attributable to the circumstance of the urethra in the female being much *shorter* and *straighter*, in consequence of which retention of urine or particles of calculous matter rarely occurs. It is, moreover, *larger* and *more susceptible of dilatation*, which likewise favours the escape of gravel, or foreign bodies likely to serve as nuclei for the stone.

The symptoms to which the stone gives rise, whenever it does make its appearance in the female, are very much the same as those it occasions in the male. But it should be borne in mind that *stricture of the urethra*, *hypertrophy of the urethra*, *painful tumours of the urethra*, (see Hosack and A. Smith,) *prolapsus uteri*, and different diseases of the *os uteri* have all been confounded with stone in the bladder. The only test here, as in the male, is *sounding*, which is performed with an instrument much shorter and less curved than the one employed in the male. The operation is very simple, and the patient should be made to vary her position if there is any difficulty in detaching the stone.

Once discovered, it is proper to resort as soon as possible to some measure for its removal. Several operations have been proposed, all of which may be referred to a few *general* methods.

These are, 1st. *Incision of the urethra*. 2d. *Incision through the space embraced between the urethra and the rami of the pubis*. 3d.

Incision of the mucous membrane of the urethra, followed by dilatation. 4th. *The vesico-vaginal operation.* 5th. *The high operation.* 6th. *Dilatation.* 7th. *Lithontripsy.*

The most ancient of these different methods is that by *incision of the urethra*; and we find, in looking over the history of the operation, that the direction, as well as the number and extent of the incisions, has been varied to suit the whim of almost every operator. The older surgeons, particularly the Greek and Arabian, introduced a grooved staff into the bladder, and then, with a probe-pointed knife passed along it, cut the urethra *downwards and outwards*, and, from the direction of the incision, this method was termed the *lateral*. Sir A. Cooper, and some other modern operators, prefer this plan. Some have divided the urethra on *both sides*, the incision being carried downwards and outwards, as in the other case, and was made with the same instruments. This is termed the *bilateral operation*, and has been preferred by Louis, Sanson, Fleurant, Amussat, &c. Others again have divided the urethra in *four* directions, and this is called the *crucial* method, and was occasionally resorted to by Dupuytren. Lastly, the urethra has been divided *directly upwards*, or vertically, and hence the method is known as the *vertical*. Collot, who lived in the 16th century, was the author of this plan, but Antoine Dubois has received the credit of it in modern times.

However performed, the operation, in the vast majority of patients, is essentially a bad one. In adult cases it is almost universally followed by *incontinence of urine*, and occasionally by troublesome hemorrhage when the incisions are made towards the vagina. Chiefly from the former cause it is now almost abandoned, except in young persons, or when, from the peculiarity of the case, none of the other means of cure can be employed. I have operated upon two little girls, eight and ten years of age, by the vertical operation, and in both a perfect cure was accomplished in a few days, and, if I am not mistaken, Dr. J. R. Barton had a similar result in a case operated upon by him in the hospital.

In order to avoid lesion of the urethra it would appear that Celsus first proposed to enter the bladder through the space between the urethra and the rami of the pubes. At one period it was a favourite operation, and, as modified by Lisfranc, is still preferred by some. In the method of Lisfranc, a sound is first carried into the bladder, with which the urethra is *pressed down towards the vagina as much as possible*, so as to separate it from the bones. While thus held a *crescentic* incision is made in the space to which reference has already been made, and by cautious dissection the bladder is opened *above* the internal orifice of the urethra. A finger is next introduced to find the stone, and with a pair of forceps the foreign body is removed. As we have other means vastly to be preferred, this, in my opinion, should never be performed.

Knowing the extensibility of the proper tissue of the urethra, it has been proposed, in order to get rid of the resistance of its mucous lining, which does not so readily yield, to divide the *latter only*, with a knife, and then introduce a dilator of some sort, and gradually distend the canal, until the opening is large enough for the extraction of the stone. The authorship of this measure is claimed by several, and among them, by Chavasse of Birmingham, England. Mr. Liston, in another place, recommends the operation, but does not say that it belongs to him. (Practical Surgery, p. 517.) The decision of this point is a matter of little moment, but it is well to bear in mind that none of the bad consequences usually succeeding the operation by incision, or that by dilatation alone, occurred in the case of Chavasse, and Mr. Liston would hardly advise a measure of the utility of which there was any doubt. I have never used it myself, as in adult cases, unless the stone is very small. We have another operation, to which there can be no possible objection, viz., *lithontripsy*.

At one time, the removal of the stone by an incision through the vesico-vaginal septum, was a favourite operation. Rousset was, probably, the first to propose this measure, but it was also practised by Hildanus, Ruysch, Tolet, Gooch, Faure, and more recently, by Clemot, Flaubert, Philippe, Castera, Lavielle, Rigal, and others. It is easy of execution, but from the fact that it is frequently followed by *vesico-vaginal fistula*, one of the most terrible defects to which a poor woman can be subjected, the probability is, that in a few years no one will be found to advocate its employment. There is, in fact, no necessity for any such operation, since the largest stone might be broken into parts and removed through the urethra.

When the stone is very large, the *high operation* has been proposed, but this is even worse than the *vesico-vaginal*, as it gives rise to more danger.

