

A *partial division*, however, will cause impaired motion, if a motor branch—or pain and hyperæsthesia, if sensory. The pain may be felt both at the point of injury and at the termination, usually it will be more continuous at the latter. Under either conditions I think *Hypericum* will be the remedy oftener indicated, giving place to others as special symptoms arise. The accident is more readily recognized than when the division is complete. Very frequently, when motor nerves are partially divided, the muscles will be spasmodically affected, either contracted (tonic) or jerking (clonic). *Stram.*, in either case, will usually be the remedy that will give the best results.

Arteries may be pricked, or even extensively wounded, and the accident will be at once recognized, not by the *color* of the blood, so much as the force with which the stream is ejected. On making pressure above the wound the hæmorrhage will be arrested, while distal pressure will produce no effect. The accident may be a very serious one, inducing dangerous conditions at the time, or secondarily by the formation of aneurism. The symptoms of wounded arteries, and the consequences resulting therefrom, are too important and numerous to receive attention at this time; a full account will be found in the proper place, under *Injuries of Blood-vessels* (“*Emergencies*”). Suffice it to say at this time, that notwithstanding the great authority of VELPEAU, we should never trust to a compress in hopes that a cure will follow. Even if the hæmorrhage should be permanently arrested, an aneurism, of some kind, will be apt to follow later, and the patient perhaps be in a less favorable condition for a radical cure. Secure the vessel at once, by ligation, or accupressure as is most convenient, and discard, in this instance as in all others, frivolous temporizing measures.

PART SIXTEENTH.

VACCINATION.

Vaccination is an operation for the introduction into the human system of the virus of the cow-pox, as a preventive of variola. Whilst eminently Homœopathic in principle, it has been employed very extensively by all schools of medicine, and is to-day the most common practice in every civilized community throughout the world. DR. EDWARD JENNER, an English physician, was the discoverer of the prophylactic virtues of this virus, and the first vaccination was performed on a boy in 1796. His attention was directed to the subject, while still a student, in 1763, from observations made in Gloucestershire, when it was the universal belief of the dairy people that those who contracted the vaccine disease from milking cows affected with cow-pox, would not contract small-pox.

Cow-pox is a disease, of contagious character, appearing as a peculiar eruption on the udder of cows, supposed to be partly due to atmospheric changes, and some errors in food. It appears in two forms, or probably degrees of severity—the differences being very largely in intensity of the symptoms. The constitutional symptoms are insignificant, although there may be much fever. The local symptoms are the eruption of pustules, irregular in size and distribution. The vesicles are first filled with clear serum, later assuming more of the pustular appearance, becoming umbilicated, depressed in the centre—and when undisturbed, drying up into a crust which

ultimately becomes detached and falls off, leaving a smooth surface without any tendency to ulceration. When removed artificially, or torn off with violence, there will either remain a long lasting ulceration, of some depth and with malignant characters—or new pustules will form, which are less perfect than the original.

Like many of the excreta of contagious or infectious diseases, the active principle of this virus is supposed to reside in the pus-cell, but its nature, that is physical properties—has never been determined, and the microscope, as well as all other scientific appliances, has as yet failed to detect it. In other words, the secretion of the vesicles does not appear to differ from that of non-specific pus, and its character can only be determined by an observation of its effects. That inoculation produces local conditions closely resembling the exanthema of variola, is patent to all; this similarity is what convinces the Homœopath of its prophylactic virtues; in other schools of practice, however, the method is employed simply from the teachings of experience, and is not based upon any recognized law of therapeutics. It is true that reasoning from analogy, many practitioners of other schools, have attempted prophylaction from syphilis, gonorrhœa, and chancroid, by inoculation with the virus of the respective diseases; up to the present, however, one of two facts have invariably been developed, *viz.*, either no protection was afforded, or the disease from which immunity was sought has been established, and the consequences were the same as if the infection had been in the natural way.

