On cleft palate / by Francis Mason.

ON

CLEFT PALATE.

BY

FRANCIS MASON, F.R.C.S.,

SURGEON AND LECTURER ON ANATOMY AT ST. THOMAS'S HOSPITAL; HON. FELLOW OF KING'S COLLEGE, LONDON, ETC.

[*Reprinted from 'St. Thomas's Hospital Reports' for* 1876.]

LONDON:

PRINTED BY

J. E. ADLARD, BARTHOLOMEW CLOSE.

1877.

[*Reprinted from Vol. VII, New Series, of the 'St. Thomas's Hospital Reports' for* 1876.]

ON CLEFT PALATE.

By FRANCIS MASON, F.R.C.S.,
SURGEON TO THE HOSPITAL.

In the last volume of the 'St. Thomas's Hospital Reports,' for 1875, I contributed an article on Harelip. In discussing that subject it would have been no difficult task to extend the paper to undue length by including the frequently associated condition of cleft palate. But it appeared to me that the latter deformity was of equal importance, and that to do justice to the subject it would be a better plan to consider it in a separate communication. Hence this contribution. Such an arrangement has at least this advantage, that, by increased opportunities at the hospital and elsewhere, I have been enabled to acquire a more mature experience of the malformation of cleft palate, and am, therefore, in a better position to estimate the relative merits of the operations that have from time to time been devised to effect union of the fissured parts.

As this paper is intended to be a supplement to that on harelip, it will be most convenient to consider the subject of cleft palate much in the same order. Whilst many of the points to which reference has already been made must necessarily be again touched upon, every effort will be used to avoid, as far as possible, needless repetition. Further, whilst I shall briefly allude to the treatment of perforations of the palate the result of accident or disease, the principal object of the present communication is to review the subject of congenital mal-

formations, the different operative procedures being more particularly dwelt upon.

Congenital fissures of the palate assume a variety of forms. Thus, in one case the split will extend through the uvula only (fig. 1). In another it will involve more or less of the soft palate, stopping short at the margin of the palate bones (fig. 2).

Fig. 1.

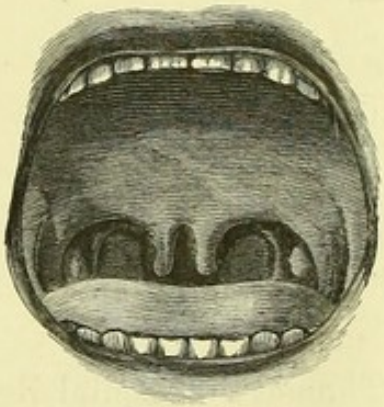
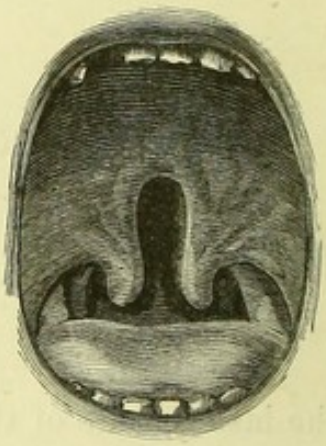


Fig. 2.



In a third the fissure will include a portion of or even the whole of the hard palate (fig. 3). In other examples, in which the deformity is complicated with harelip, whether single

Fig. 3.

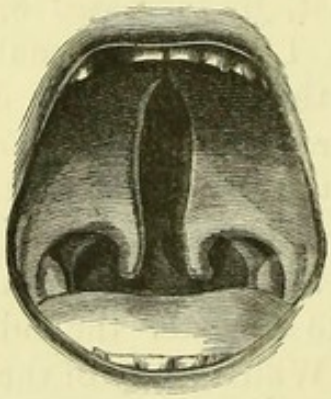
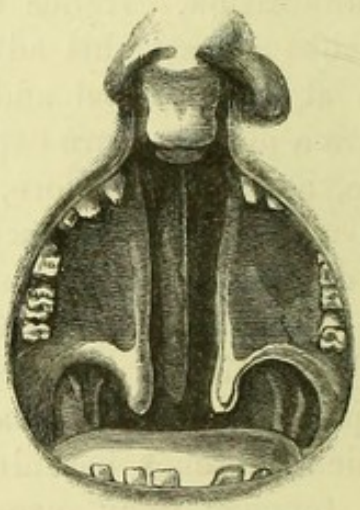


Fig. 4.



or double, the alveolus in front will be more or less involved (fig. 4). On examining the roof of the mouth in these cases the vomer may in some examples be seen to be placed free and

exactly in the median line, so that a probe may be passed into the nasal cavity of either side (figs. 4 and 5); whilst in other instances the septum is attached to one or other half of the palate, thus shutting off the cavity of the nares of that side from the bucca cavity (fig. 6). Referring to this point, Rouge[1] states that the vomer is most frequently attached to the right side. Lastly

FIG. 5.

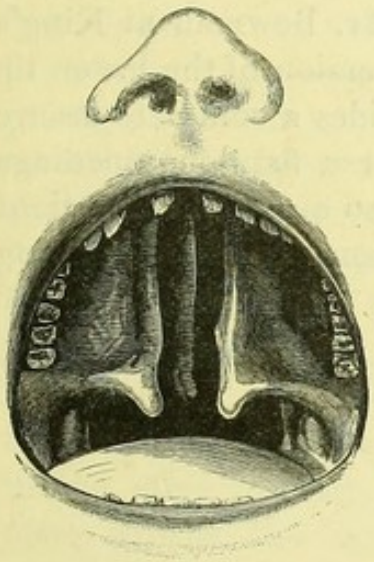
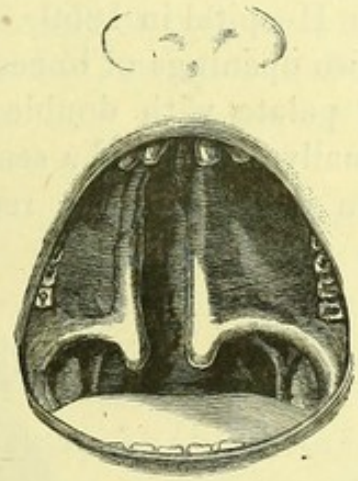


FIG. 6.



there may be fissures of variable size extending through the alveolus (fig. 7); this latter condition may be associated with a cleft of the soft palate only, the rest of the hard palate being to all appearance perfect and arching across like a bridge, as in a case under my care at the hospital in the summer of 1874.

