

fissure. This he accomplished by seizing the margins, as before, with his forceps, and paring from behind forward. To tie the ligatures, he commenced by knotting the middle one with the fingers, and, after making a simple tie, confiding it to an assistant, who held it with an instrument termed by the French a *serre-nœud* (knot-tier); he then passed on to the second ligature, and from that to the first, drawing them tighter than was necessary to approximate the edges of the wound, in order to prevent any separation. Eating, drinking, and speaking were interdicted the patient for from two to three days, the ligature being removed on the third or fourth day, excepting the lowest one, which was allowed to remain twenty-four hours longer than the other.

Dr. John C. Warren performed the operation as follows: The patient being well supported and secured, a piece of wood, an inch wide, a little curved at the end, and with a handle to be held by an assistant, was placed on the molar teeth of one side to keep the mouth open. A sharp-pointed curved bistoury was then thrust through the top of the palate, above the angles of the fissure, and carried down on one edge of the cleft to its extremity, and the same was done on the opposite side, so as to cut out a piece in the form of a letter V, including about a line from each edge. Next a hook, or curved needle, fastened in a handle, with an eye on its extremity, and a movable point, armed with a triple thread of strong silk, was passed doubled into the mouth through the fissure behind the palate, and the latter pierced by it one-third the length of the fissure from the upper angle of the wound, so as to include about three lines of the edge of the soft palate. The eye, with the ligature, being seen, was seized with a common hook and drawn out. The eyed hook was then drawn back, turned behind the palate, and the other edge transfixed in a similar manner. A second and a third stitch were now passed in a similar manner, the third being as near as possible to the lower end of the fissure. Then, seizing the upper ligature with the finger, the knot was tied without using a *serre-nœud*, and placed on one side of the wound in order to prevent its pressing on the fissure, the other being tied in like manner, and the fissure closed.

After the first operation of Dr. Warren, Dr. A. H. Stevens, of New York, in September, 1826 (see *North American Medical Journal*, vol. iii. p. 233), operated successfully, by first inserting the ligatures and then paring the edges.

In 1827, Dr. Mettauer, of Virginia, operated for staphyloraphy, and in 1837 published an excellent essay. Dr. M. employed leaden ligatures. (See *American Journal of the Medical Sciences*, vol. xxi. p. 309.)

Allusions are made in this chapter to other operators and operations; but as they are all only modifications of the methods of Roux and Warren, it is not necessary to refer to them.

Several years back the author had in his possession a monograph on the subject of staphyloraphy from the pen of the late Professor Mütter. He regrets

that he cannot now lay hands upon it. Dr. Mütter was much interested in the operation, and his pamphlet abounded in cases illustrating his success in the direction.

To Sir William Fergusson, of England, more than to any other man, are we perhaps indebted for a scientific appreciation of the requirements in staphyloraphy. The cutting and sewing parts of the operation are simple mechanical manipulations, which are of consequence only as they tax the ingenuity of an operator. The proper surgical understanding of the subject consists, as we are prepared to see, in an acquaintance with the muscular relations of the parts. These relations we have just studied. To Mr. Fergusson belongs the credit of first making the demonstrations. It is very true that before his time incisions in the soft parts had been advised. Roux, Dieffenbach, Mettauer, Liston, and Warren all practised them where difficulty was met with in approximating the fissure; but the sections made by them, as remarked by Mr. Fergusson, seem to have been without reference to the anatomy of the parts, and, as a consequence, rendered success somewhat a matter of accident. The operation of Mr. Fergusson, as the paring and bringing of the fissured parts together are concerned, is much the same as that practised by Dr. Warren. He pares the cleft before inserting his sutures, and his knots are made about as Dr. Warren's.

In looking over the history of staphyloraphy, the reader will be struck with the likeness in complaints, the three principal of which seem to be the difficulty in tying the ligatures, the great tendency of the ligatures to slough out after they are once nicely secured, and the concealment of the parts during operation both because of deficiency in light and the accumulation of the viscid muco-saliva which in mouths thus affected is secreted in great abundance.

Now, in the direction of operations in and about the oral cavity, the writer has had an experience which will, perhaps, justify him in asserting that there is an easier and more philosophical mode of performing the operation of staphyloraphy than has yet been described. To sit in front of a patient and operate in the mouth is most unhandy. The operator is in his own light; besides, it is certainly much more difficult to operate sitting than standing: motion is cramped, freedom is interfered with. To perform on the mouth of a patient, when the surgeon is seated in front, renders necessary an assistant, whose office it is to manage the head. This has a twofold objection. In the first place, the assistant cannot follow in all those little changes which are so necessary to success. He does not see quickly the shiftings and turnings which so help in the manipulations. Again, one is more naturally ambidextral when the arms are supported than when they are unsupported. In operating sitting in front of a patient, the surgeon must work at arm's length; he has nothing to steady him,—no guard which shields against any sudden awkward movement on the part of either assistant or patient.