For purposes of vaccination the virus is procured in many ways. Some preserve the crust formed by the drying up of the pustule; some extract the lymph while still fluid, and collect it on ivory points, in glass tubes, in quills, in small

capsules or boxes, or in any way that experience or fancy may suggest to them. However, collected, it must be remembered that like all animal matter it is subject to decomposition, and not only will its virtues as a prophylactic diminish in proportion to the degree of decomposition, but it becomes an element of danger, inducing septic or pyæmic conditions when introduced into the system of a healthy individual, just as any other decomposed animal matter would. Like most of the specific secretions, heat and acids will destroy its specific virtues, while cold, even when long subjected to its influences, will not have any appreciable effect on it. This should teach us caution in using virus that has been exposed to the air for a number of days, been kept in a warm place, or that may have been subjected to influences that would deteriorate it. Whether in tubes or points, there can be no question that two vaccinations, after the interval of twenty-four hours, should not be made from the same specimen. The tube or point should contain just sufficient for a single vaccination. In winter, of course the danger of decomposition would be greatly lessened, but a proper caution and regard for the physical welfare of those reposing confidence and trust in us, would forbid our running any risk by using virus that might possibly have undergone some vital change. Treating it with Carbolic acid, or any of the so-called anti-septic agents, will only retard putrefaction, and will at once effectually destroy the activity of the virus.

The best and only rational method to pursue to preserve the virus until needed, is to have it put up in such a way that it is thoroughly protected from the air, and as far as possible beyond the reach of atmospheric changes. Nothing is better, for this purpose, than to have it put up in sealed glass tubes, or enclosed in wax. The method of DR. WM. HUSBAND, of

Edinburgh, (HOLMES' *Syst. of Surg.* V. p. 543), is described as follows: "He recommends for the purpose such (tubes) as are from two to four inches in length, and about 1-28 of an inch in diameter, their walls being 1-200 of an inch in thickness. The vesicles having been opened with the lancet in the usual way, the tube, held horizontally, is charged by applying one end of it (the straight end, if they be not both straight, not that which tapers to a point) to the exuding lymph, which enters immediately. As much lymph is allowed to enter as will fill from one seventh to one-half the length of the tube. As a general rule, each tube should not be charged with more than will suffice for one vaccination. It may be sealed in one or other of the following ways. In the first, the lymph is made to gravitate towards the middle, by holding the tube vertically, and if necessary giving it a few slight shocks by striking the wrist on the arm or table. The end by which the lymph entered may then be sealed, by applying it to the surface of the flame of a candle. The other end should be plunged about half an inch into the flame, and as quickly withdrawn till it touches the surface, when it should be held till it melts over and is sealed. This precaution, of plunging the tube, into the flame before sealing it, is useful, in order to expel a portion of the air, or the tube may be sealed thus: the lymph having been introduced at one end of the tube, is made to pass towards the opposite by exhausting the air at that end over the flame of a spirit lamp; this end of the tube is then sealed. On cooling the lymph will pass towards the middle of the tube; the orifice by which the lymph entered is then sealed, as in the first method. Not more than a minute or two should elapse between charging the tube with lymph and sealing it up, or the lymph will congeal at the orifice, and cannot then be forced into the

centre of the tube." By keeping the lymph at the centre of the tube it is not acted upon injuriously by the heat. When using the lymph thus preserved, the sealed ends are to be broken off, and the lymph blown out on the lance.

The operation of vaccination must be performed under certain precautions, due attention having been paid to the purity and potency of the virus. In hot summer weather it is well to avoid it, unless the existence of epidemic small-pox demands it. This is not from the effects of temperature on the individual, so much as upon the virus. Under all circumstances, unless a number are vaccinated simultaneously in one household, the same virus should not be used a second time, nor should the lancet or vaccinating instrument be used on a second person until thoroughly and scrupulously cleansed. Under peculiar conditions the smallest particle of decomposed organic matter introduced into the absorbents will set up the most violent and dangerous septic symptoms.