In very exceptional cases there is a congenital aperture in the soft palate without any division of the uvula or palate bones. I have myself never met with an instance of the kind, and the condition must be regarded as rare when Dieffenbach declares he has only seen one example, and this occurred in a young medical student.[2]

Trélat, Notta, and Langenbeck refer to cases in which the hard palate has been deficient, the gap being filled in by the mucous membrane only, stretched from side to side.

Whatever the extent of fissure, there is generally more or less of the hard and soft palate observable on each side, yet

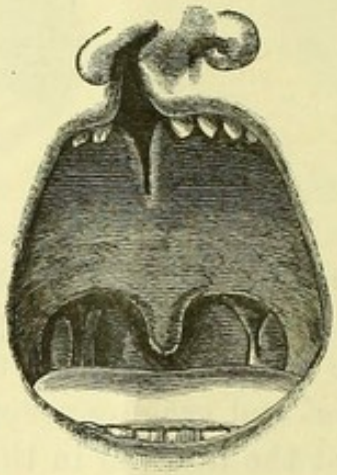
[1] Rouge, 'L'Uranoplastie et les Divisions congenitales du Palais.'

[2] 'Die Operative Chirurgie,' von Johann Friedrich Dieffenbach, Erster Band, 1845.

there are even exceptions to this rule; thus, M. Ancelet[1] refers to an example in which there was a *total absence* of the soft palate in a child; and amongst other anomalous conditions, an instance is reported in the 'Brit. Med. Journal' for March, 1857, in which the left side of the uvula adhered to the edge of the soft palate near the tonsil.

Besides the fissured palate other deformities have been occasionally met with in the same patient. I remember one curious instance which was under the care of Mr. Bowman at King's College Hospital in 1859. There was eversion of the lower lip with two openings of buccal glands, besides a complete fissure of the palate with double harelip. These fistulous openings perpetually discharged a secretion, which so annoyed the patient that an operation was required. It consisted in dissecting

Fig. 7.



up the apertures and turning them back so that the discharge might enter the cavity of the mouth.[2] And in a case of complete cleft of the palate sent to me by my friend Mr. Samuel Osborn there was also a congenital fissure of the lobe of the right ear, in another example congenital talipes calcaneus was present in both feet, and in a third the little patient had marked hypospadia.

In looking into a patient's mouth it is well to bear in mind that sometimes the appearance after an injury of the upper jaw closely resembles that after an operation for cleft palate. I was

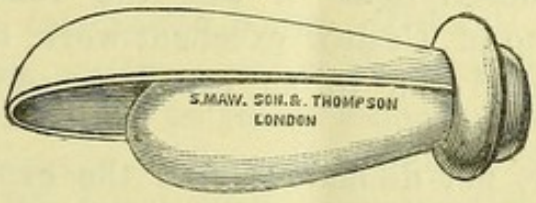
[1] 'Bullet. Méd. de l'Aisne,' 1867, No. 2.

[2] 'Brit. Med. Journ.,' August 20th, 1859, p. 666. This case is probably somewhat similar to the one to which I referred in 'St. Thomas's Hospital Reports,' 1875, p. 141, art. "Harelip."

much struck with this fact in the case of a man aged 19, who applied as an out-patient at St. Thomas's Hospital on June 1st, 1876, for another ailment. The right side of his face was peculiar, which led me to examine his mouth. He stated that when a boy he was kicked on the right cheek by a horse. On carefully examining him the lateral incisor tooth of the right side was absent, and there was a deep V-shaped furrow extending from before backwards. There was no distinct fissure, but in the absence of any history it might easily have been taken for a case in which a successful operation for cleft palate had been performed. It showed, at least, that injuries sometimes occasion deformities that have a somewhat similar appearance to those of a congenital origin.

The main difference between cleft palate and harelip is that the former is always in the median line, whilst in harelip the fissure is, as a rule, on one or both sides. Cleft palate, as Velpeau says, has never yet been seen double. Harelip attracts the attention of bystanders, a cleft palate does not offend the eye in the same manner, but when the patient speaks the ear at once detects the malformation. It is scarcely possible to estimate the number of adults who are practically excluded from society by this distressing deformity. There is no doubt that many infants with fissured palate die very early of sheer starvation. They are unable to suck, and if food be administered by the spoon so much returns through the nose that a sufficient quantity is not swallowed to insure nutrition. At my suggestion Messrs. Maw and Co. have manufactured an instrument such as this. It consists of an ordinary teat attached to a feeding bottle.

Fig. 8.



Over the teat is a very thin plate of soft metal, which can be moulded to the little patient's mouth. The instrument is not available in all cases, but is, as I have reason to know, well worthy of trial. Mr. Oakley Coles has devised a somewhat similar apparatus, but the shield is made of india rubber.[1]

[1] 'Mechanical Treatment of Deformities of the Mouth.'

According to Mr. Atkinson,[1] any such apparatus is scarcely needed, for he declares that "when a child with a defective palate sucks the breast it places the nipple under the tongue, and thus instinctively makes an artificial palate of its tongue which prevents the milk from flowing into the nose instead of the pharynx." There is no doubt that the little patient should, when fed, be placed in the almost upright posture, and that mother's milk should be given, either from the mother herself or from a wet nurse. I have, however, noticed that many children with congenital cleft palate appear to thrive better under a more farinaceous diet.

When the patient arrives at boyhood or girlhood the regurgitation of food through the nostrils does not frequently occur, but some care has to be exercised in order to prevent it from doing so. In cases of complete cleft through the hard palate there is often a deficiency in the sense of smell.

Some writers, Mettauer amongst others,[2] speak of extreme fœtor of the breath. I cannot say I have noticed this. There is a peculiar odour which may possibly arise from the mucus becoming rapidly dry and thus forming incrustations on various parts of the mucous surface.

It is further very difficult, and in some cases impossible, for the patients to blow out a candle, and on the same principle they cannot perform on a wind instrument, such as the flute or cornet. M. Roux noticed these points in his first operation on Mr. Stevenson.

It would be foreign to the purport of this paper, which is intended to be a practical one, were I to enter into the consideration of the development of the mouth. For minute and elaborate descriptions of this the reader is referred amongst others to M. Coste's[3] excellent work, to Mr. Goodsir's exhaustive article,[4] and to an excellent résumé by Dr. T. Hamy.[5]

It is, however, not difficult to find the explanation of the origin of fissures of the lip and palate when it is remembered

[1] 'Lancet,' 1833, vol. i.

[2] 'American Journ. of Med. Science,' vol. xxi, 1837-38.

[3] 'Histoire générale en particulière du Developpement des Corps organisés.'

[4] 'Edinburgh Medical and Surgical Journal,' vol. li.