To make a knot deep in a canal, such as the mouth or the vagina, is not easy. To fix a ligature by compressing something upon it is very simple.

Silk is not unapt to act as an irritant to human tissue,—silver or lead is less worrying; therefore, where it is desirable to retain a ligature for several days or weeks, without irritation, metal is best adapted to the end.

Instruments perfectly suited to a performance simplify it greatly.

Predicating an operation on these self-evident truths, the following manner is commended as being the best and easiest mode of manipulating. Where once practised it will take precedence of all other modes.

The instruments required are those belonging to the ordinary vesico-vaginal case,—a long-handled knife, needles and needle-carrier, shot-carrier and compressor, tenaculum, cutting forceps, silver or lead wire, the perforated flat shot of McLean, and mop-sticks. Better instruments than these for the operation of staphyloraphy will not soon be devised. The instruments arranged on a tray in the order in which they are to be used, the patient, having had the steps of the operation explained to him,—for much is expected from him,—is seated on a chair having a movable head-rest: it is well if this rest move in a ball-and-socket joint; at any rate, it must be movable backward and forward. The ordinary dental chair answers the purpose admirably. When the head is placed on this rest, the mouth will be found to look directly upward. The surgeon now takes his position back of the patient, standing on a footstool of such height that his breast shall be brought on a level with the head. If the reader be disposed, he can thus seat a friend, and, taking a position back of him, by leaning over his head he will find that when the mouth is opened he not only has a perfect view of a thoroughly lighted cavity, but by leaning against him, and passing his arms around the head so as to bring the hands to the mouth, he will perceive that, besides having his own arms so steadied as to allow of the easiest manipulation, he has the movements of the sitter completely under control.

This relative position of the surgeon to his patient gives not only the advantages enumerated, but places him out of the way of ejective spasms. If saliva and blood accumulate about the parts, he can and will, almost unconsciously, and certainly without effort, so turn the head that, while he does not at all interfere with his own manipulations, he throws the fluid into some more convenient part of the mouth. This is to be done so readily that each step of the operation may be accomplished without the annoyance and delay experienced in using the mop. Certainly, a patient so held cannot make any movement too quickly or too unexpectedly for the surgeon. True, he might be so obstreperous that the operation could not be accomplished; but he could not make any change which the knife of the operator would not intuitively follow, and therefore accidental harm could not be done.

Patient and surgeon being in position, a tenaculum is taken up and carried through the very point of the cleft pendulum, or, if preferred, the forceps

may be used. (See Fig. 412.) The part is then put on stretch, and a paring (as shown in the diagram) of about a line is taken from the whole of that side, cutting from behind forward. The manipulation is repeated on the opposite side. The first stage completed, very dilute compound tincture of capsicum, ℥j to ℥xvj of water, or water medicated with potash, or ammonia, is given the patient, with which to gargle and wash the mouth. These cleanse the part admirably, besides acting as healthy stimulants.

The bleeding arrested and the patient a little recovered, the second step, that of passing the ligature, is to be practised. Take up one of the curved needles, Fig. 413, and, threading it with the silver wire, thrust it through one side of the cleft, about three lines from the margin and about half an inch from the apex of the cleft or hard palate. After passing it to this point the wire is unthreaded by means of an excavator. This accomplished, the needle is withdrawn, rethreaded, and carried after a like manner through the opposite side; the two ends are next brought from the mouth and their relaxation secured by one or two twists. This completes the first ligature. A second is now passed half an inch farther on, also a third, or more, as may seem needed. The manipulations required are of course the same as for the first. This completes the second stage, and the patient is allowed to rest as before. If he need to wash his mouth, which is very much more than likely, the surgeon must look carefully after the ligatures.

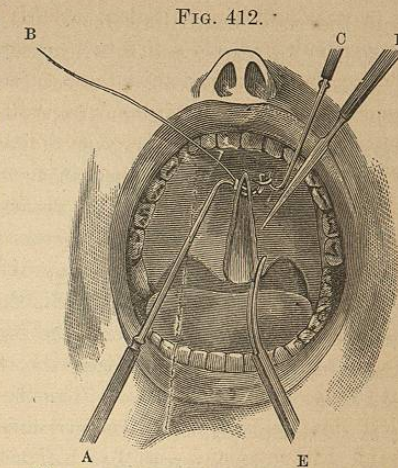


FIG. 412.  
The author's operation as described. A, is the curved needle; B, the wire-thread; C, is an ordinary dental excavator used in unthreading the eye; D, is the knife paring the cleft; E, is tenaculum or forceps putting the part on stretch.

FIG. 413.



The Author's Curved Needles.