It is also a matter that should receive the most scrupulous attention, that vaccination from humanized virus—that is crust, taken from those who have been vaccinated—should never be made. If pure cow-pox virus cannot be obtained, I think it is even preferable to omit it altogether until it can be procured. With each revaccination the amount of virus becomes less and less and the septic material correspondingly increased. It is a matter of impossibility to avoid some septic inoculation, although it may be very slight—and we certainly run a risk of introducing some other specific virus under such circumstances. Whether it can be, as some affirm—detected, we certainly know that syphilitic blood is a fact, and the horrible contagion may be communicated mediately. From every point of view, therefore, humanized virus should not be used.

Having selected the virus, the operation is performed as follows: The point of insertion is purely a matter of taste; one part of the body is as capable of inoculation as another, the sole consideration being to choose a locality that is not habitually uncovered, as the scar resulting is somewhat of a blemish. For this reason the usual site is on the left arm, just below the insertion of the deltoid. The skin at the point selected is to be scarified, or abraded either by scratching it with the lancet, or making minute punctures or incisions. It is not necessary that blood should be drawn, indeed hæmorrhage would often have the effect to delay absorption. For the purpose of making the abrasion there are a variety of instruments. The majority of practitioners use the ordinary thumb-lancet; some a small scarifier, like a minute comb with sharp teeth. Still others use a vaccinating instrument, by which a hollow needle, like an aspirator—is forced under the skin, and a piston fitting into the cavity of the needle, and released by a spring, is forced into the puncture carrying the virus with it. I must emphatically object to this instrument in all of its forms. It may answer very well for one or two operations, but after that, unless extraordinary care be taken, it will become unfit for use from the greater or less amount of animal matter that must adhere to it.

Having made the puncture, the virus is to be introduced. If ivory points are used, the dried virus on one of them must be softened by holding it for a moment in the steam from hot water, and then rubbed off on the wound, crowding it into it with the point of a lancet. It may be best to insure success, to make more than one puncture on the same arm. If so, they should be made about an inch apart.

When completed, allow the lymph or blood that has exuded to dry, by exposure to the air, but do not apply any

plaster or dressing of any kind. If the child should be ungovernable, and there is danger of its scratching the part, or otherwise irritating it, a small piece of cotton may be laid on and secured by a narrow strip of adhesive plaster.

When successful, the vaccine affection will run through the following course: On the second day a slight elevation will be observed, of a delicate rosy hue, all signs or marks of the operation having previously, in most cases, disappeared. About the fifth day a red pimple appears at the point of puncture, which the next day, or at the latest the day after—becomes a pustule. This gradually increases in size, surrounded by a more or less bright-red areola, and may attain a diameter of a quarter of an inch. The lymph is at first clear and milky, soon becoming yellow, and finally drying into a brown crust, depressed in the centre, which drops off about the twenty-first day. A dark areola, with profuse pus, much pain or constitutional disturbance, and a dirty yellow color of the crust will indicate a failure, as to vaccination and infection with some other specific virus or septicæmic difficulty.

Ordinarily there is little constitutional disturbance, a slight fever on the seventh day, and some pain on motion in the arm, with a slight fullness in the axilla being the maximum in general. A higher grade of fever and more profound disturbance of harmony in general, will indicate either vaccination with impure virus, or the invasion of some latent or acute disease, perhaps excited by the operation. The symptoms indicating specific infection will be as if it had been induced by other means, and will be readily told by the experienced practitioner, at least by reference to the standard authorities. The appearance of the pustule will be syphilitic in syphilitic cases, chancroidal in similar

cases, or scrofulous when purely septic. Reference to *Surgical Therapeutics* will give the peculiar appearances.