[5] 'L'Os Intermaxillaire de l'homme à l'état normal et pathologique,' 1868, Paris.

that in normal development at an early period of fœtal life the nose and mouth form one common cavity. At about the eight or ninth week the horizontal plates of the superior maxilla of each side unite in the median line, and also with the incisive bone; and further, that from the superior maxillary protuberances the palate and superior maxillary bones are developed. Thus, various degrees of fissure, either of the hard or soft palate, will result from non-union of these parts.

MM. Follin and Duplay[1] put the case very plainly when, after giving an elaborate account of M. Coste's views on development, they state, "It is easy to understand all the complications of harelip and cleft palate if we suppose that the arrest of development extends to the bones and the soft parts. If the separation is persistent between the superior maxilla and intermaxillary bones there may be a labio-alveolar fissure, and if it entered further back it will be labio-palatine. And, again, if the arrest of development occur very early in fœtal life, when the nasal and buccal cavities freely communicate, the deformity known as a complete cleft palate will be the consequence." As bearing on development I may direct attention to an able paper by Dr. Langdon Down on "The Relation of the Teeth and Mouth to Mental Development."[2] He says:

"I have made a very large number of careful measurements of the mouths of the congenitally feeble-minded and of intelligent persons of the same age, with the result of indicating, with few exceptions, a markedly diminished width between the posterior bicuspids of the two sides. One result, or rather one accompaniment, of this narrowing is the inordinate vaulting of the palate. The palate assumes a roof-like form. Often there is an antero-posterior sulcus corresponding to the line of approximation of the two palate bones. There is very frequently a deficiency in the posterior part of the hard palate, from a want of development of the palatal processes of the maxillary bone, as well as an absence of the palatal process of the palate bone. As a result of this defect the false palate hangs down abnormally and interferes with clear phonation." Dr. Down then adds that at an early period of his investigations he was prepared to find a large number of cases of cleft palate, but he discovered by

[1] 'Traité élémentaire de Pathologie externe,' tome iv, fascicule 3, p. 645.

[2] 'Trans. Odontological Soc.,' vol. iv, 1872.

statistics that these were not more than five in one thousand cases. Bisection of the uvula occurred four times in one thousand, and absence of the uvula twice. The excessive vaulting of the palate, he adds, may possibly arise from arrest of development of the sphenoid bone or defective growth of the vomer.

I have not been enabled to ascertain the percentage of cases of harelip and cleft palate in this country, but the subjoined statistics may be briefly referred to, so that the reader may form some idea of the proportion of such cases on the Continent. According to Grenser, of 14,466 infants born living at the Maternity of Dresden from 1816 to 1864, there were sixteen cases of simple harelip and nine with fissures of the palate. And Credé states that from October 1st, 1856, to December 31st, 1865, 2044 children were born. Out of this number there was one case of simple harelip and one of complete division of hard and soft palate.[1]

It is somewhat curious that the notion of closing a fissure of the palate by operation is only of comparatively modern date, principally, indeed, within the present century. As Sir William Fergusson truly remarks, "The early history of the operation for cleft palate sounds like a romance."[2] And in order to show how little operative interference was considered justifiable there is, I observe, no mention made of the subject in Cooper's 'Surgical Dictionary,' published in 1818. And Sir Astley Cooper, writing in 1823, implies that little can be done for the deformity.

Sir William Lawrence, too, speaking in 1829,[3] says that "there are few cases in which the operation is required."

Further, Mr. Syme, writing so recently even as 1854,[4] believed the operation was of doubtful expediency, and states, in his 'Principles of Surgery,'[5] "Split palate does not admit of any remedy for the division of the hard palate, except the closure of the communication between the nose and mouth by a piece of silver, enamel, or other substance so fitted as to retain it without shifting. Fissure of the soft palate may be

[1] Rouge, op. cit.

[2] 'Lectures on the Progress of Anatomy and Surgery,' 1867.

[3] 'Lancet,' vol. ii, p. 959.

[4] 'Association Med. Journ.,' March 10th, p. 230.

[5] 'Principles of Surgery,' 1856, 4th edit.

united in favorable cases by an operation similar to that for harelip, but which is uncertain of execution owing to the situation of the parts, their mobility, and the involuntary efforts of the patient." How vastly different is our experience of to-day!

As to the *hereditary character* of cleft palate it does not seem, if compared with harelip, to descend so frequently from parent to child. In most of the cases that I have observed there has been no history, and yet in the few exceptions the circumstances have been somewhat striking. Thus, at St. Thomas's Hospital, in 1874, I saw two children, sisters; one had a simple cleft in the soft palate, and the other a double harelip with a complete fissure of the hard and soft palate. The father and mother showed no similar condition, but the mother's aunt had a fissure of the palate. In another instance the father and child had cleft palate, and there were three other children by the same father whose palates were perfectly normal. In another instance a father and two children all had cleft palate, and one child had harelip besides.

Rouge[1] refers to the cases of two sisters with cleft palate, one rather worse than the other. The parents were perfectly healthy, and there were two brothers normally developed, but otherwise there was no trace of similar deformity in the family.

Other examples might be adduced of a somewhat similar nature. Mr. Ramsay, who read a paper at the Odontological Society in 1865, stated his belief that the deformity was not hereditary, and further mentions a point which is certainly at variance with my own experience—that he had never seen a case in which the patient's complexion was dark. It is a matter of little moment, but I am inclined to think that most of the patients I have seen have had a somewhat nervous temperament, and many, perhaps the majority, have had fair complexions.

As to the *causes* of cleft palate, I have observed that parents are not so ready to supply a reason for that deformity as they are in cases of harelip. Maternal impressions of all sorts are of course given. Thus, in one case now under my observation the mother attributes the deformity to the fact that when she was pregnant one of her other children fell on a walking stick

[1] Op. cit.

and split open the soft palate. In another the mother said it was due, she believed, to her having longed for some particular fish which had a huge mouth. What the fish was I could not ascertain. She assures me that this occurred at about the sixth week of gestation.

The merit of having first performed the operation has been claimed both by Professor Graëfe, who published his unsuccessful case in 'Hufeland's Journal' in 1816, and by M. Roux. M. Roux certainly seems to have been the first to excite the interest of the profession to the subject, for he operated in September, 1819, and according to his own showing at least acted perfectly independently. Thus he says, "Je declare, sur l'honneur, que jamais rien ne s'etait offert à mon pensée, et que je n'avais reçu non plus aucune inspiration étrangere relativement à la suture de voile du palais, lorsque je fus conduit à entreprendre cette operation sur le jeune médecin du Canada" (Mr. Stevenson). This case is fully given in his 'Mémoire sur la Staphylorophie,' Paris, 1825.