The third stage, or approximation of the edges, is next to be accomplished. Take up the shot-carrier, and, slipping through its fenestra the twisted ends of the last ligature introduced, push the carrier down the wires, and it is found that as it approaches the palate, the edges of the cleft approximate. This will always be found to be the case with the ligature nearest the



uvula: the parts are closed very easily. Now slip off the carrier and take up one of the perforated shot; put this on the wires, and with the carrier force it down to the palate. Holding this in place, which is done by simply laying the wire against the carrier and shifting a finger over it, take up with the right hand the forceps, and compress the shot tightly upon the strands. The parts up to this ligature will now be found nicely approximated and fixed. This completed, repeat the operation on the second ligature. This, however, may be found impossible, without greatly overstraining the parts and risking the tearing out of the wire.

If this be the case, the operator at once desists from the attempt, and makes the section as described of the tensor palati muscles on either side. Now most likely the parts will come together conformably: if so, fix them with the shot as before; if, however, an approximation has not yet been secured, nick the anterior half-arch; and if this do not suffice, cut the posterior and as well the levator palati muscle: the ligature may then be fixed, and, as well, those still farther front. Each shot firmly compressed, the wires are to be cut off as closely as possible. Thus the third and fourth steps of the operation are completed, and nothing remains but to enjoin on the patient reasonable quiet. In this rest lies half the secret of success: the patient should move warily for two or three days; certainly he should not be permitted any food that would demand for its comminution the slightest effort at mastication. He is to be directed to allow the liquids taken to trickle down his throat, rather than attempt to swallow them. These restrictions need not, however, be made quite so stringent if in the operation myotomy of the half-arches has been employed.

In the old mode of performing the operation, it was found necessary after the first day or two to remove the ligatures, because of their tendency to slough out: the use of silver wire obviates this necessity to a great extent, as the metal seems to provoke little inflammation. These ligatures may therefore, if they seem useful, be allowed to remain a whole week. This non-irritating quality of metal ligatures is so marked that they have been seen, when applied to varicose veins, as firmly fixed after four months as on the day of application. This is the feature which adapts such ligature-material so admirably to staphyloraphy.

The wounds made in dividing the muscles may be left to nature. If the patient be in condition for the principal operation, he is in a condition which does away with any necessity for care in trifling flesh-wounds; if, however, trouble should arise in such a direction, the practice is that which applies to similar wounds, however made.

It is seen that the manipulations here suggested for the cure of cleft palate are precisely the same as those practised in vesico-vaginal fistula, and that the instruments adapted to the one operation are exactly suited for the other.

The position in operating together with the employment of perforated shot

and carrier was first suggested and practised by the author twenty years back.\*

From this consideration of cleft palate proper, we now pass to the study of other defects of the parts.

**Holes in the Palate.**—Breaks in the continuity of the palate may be treated in two ways: either by an operation strictly surgical, as reference is had to the use of the knife; or by means which are to be denominated surgico-mechanical. If the knife is to be exclusively used, we have simply to pare the edges of the break, and then get the parts in apposition as best we can. Herein consists, however, the difficulty of such operations; and the tact and knowledge of the surgeon will prove his best guides. If the breaks are in the soft palate, any resistance that may be met with is to be overcome precisely as in staphyloraphy: let the surgeon consider what muscle or muscles oppose him, and divide them as before suggested; or, if myotomy seem scarcely necessary, he can in all probability accomplish his purpose by making lateral slits through the mucous membrane alone, or otherwise he may go a little deeper, making a kind of semi-myotomy.

If the break be small, one ligature will perhaps be all that is necessary to secure the approximation of the pared edges; this suture is to be made and fixed precisely as in the previous operation. If more than one seem indicated, of course more are to be employed.

Defects in the hard palate are also amenable to surgical skill: they may be remedied by the use of the knife and stimulating local applications, or, if these fail, an artificial palate, properly constructed, will so admirably supply the deficiency that the patient is rendered almost as well off as his fellows. (See *Obturator*.)

Using the knife alone, most successful results are frequently attained by first paring the edges of the break and afterwards dissecting the parts freely from the bone. This mode of operating is suited to such hard palates as have a thick, soft, mucous membrane. Through this manner of manipulating, and with such character of mucous membrane, quite wide chasms may be spanned.

With such mucous membrane, plastic operations are found to answer very well. It is quite easy to get a flap without disturbing the periosteum, and such a flap may be twisted on its pedicle without any special interference with its function. The pedicle, however, should be as wide as possible, remembering that the circulation pertains to the basement membrane alone. An objection, however, to such operations in the mouth is the difficulty that attends the fixing of the flap in its new place.

The next mode of relieving these defects which may be alluded to is that originally suggested by Dieffenbach. This surgeon commends the pencilling of the edges of the break with tincture of cantharides, hoping thereby to

\* These manipulations were first practised in 1861, and were described in papers published by the author in the *Medical and Surgical Reporter* of Philadelphia.