When the crust or scab has been removed, in successful cases, the scar remaining will become unnaturally white in color, depressed, and of an uneven surface. It will gradually fade out, and after some years often disappears entirely. Some practitioners attempt to judge of the continuance of protection by the appearance of the scar, but it is generally thought that this is not positive. How long protection will continue is a question of some moment, but one that cannot be accurately answered. Some observers esteem it perpetual; others limit it to from seven to ten years. It can only be told with accuracy by the results of re-vaccination. It is a proper plan to attempt this about once in ten years, and, if after repeated operations, inoculation is not produced, the individual is still protected.

We may note in closing, that if the fever runs high, a few doses of *Aconite* will usually make things all right again. If septic conditions arise, *Arsen.*, *Lach.*, or *Carbo veg.*, or even *Rhus* may be used according to indications as they arise. Specific infection will call for *Merc. cor.* usually, but the presumption is that nothing will cure the victim, the disease is implanted in him for the remainder of his life, and will in all probability be transmitted to remote posterity should he survive the period of childhood.

It is proper to note, while not exactly germane to our topic, that there is a very large and respectable class of practitioners who are opposed to vaccination under any circumstances. BENNINGHAUSEN and others, claim perfect prophylaxis in *Thuja*, administered during the prevalence of an epidemic of variola, and certainly, when we consider the many dangers that hang about this apparently simple

operation, and the disastrous consequences that follow the introduction of impure virus, it cannot be denied that there are many reasons why conscientious practitioners should hesitate to expose their patients to such danger. On the other hand, the evidence is so clear and conclusive that compulsory vaccination has not only checked an epidemic of variola, but banished it for years from infected districts, that it will be long ere the practice is abandoned; at least it will not be until something equally certain is offered, and that will stand an equally severe test.

PART SEVENTEENTH.

TONGUE-TIE.

Occasionally infants will be found unable to suck properly when nursing, and on examination the frænum of the tongue will be found shortened, so that the tip is drawn downwards, sometimes to an extent that keeps it close to the lower jaw. If the difficulty in nursing were the sole impediment to perfect function, there are many cases that might be left without treatment, as the parts will to some extent accommodate themselves to the malformation. Unfortunately, however, the defect will likewise embarrass the speech when the child becomes older, and from the plastic and cartilaginous character of the jaws and bones generally, some osseous deformity may be produced. The defect being recognized, therefore, some treatment must be instituted to remedy it.

To properly comprehend the rationale of the operation proposed, it is essential that the student should recall the anatomy of the parts involved, particularly the arterial distribution. The apex of the tongue is attached to the lower jaw by the genio-hyo-glossi muscles, which are partly attached to the tubercles on the inner surface of the symphysis. The mucous membrane covering the tongue, assists in this connection with the jaw, by attachment to the gums and inner surface of the jaw. A distinct fold of this membrane constitutes an especial and important attachment to the maxilla, and is called the frænum linguæ. It is the ab-

normal shortening of this that constitutes the affection known as tongue-tie. At this time, it will be noticed the continuance of this shortening for some months, or a year or more, must have the effect to shorten the muscles, and render a simple section of the frænum insufficient to a cure.

The ranine artery is a branch of the lingual, which after ascending perpendicularly near the origin of the genio muscles is directed forwards, nearly at right angles to its former course, running along the base of the tip of the tongue. (See A in the accompanying figure). When the frænum is too short, the muscles and artery are both drawn

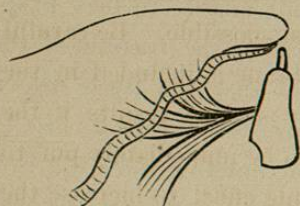


FIG. 79.

farther forwards, and incision of the mucous fold must expose the vessel to injury to a greater extent than when all the parts are in a perfectly normal position.

The deformity is easily detected, when extreme, but some embarrassment may be experienced when not so marked. In a normal condition of the parts, the tip of the tongue will be occasionally protruded, but can at all times be seized between the finger and thumb. When this cannot be done, and suckling is defective, the diagnosis is made out, and an operation must be performed.