But about the same period (1820) Dr. John C. Warren, of Boston, performed an operation for closing the soft palate. Thus he says, in the 'American Journal of the Medical Sciences,' vol. iii, 1828, "Some years ago I had occasion to perform an operation for remedying the natural fissure in the soft palate. At that time I understood the operation had been once done in Poland or Germany, and once by Professor Roux, but I sought in vain for details that might assist me in its performance. However, I executed it satisfactorily then, and have since repeated it." He then gives an account of his first operation—which was successful—on a young woman aged sixteen.

The operation had, however, been successfully performed previously, for, according to M. Robert,[1] M. Lemonnier, a dentist, succeeded in uniting the two borders of the cleft in the case of a child about the year 1760. He first inserted several points of sutures in order to keep them approximated, and afterwards abraded them with a cutting instrument. Upon which Velpeau observes, "A child, a cleft, the suture, the refreshing, the cure, everything, in spite of the somewhat vague expressions of Robert, scarcely permit us to doubt that this dentist truly had recourse to staphy-

[1] 'Mémoires sur différents objets de Médecine,' Paris, 1764.

loraphy and not to suture of a simple perforation of the palatine vault."[1] Eustache (of Beziers) is said to have performed the operation in 1770, and in 1801[2] Désault reports the case of a child in which the palate was closed twenty-seven days after the operation for harelip. In 1813 M. Colombe attempted the operation on the dead body, and failed to induce a living patient to submit to the proceeding in a suitable case in 1815. Dr. Stevens, of New York, and Mr. Mettauer performed the operation in 1827.

It must be remembered that all the above cases were fissures of the soft palate, for no one had thought of closing the hard palate. It is supposed by Rouge that to Krimer is due the credit of having been the first to close a fissure of the hard palate, which he did in 1824, in the case of a girl aged eighteen.[3]

Other surgeons immediately followed suit, and undertook operations for closing both the hard and soft palate, amongst others Dieffenbach, Mason Warren, Liston, Alcock, Brodie, Guthrie, Bushe, and Crampton; and more recently Avery, Pollock, Sir W. Fergusson, the last distinguished surgeon's experience having, perhaps, surpassed any of the others.

It is somewhat remarkable, that though assumedly the first case (that by Lemonnier) was in an infant, and the success perfect, yet to within even a few years it has been considered the correct practice to defer the operation until the patient has arrived well nigh to the age of puberty. Velpeau has expressed this opinion, and Müller thought that from the sixteenth to the eighteenth year is the best time. Within even the last twenty years the same theory has been held by some surgeons; and as an illustration I may say that at St. Thomas's Hospital last year (1876) a boy, aged sixteen, applied to me to be operated on, and stated that his mother had been told that the operation could not be safely undertaken until he was sixteen years of age. He certainly took the earliest opportunity of seeking advice, for he applied on the anniversary of his birthday. Further, M. Velpeau[4] thus expresses his opinion on this point:— "Toutefois, l'opération échoue encore assez souvent; une jeune

[1] South's 'Chelius,' vol. i, p. 603, 1845.

[2] 'Œuvres chirurgicales,' p. 204.

[3] Op. cit.

[4] 'Méd. Opératoire,' 2nd edit., vol. iii, p. 561.

fille que j'ai vue à l'Hotel Dieu l'a subie cinq fois sans succès. Plusieurs malades de M. Roux en sont *morts*, et j'en ai vus un certain nombre que ce chirurgien avait opérés sans fruit. Les autres praticiens ont obtenu une proportion de resultats heureux moins forte que M. Roux, en sorte qu'il n'est prudent de la tenter que dans les bonnes conditions, chez des sujets bien portants, dociles, et âgés de quinze à cinquante ans, par exemple."

However, within the last fifteen years, surgeons have practised the operation at a much earlier period of life; thus, Billroth operated in 1859 on a child six months old at the same time he operated on the harelip. The harelip united, but the palate failed.[1] He also operated in 1861, successfully closing the hard and soft palate at the same time in a child aged about two and a half, and with partial success in a child aged one year, complete failure in a boy aged eight weeks and also in a girl one and a half year old.[2]

Otto Weber operated in 1861 on a child six weeks old; the soft palate failed, the hard united. From 1863 to 1865 M. Gustave Simon operated on three cases, one child five days old; hard and soft closed at same time; hard palate united, soft failed. Second case, child nine months, good result. In this case the harelip and palate were both done at same time. Third case, a child aged twenty weeks, failure. And another case, aged six days, of uraniscoplasty, the child died eight days after of diarrhœa.

M. Ehrmann, writing in 1870,[3] reports five instances of fissured palate. The patients were aged respectively three and a half years, four and a half months, eight months, eight weeks, and twenty-seven months. And Mr. Marsh operated on a case with partial success at the age of sixteen months,[4] and I operated successfully on a child at St. Thomas's Hospital, aged two months.[5]

Of Mr. T. Smith's eleven cases included in a paper published in the 'Transactions' of the Royal Med. and Chir. Soc. for 1868, the eldest was twenty-seven and the youngest two years of age.

[1] 'Lancet,' 1852, vol. ii, p. 31.

[2] 'Archiv. f. Klin. Chir.,' 1862, t. xi, p. 658.

[3] 'Lancet,' August 20th, 1870, p. 259.

[4] 'Brit. Med. Journ.,' November 6th, 1869, p. 520.

[5] Ibid., January 6th, 1872, p. 15.

M. Gustave Simon held that the operation ought to be performed during the first six months of life, and by preference during the first or second. A greater number of patients die, he says, after the operation, but in those that live the result is much more satisfactory. The muco-periosteal flaps are also said to be more readily stripped off in infants than in adults.

In expressing my own opinion I have no hesitation in stating that operations on very young children are, as a rule, extremely unsatisfactory, and this is the experience of other surgeons; thus, M. Passavant operated on five children varying from six weeks to two and a half years without one success. Langenbeck operated at five months and two and a half years without a better result. Billroth operated on a child two months old, who died six hours after the operation, and Rouge operated on a child six weeks old, who died twelve days after staphyloraphy.