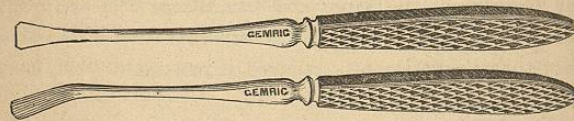
excite granulation to an extent that shall fill up the cleft. The use of nitric acid is advised in the same direction.

Now, while this does very well for small holes, it seldom succeeds with the larger. The granulations, having nothing to support them, break down before connecting in the middle.

This defect in the treatment is to be remedied, and success almost warranted, by the following modification: make a simple obturator, or artificial roof; after fitting this so as to cover accurately every portion of the hard palate, it is to be removed and the cleft pared; next touch the parts with cantharides, nitric acid, or tincture of iodine,—the latter is preferred by the writer. The plate is now to be replaced, and will be found to act most completely as a support to the granulations which form. The process of freshening the edges is, of course, to be frequently repeated; but after the first paring the cuts may be made from the circle on, and not around, the cavity.

**Uranoplasty.**—To Dr. J. Mason Warren seems justly due the credit of the conception of this operation. His plan of manipulation is as follows: Incisions are first made on either side of the cleft down to the submucous cellular tissue, being midway between the borders of the break and the alveolar processes, these incisions extending back to the extent of the break. Next, using a double-edged knife, these flaps are dissected towards the cleft,

FIG. 414.



Instruments for raising soft tissues from hard palate—two patterns.

and, falling, are united in the middle line. Another plan practised by this surgeon consists in dissecting the mucous membrane from the edges of the cleft toward the alveolar processes, and, as they are thus made loose and pendulous, uniting them along the centre line.

A modification by Langenbeck on the operation of Warren consists in including in the dissection the periosteum, thus taking advantage of the osteogenetic qualities of that membrane to secure the filling of the break by a deposit of bone.

The use of a gag to keep the jaws separated, both in the operation of staphyloraphy and in that of uranoplasty, will be found to add to convenience in the operation. The instrument of Kolbe, shown in Fig. 415, the author occasionally uses with much satisfaction. A means, however, more commonly employed is known as Whitehead's Gag and Tongue-Depressor; this consists of two curved bars, one supporting either jaw, kept separated by a ratchet lever; to the lower bar being attached the tongue-holder. A modification of this gag (or, more properly speaking, of the Smith gag, which is

much like it), made by Dr. Louis Elsberg,\* of New York, is preferred by many.

Another form of gag is a very simple, but yet quite effective, apparatus devised by Dr. Goodwillie, shown in Fig. 416: this consists of two arms

FIG. 415.—SCREW LEVER.

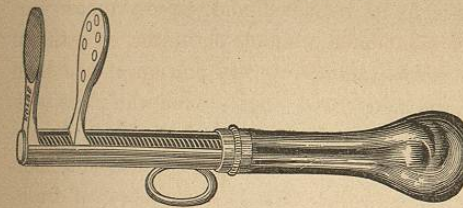


FIG. 416.



covered with elastic rubber, with a central screw which increases or diminishes the length of the piece as required. Gags of this class require, however, to be held in by the finger of an assistant.

Still another form of this instrument is one devised by John Wood, of King's College Hospital, and which was used exclusively by Sir William Fergusson in his operations about the mouth; this consists of a double bar, having rests for the support of the teeth, and which are separated on a principle precisely the same as that employed with the bivalve speculum.

In concluding the subject of treatment of cleft palate by operation, reference is to be made to uncertainty in success both as regards result of manipulations and improvement in speech. Cases operated on by the writer have proved to the fullest degree satisfactory; a greater number have ended in failure.

Where the remnants of a velum are plentiful, and the patient is in health, operation promises most, and is to be recommended. Where, on the contrary, the parts are scanty, and these scanty parts fixed, little good is found in trying anything outside of mechanical means.

Section of the velum, as shown in Fig. 5 of illustrative plate, is only to be practised when impossible to be avoided. As a result of such section, a tumidity of the parts is almost certain to show itself, which proves very adverse to union of the pared edges.

Fig. 1 (see plate) shows the operation of Roux.

Fig. 2 shows paring of edges of cleft.

Fig. 3 shows the operation of Warren; the knife freshening the edges of the fissure from above downward; the forceps steadying the margin so as to favor its regular incision.

Fig. 4 shows manner of introducing sutures, Physick's forceps and a curved needle being used.

\* A sponge-holder of most convenient form and construction, and of great service in operations about the mouth, is known as Elsberg's sponge-forceps.



Fig. 5 shows Dieffenbach's operation of staphyloplasty. In this case silk has been used and ties made.

With the understanding now secured of the mouth, the pharynx, and their diseases and deformities, we may carry our observations from above forward through the nose.