Have the child held in the lap of nurse or an assistant, the hands firmly held, and the head thrown back. Another



FIG. 80.

assistant will then depress the lower jaw so that the operator shall have both hands free. The instruments needed are

a pair of blunt-pointed sharp scissors, and a director, as in Fig. 80, which is found in all pocket-cases of instruments. Insert the broad extremity of the director under the tip of the tongue, engaging the frænum in the slit. Raise the organ and elevate the director so that it will not be in the way of the scissors, thus putting the frænum on the stretch. With the scissors now nick the frænum to the extent of a couple of lines, directing the incision downwards and backwards, keeping as close to the jaw as possible. Be careful that nothing but the mucous membrane is included in the incision, as it will produce possibly serious results if the muscles are divided. The child is to be immediately put to the breast, which will have the double effect to increase the division in the frænum, and to arrest the bleeding, which last, however, is usually very trifling.

Simple as the operation seems, it is not entirely devoid of danger, as a few recorded cases will amply testify. At the present day accidents rarely occur, but in the last century, or the first part of the present, it was a common occurrence for ignorant midwives to tear the frænum with finger and thumb, sometimes tearing up the muscular attachments, lacerating the arteries, and if the little patient survived the "treatment," producing an aggravation of the deformity by the cicatricial contraction ensuing.

The accidents at the present day are chiefly one of there, viz.: hæmorrhage, falling back of the tongue, and tetanus. The first is due, of course, to division of the ranine artery, which cannot be of frequent occurrence, unless there is some anomalous distribution, or the incision is made too high. The occurrence will call for prompt treatment, and from a consideration of the age of the patient, and the function of the part, the ordinary means for arresting hæmorrhage can-

not be employed. Should the accident happen to me, I should pass a fine needle through the frænum, armed with a fine cat-gut suture, and tying it tight, cut off the ends close. Such a practice would be far preferable to styptics, and certainly should be preferred to ligation of the lingual.

The tongue has fallen back into the fauces, closing the glottis and posterior nares, and greatly endangered life. This is due not so much to extensive injury to the frænum as to section of the muscles. By exercising some caution in making the section, and ascertaining that nothing but the mucous membrane is engaged between the points of the scissors, such an accident should never occur. It must always be an evidence of bad surgery. It might be remedied by passing a ligature through the tip of the tongue, and attaching it to adhesive strips on the chin. Possibly in some instances, it would be practicable to unite the edges of the incision by a fine suture. In either case, the ligature or suture should be retained until the wound has united.

Tetanus may follow the operation in the case of very sensitive children, particularly if the operation has been bunglingly performed, and the incision made by a succession of snips with the scissors, rather than a single decided cut. The treatment will be as usual in that condition.

Ordinarily there will be little pain, the child nursing with avidity immediately after the operation, but *Hypericum* had better be given for a day or two.

The condition is not as frequent as our text-books would lead one to suppose, at least as far as my experience goes; the cases occurring in my practice not having exceeded half a dozen.

PART EIGHTEENTH.

CATHETERISM.

Catheterism is the operation for evacuating urine from the bladder, in cases in which, from any cause, it is incapable of evacuating itself. The term is also applied for want of a better one—to operations for the injection of fluid or air, into some of the visceral cavities, through the medium of a hollow tube. Thus the eustachian tube, under some circumstances, requires dilatation, and a catheter made for the purpose is employed. In some conditions the bladder will require, or is thought to require washing out, either with medicated solutions or chemical agents, and a special form of catheter is used for the purpose. At this time, however, we have only to consider catheterism as applied to the bladder, that of the eustachian tube coming more properly under the consideration of special practitioners. Even as confined to the bladder, the operation is one of some importance, and very frequently will be found of exceeding delicacy, requiring accurate anatomical knowledge, and very considerable manual skill and dexterity. So frequently is this the case, that the subject had better be reserved for consideration under major surgery, but inasmuch as the general practitioner will be frequently obliged to resort to it, it will receive attention at this time, and with somewhat greater minuteness than has been bestowed upon other topics in this volume.

We will first consider the instrument used in the opera-