The surgeon must, of course, be guided by the peculiarities of each case. I have myself operated on very young children in several cases, and, as just stated, one child was two months old; but this case was a very favorable one, for the fissure only involved the soft palate. I am, however, inclined to think that unless there be good reasons for doing it, the operation should not be undertaken before the age of five or six. Langenbeck advises staphyloraphy "not under seven years." Any one interested in the subject has only to look at the fissured palate in a newly born infant, and he will see how extremely thin the mucous lining is. It is almost like tissue paper, which with the slightest touch of the finger-nail will break away. I myself cannot conceive that operative measures under such circumstances can be of much avail. If the case be watched (and I have now some twelve or more cases under my personal observation), the gradual and slow development of the soft palate, as well as the covering of the hard palate, into a tough, thick, and solid structure may be readily observed. Chloroform necessarily is a great boon during the operation, but in very young children the chief difficulties arise in the after-treatment of the case. From sheer ignorance the little patients are apt to do something that promotes disunion; perhaps they will cry perpetually, or cough, or sneeze, or play with the ligatures with their tongue, and such acts favour the separation of the parts.

I would here mention that if the wound bursts open, the surgeon should never despair of getting considerable, if not complete union, provided the smallest portion of the edges can be got to adhere. The persevering application of strong nitric acid will promote granulations, and I have seen surprising results in cases which I at first regarded as hopeless. I am especially reminded of one case, that of a boy, aged four, upon whom I operated rather more than two years ago, and who was going on quite well until one day he gave an unlucky cough. The whole of the soft palate gave way, but by using the nitric acid a most perfect cure was effected.

In describing the various operations, it will be convenient to divide them into two classes:

1st. Including those cases in which the soft palate alone is involved. This operation is termed staphyloraphy (*σταφυλή*, the uvula, *ῥαφη*, a seam).

2nd. Including those cases in which the hard palate is more or less implicated. These may be remedied by two modes of procedure:—(*a*) By stripping off the soft tissues from the hard palate (in one or more ways), and so closing the aperture. This operation is termed uraniscoplasty (*οὐρανίσκος*, palate, *πλασσω*, I form. (*b*) By completely dividing the bone and so uniting the sides of the fissure. This operation is called osteoplasty (*ὀστέον*, bone, *πλασσω*, I form).

1. *Staphyloraphy.*

Before proceeding with this subject it is necessary to make a passing allusion to the numerous mechanical appliances that have been employed in cases in which the patients have either objected to, or the condition of whose palate has rendered it not amenable to surgical treatment. The practical surgeon is aware that the best constructed apparatus cannot take the place of operative procedure. Most of the instruments that have been suggested have had for their object the closure of holes or perforations, especially of the hard palate acquired by accident or disease. Such instruments are termed obturators, and to these I shall presently refer. Various mechanical means or false palates have been employed by Stearns,[1] Kingsley, Sercombe,

[1] 'Lancet,' July 5th, 1845.

Ramsay, and Oakley Coles, as a complete substitute for an operation on the soft palate In a patient who was exhibited at a meeting of the Royal Medical and Chirurgical Society, November 27th, 1866, "the instrument consisted of a piece of hard vulcanite with two teeth attached to the anterior portion. This supplied most accurately the deficiency in the hard palate. The fissure in the soft palate is closed by means of a piece of soft vulcanite attached to the hard, which is capable of being pressed slightly upwards and downwards by the muscles of the fauces, thus effectually closing the passage of the nares during speech or deglutition."

An ingenious instrument, such as this (fig. 9), has been used

Fig. 9.

by Mr. A. T. Norton in a case of partial cure after operation, a description of which will be found in the 'Med. Press and Circular' of April 19th, 1876.

Mr. James Salter gives an excellent description of an instrument he has devised for the same purpose;[1] and Mr. George Parkinson, who has had considerable experience in such cases, refers especially to this method of treatment.[2] On the other hand, Mr. William Donald Napier, after numerous trials in such cases, has arrived at the conclusion that the value of mechanical apparatus is very much overrated, and is of opinion that no artificial means should be employed excepting in those cases in which it is not possible to perfect a cure by surgery.

Again, in order to avoid the use of cutting instruments, various means to establish inflammation and thus to produce a raw surface have been suggested. Graëfe used caustic potash, and also sulphuric acid, Ebel advised the tincture of cantharides, and Doniges used a hot iron (A.D. 1823).

Dupuytren, Béclard, and Wernecke tried cauterization by

[1] 'Holmes's Surgery,' vol. iv, article "Diseases of Teeth."

[2] 'Lancet,' vol. i, 1867, p. 41.

means of muriatic and sulphuric acid, but the results were not favorable.[1]

During the past year I have been trying the application of strong nitric acid to the fissure, and, I think, with decidedly good results. The only drawback is that the process of cure is somewhat tedious. The *modus operandi*, as I explained in the 'Lancet,' July 29th, 1876, is this:—I first produce a raw surface by carefully applying with a stick (not a glass rod) the Acid. nitric. of sp. gr. 1·500, and in a few days afterwards I use in the same way the Acid. nitric. sp. gr. 1·420 (Ph. Brit.), about twice a week to the part, especially to the fork of the cleft. The merits of this procedure have been put to the test by other surgeons. Thus, Mr. Charles Gaine, of Bath, writes to me under date November 26th, 1876, respecting one case, that "The fissure was nearly closed after eight or ten applications of the Acid. sp. gr. 1·500, and about six of the Acid. Nit. pur." Mr. H. G. Armstrong, too, of the Royal Berks Hospital, Reading, states that in one case in which he applied the treatment he was quite satisfied of considerable improvement.

M. Jules Cloquet, like myself, seems to have been fairly satisfied with this mode of treatment, and in 1855 published an essay entitled 'Mémoire sur une Méthode d'appliquer la Cauterisation aux divisions anormals de certain organes, et specialement a celle du vois du Palais,' in which cases are given of success after repeated cauterizations.

At the meeting of the Academy of Sciences of Paris of the 21st of May, 1860, a case was brought forward by Professor Benoît, of Montpellier, which had been treated by this method. The child was eleven years old, the soft palate was completely cleft, and all the usual symptoms were present. The treatment lasted nineteen months, with two rather long interruptions. The whole cleft has now united save that of the uvula, and this result was obtained by thirty-three cauterizations, fourteen with the acid nitrate of mercury and nineteen with the solid nitrate of mercury.[2]

Mr. Tyrrell reported a case in which he closed a small congenital aperture of the roof of the mouth (a very rare deformity), situate about the centre, in a girl seventeen years old.

[1] 'Dictionnaire de Médecine et de Chirurgie pratique,' vol. xv, 1836.

[2] 'Lancet,' June 9th, 1860, p. 576.