A very important method for removing the stone, not yet mentioned, is that by *simple dilatation of the urethra*. It is probably one of the oldest operations used, and is still very useful in certain cases. It may be executed *rapidly*, as proposed by Tolet, or *slowly and gradually*, as advised by Douglass and others. The former method is the most painful, and most likely to be followed by inflammation, or incontinence of urine. It should, therefore, give place to the latter. Various agents are employed for the accomplishment of our object, but there is nothing better than a *sponge tent*, increased in size from day to day until the canal is sufficiently large. A piece of gentian root will also answer the purpose, and it is entirely useless to resort to the speculum of Weiss, or the dilator of Arnott, or any other complicated or expensive apparatus. The only objection to this mode of removing a stone, is the injury inflicted upon the sphincter vesicæ, from which, in some instances,

arises incontinence of urine. Hence it should not be employed, except in cases of *small calculi*, which require but a slight amount of dilatation for their extraction.

Lastly, we have the operation of *lithontripsy*, which is far beyond any other in cases of large stone, and should be employed in all such, to the exclusion of every other method. The directions given for performing the operation on the male apply here, but it is much more easy of execution in the latter case, from the size, length, and direction of the urethra.

In all cases of operation upon the bladder for stone, the woman should be placed upon her back, with the buttocks drawn over the edge of a table or bed, and slightly elevated. In the vesico-vaginal operation, it would be necessary to employ a speculum.

T. D. M.]

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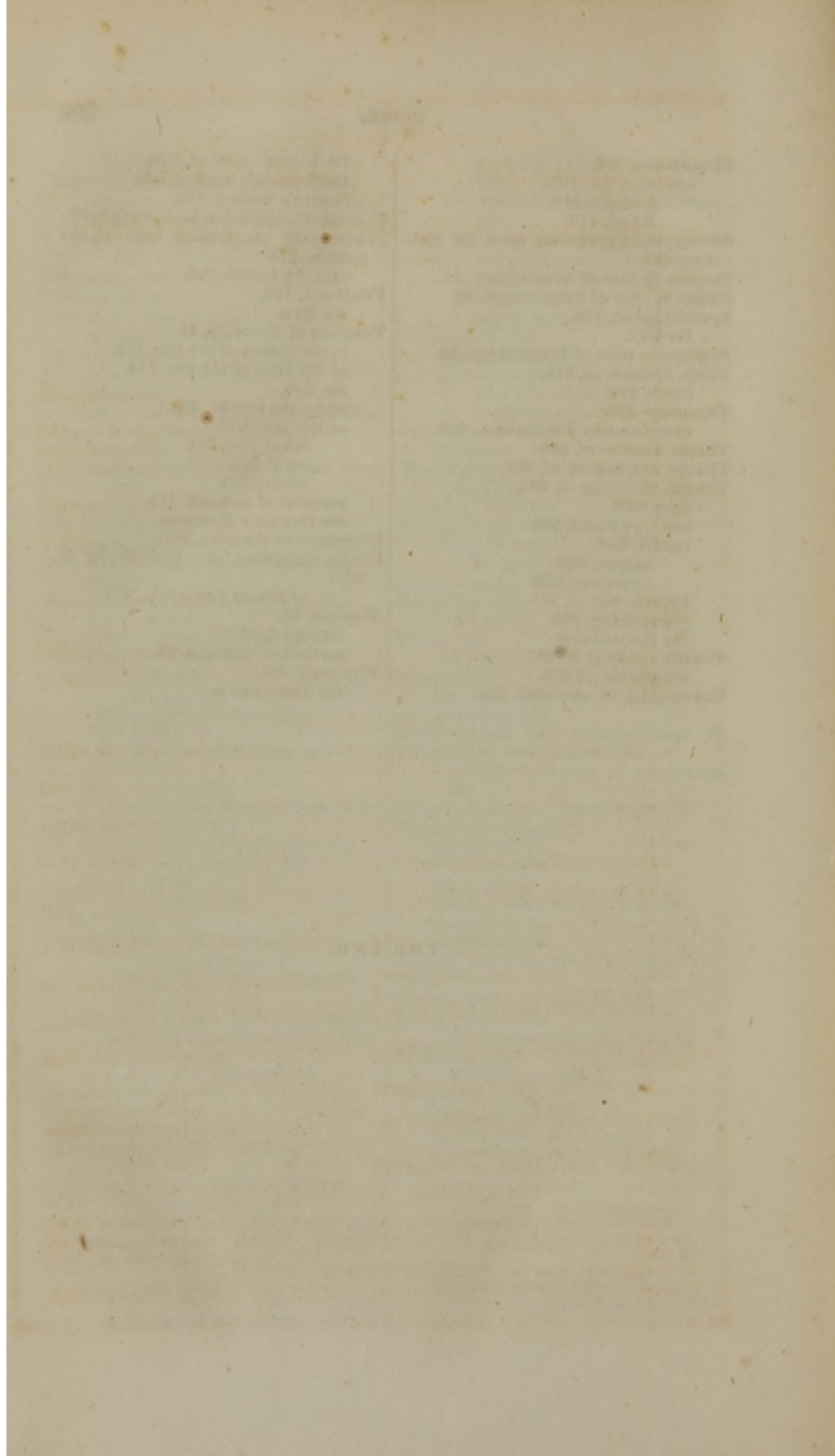
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