The hole was only large enough to admit the blunt end of a probe, and it was cured by a few applications of a hot iron.[1]

Before undertaking any operation for closing a fissure of the palate, the surgeon should ascertain, as far as he can, that the patient is in the best possible state of health. Occasionally there is enlargement of the tonsils, and their removal is very desirable, because they hinder the prospect of union. It is a good plan, too, to accustom the parts to the contact of the finger without the patient retching; hence for a few days previously the fauces should be touched three or four times daily with a stick or other suitable substance. M. Ebel insisted on this; and though it might appear to be less necessary at the present day, because chloroform or some other anæsthetic is generally employed, yet I think it is useful in the after-treatment. Alum gargle has been also employed with the idea of diminishing the vascularity of the part. The administration of tonics is necessary in some cases, especially in women who have leucorrhœa or other uterine disturbances. I must confess I have my doubts as to the propriety of purging the patient on the day previous to the operation, for I am inclined to think that it is apt to weaken him and so diminish the chance of union. Again, the effect of a purge in many instances is to give the patient a vigorous appetite, hence he is likely to eat with less care than he otherwise would. I have observed this especially in children about seven or eight years of age. The rule that I generally act upon then is, not to give a purgative unless it appear necessary, and then to administer it on the third day before the operation.

Anæsthesia in some form may be employed, but if used it should be carried to some considerable extent, otherwise, if the patient be in the least conscious, the operator is greatly hampered in his manœuvres. In 1852 a writer in the 'Lancet,' vol. i, p. 118, says, respecting the administration of chloroform and such anæsthetics, "Staphyloraphy is, of course, one of the few operative proceedings where chloroform cannot be used." Long before this period, however, surgeons had removed large tumours of the jaw under the influence of this agent, and there appeared to be little reason why staphyloraphy should not be performed with the patient in a state of unconscious-

[1] 'Lancet,' 1829, vol. i, p. 549.

ness. In 1857 Mr. Field, of Brighton, closed a fissure of the palate under chloroform, and Mr. T. Smith brought forward the advantages of anæsthesia in an interesting paper read before the Royal Medical and Chirurgical Society, January 14th, 1868.

I may say that in selecting the kind of anæsthetic it is well to bear in mind that ether excites the salivary secretion. I therefore prefer chlorform in all operations about the mouth, and am supported in this opinion by Mr. Charles Moss, whose great experience as a chloroformist in such cases enables him to speak with authority.

The operation on the soft palate is sufficiently easy, and may be thus performed :—Although some surgeons prefer the upright posture, there is no doubt that the recumbent position is the best both for the patient and the surgeon. The patient's head can be more readily steadied, and the light directed more completely into his mouth. Under chloroform the patient is very apt to struggle occasionally, hence his movements should be restrained by straps applied in the following manner :—The knees are kept down either by a strap or bandage, which passes under the operating table. Another strap or bandage is fastened to one wrist, say the right, and is then carried under the left thigh of the patient and then secured to his left wrist. These straps, it must be understood, need not be put on too tightly ; they are only intended to check movement, and should be applied in such a way as to allow of the patient being turned on his side if necessary, so as to clear the throat in case of vomiting. The mouth should be kept open by a gag of some kind. Surgeons have their own fancies on this point. Mr. T. Smith's ingenious instrument[1] is useful, but the instrument I am in the habit of employing (fig. 10), and which answers the purpose remarkably well, is one that was made for me in 1870, and which has since been slightly modified by Sir William Fergusson.[2] I was not aware, until my attention was directed to the fact by my friend Mr. Alfred Coleman, that he had devised a somewhat similar, but rather more cumbersome instrument to that first made for me.[3]

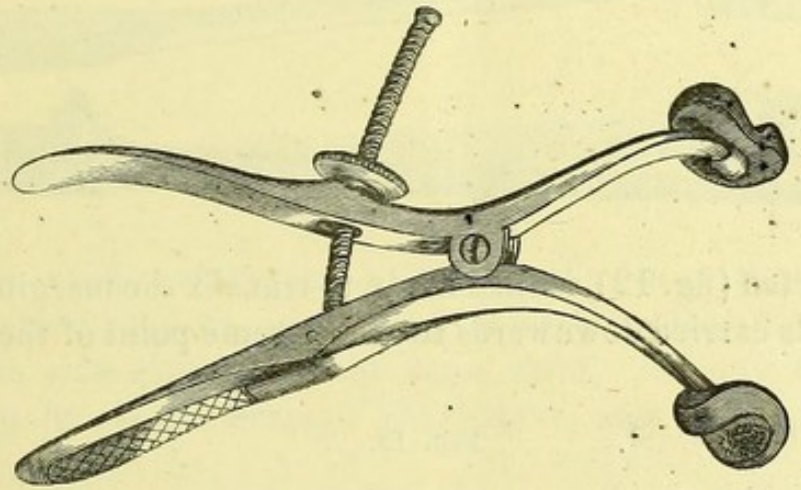
[1] See ' Med.-Chir. Trans.,' 1868.

[2] See ' Brit. Med. Journ.,' January 1st, 1876, p. 3.

[3] See 'Med. Times,' January 26th, 1861.

I am quite convinced that the main difficulty in operations on the palate is the hæmorrhage, which is occasionally very trou-

Fig. 10.



blesome; and whilst I think most highly of Sir W. Fergusson's plan of dividing the muscles, yet I am inclined to believe that this part of the operation, inasmuch as it is attended with some bleeding, had better be postponed until after the denudation of the edges. Now that chloroform is so universally administered the operator is enabled to pare the fissure rapidly and generally in one continuous piece, the anæsthetic preventing the sudden contraction of the muscles. The different methods of dividing the muscle will be referred to presently.

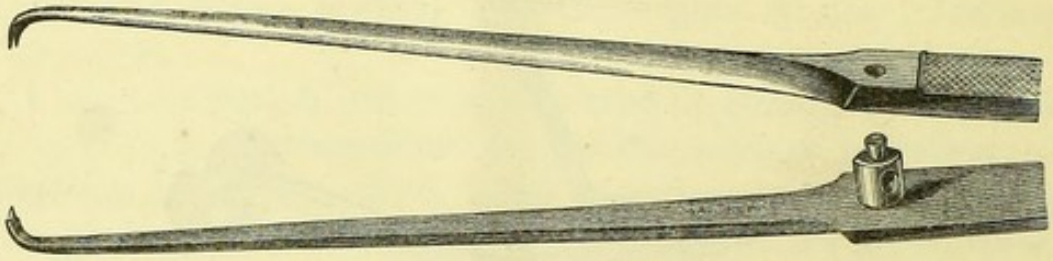
The instruments to be employed should be of the simplest character. Roux evidently had a horror of complicated surgical apparatus. He says, after an experience extending over nearly half a century, "Je crains toujours dans la pratique des opérations les instruments qui tiennent trop du jeu des machines. Partout où les actions simples peuvent suffice, c'est de ce côté que sont mes prédilections."[1]

The necessary preparations having been made, there should be two or three assistants to hand instruments and to soak up the blood with clean sponges, which latter should be about the size of a walnut. The plan I adopt may be thus described:—The operator, standing on the right side of the patient, commences by seizing with a pair of hook-forceps (fig. 11), a little below the

[1] 'Quarante Années de Pratique Chirurgicale,' t. i, p. 329.

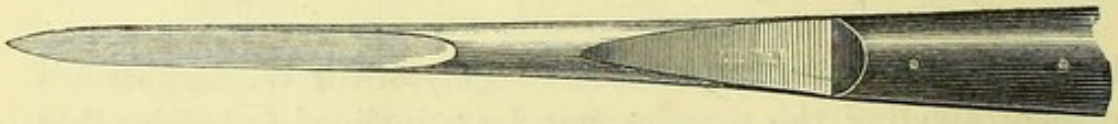
centre of the cleft on the patient's left side. A knife, such as

Fig. 11.



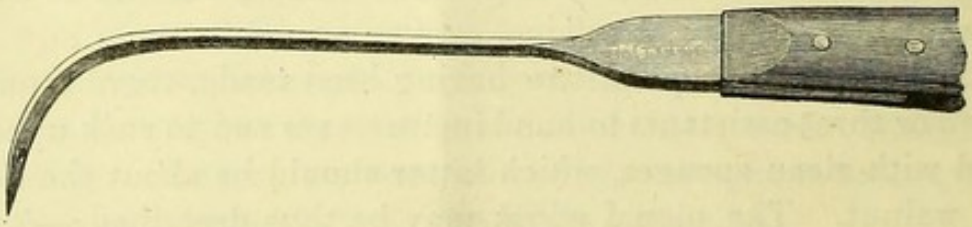
here depicted (fig. 12), is then made to transfix the margin of the cleft, and is carried downwards to the extreme point of the uvula.

Fig. 12.



The instrument being now reversed, pares the remaining part of the edge upwards towards the junction of the fissure, where puckered up it remains until the other or right side is denuded in like manner. If possible the whole of the edge should be removed in one continuous piece from side to side, in order to insure the certainty that not the least particle of mucous membrane is left, otherwise perfect union cannot possibly take place. Some surgeons use scissors to denude the edges, but with such an instrument the parts are more or less bruised.[1] A needle such as this (fig. 13), armed with a thread, is then

Fig. 13.

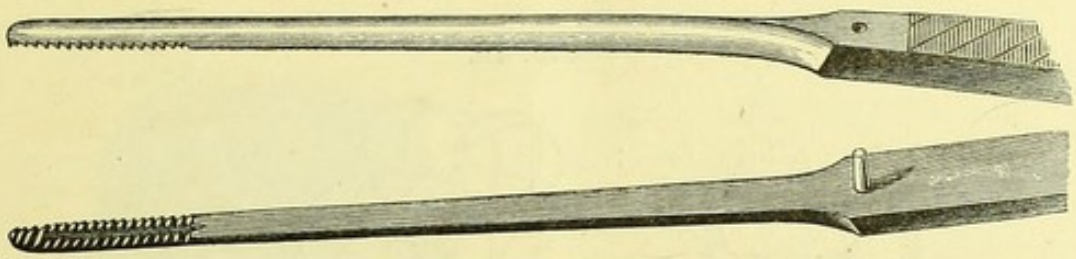


passed through the palate at about a quarter of an inch from the free edge. The thread is then grasped with either the

[1] Mettauer, 'American Journ. of Med. Science,' vol. xxi, 1837-38.

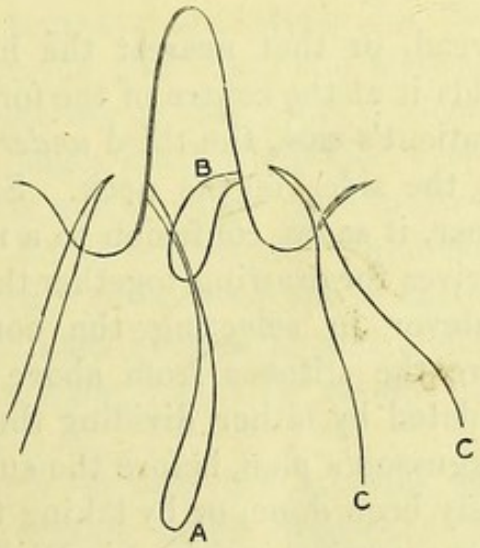
hook forceps or with a pair having serrated blades (fig. 14),

Fig. 14.



and the needle withdrawn. The needle is now re-threaded (or another may be used), and is to be passed through the opposite side exactly on the same level. If now the end A (fig. 15) be passed through the loop B, and traction made at

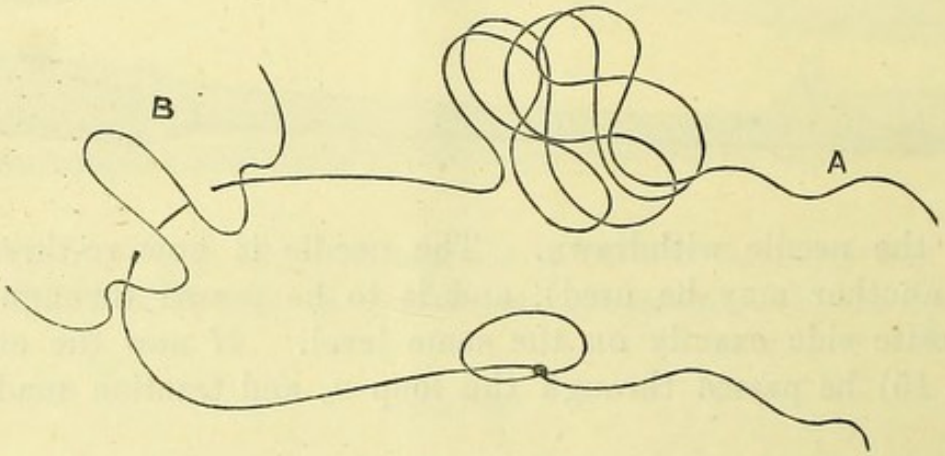
Fig. 15.



cc, the end A will be brought through the opposite side of the fissure. It now only remains to pull through one side of the thread, when the appearance represented at B (fig. 16) is shown. When sufficient threads, say three or four, have been introduced, the next step is to approximate the edges. A slip knot is perhaps the best; and before putting the end into the noose, it is well for the surgeon to take the other end of the thread in a figure-of-8 form around his left forefinger and thumb, which manœuvre prevents the thread from getting entangled, and then it runs as easily as possible (fig. 16). Coloured threads may or may not be used. It is, I think, a good plan as the

operator proceeds to tie the ends of each succeeding thread; and supposing four sutures are employed, the practice I adopt is to

Fig. 16.



give the first thread, or that nearest the hard palate, to an assistant, who holds it at the centre of the forehead; the second is held *over* the patient's ears, the third *under* the patient's ears, and the fourth at the sides of the neck. Simple as this proceeding may appear, it saves confusion to a marked extent, for when the time arrives for drawing together the sutures, there is no difficulty whatever in selecting the corresponding ends. As a rule, I secure the stitches from above downwards. The operation is completed by either dividing the muscles, according to Sir W. Fergusson's plan, before the sutures are closed, if this has not already been done, or by taking the tension off the stitches by making a vertical incision, as Dieffenbach did, about a quarter of an inch in length on each side of the fissure. When necessary the anterior and posterior pillars of the fauces, with some fibres of the palato-glossus and palato-pharyngeus, may be divided. The accompanying woodcut (figs. 17, 18) show the incisions referred to.

Respecting the operation a few practical points may not be out of place. There is often some difficulty in grasping the thread when passed through by the needle, but it may be easily secured if the needle be thrust freely and somewhat roughly through and slightly withdrawn at once; but this must be done immediately and before the thread gets saturated with moisture. A slight loop in the ligature is thus formed, which

can be readily secured in the grasp of the forceps. Various instruments have been devised to catch the thread, but they are

Fig. 17.

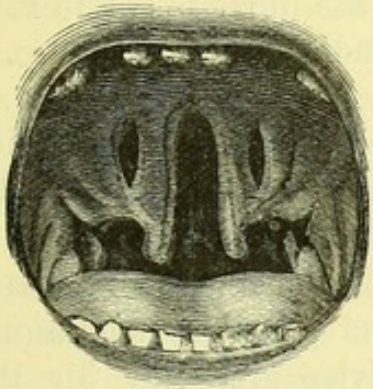
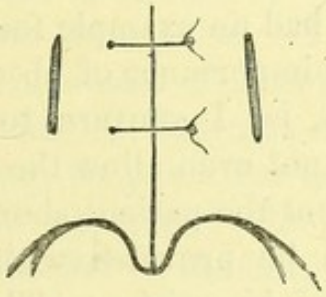


Fig. 18.



unnecessary, as a pair of forceps such as those already referred to answer the purpose perfectly. It is important, too, not to draw the stitches together too tightly, for there is generally a little swelling after the operation, and allowance must be made for this, but in referring to this point it must be distinctly understood that the edges must be applied with the most perfect precision, otherwise union cannot be expected. It is desirable, also, to place the knots so that they shall not lie exactly over the wound. In order to increase the breadth of the raw surface I have seen Sir William Fergusson take a curved knife and run it along the cut surface. This he thinks gives a greater probability of union.[1]

As to the length of time the stitches should remain is a point on which there is much difference of opinion. Sir W. Fergusson advises their removal about the third or fourth day; but then he was guided by circumstances, and has left them even to the eleventh day. I myself leave them to work their way out, unless they appear to cause irritation, when they ought to be taken away immediately. A remarkable case bearing on this question was under my care in February, 1876:—The patient was a boy aged 14; the stitches were left for one week, when a blush appeared all over the palate, and I was fearful that the parts might burst open. I removed the sutures, and on the following day all the inflamed appearance was gone, and the fissure united most perfectly.

[1] 'Med.-Chir. Trans.,' vol. xxviii, 1845.

As to the patient being confined to bed, I am of decided opinion that this is very necessary for three or four days. At all events, if he is not in bed he ought to be under the strictest supervision. Certainly in hospital practice this point is of great consequence, for the patient evading the nurse is apt to subject himself to draughts and to vicissitudes of temperature. Of this I had an example four years ago at the hospital.

The importance of absolute quiet, with perfect suspension of speech, is, I venture to think, somewhat overrated. Roux would not even allow the patient to swallow his saliva. It is as well that the patient should not speak above a whisper, and he should be provided with a slate and pencil to communicate most of his wishes. The sound advice given by Sir Philip Crampton, and by M. Ehrmann also, of not starving the patient should be rigidly carried out. All surgeons with any experience of staphyloraphy know that the operation is an exhausting one, sometimes there is considerable hæmorrhage, and besides, the shock is great in certain patients, and is really severe in very young patients. There is in some cases considerable nausea and retching after the operation, hence it may be necessary to administer enemata of beef tea and other nutriment.

In reference to the disastrous effects of retching after the operation, I may refer to the case of a patient, a little girl, aged nine, sent to me by Mr. Wearne, and upon whom I operated. Two days after, she vomited two lumbrical worms, each about six inches in length, and the fissure broke open in consequence. Mason Warren attributed one of his failures to the sponges being filled with sand.[1]

I think the chief, and perhaps only real drawback to the use of chloroform is, that it is apt to be followed by nausea, retching, and vomiting. The patient swallows a good deal of blood, or rather perhaps the blood runs down into the stomach, which causes great uneasiness until that viscus is emptied.

In cases where there is oozing of blood the patient should be kept as quiet as possible, and be charged not to keep "hawking." I prefer that the mouth should be kept open, so as to allow the ingress of fresh and cool air rather than have recourse to the use of ice, for with the latter the chances of sloughing are increased by diminishing the blood supply.

[1] 'American Journ. of Med. Science,' April, 1848.

Steady pressure with the finger will arrest any hæmorrhage, and I disapprove of the application of the perchloride of iron unless employed with great care and skill because it adds to the risk of sloughing.

As to the order in which the various stages of the operation may be performed there has been some difference of opinion. Thus, Roux divided the operation into three parts:—1st. He introduced the needles which he held in a sort of forceps, and passed them from behind forwards, using as ligatures four or five strands of thread well waxed; 2nd, he pared the edges of the fissure; and 3rd, he tightened the ligatures. He further detached the lips from the posterior border of the hard palate by a transverse incision of from four to six lines in length. Dieffenbach objected to this proceeding on the ground that, if the operation does not succeed, the soft palate is disqualified from another operation. Dieffenbach,[1] Mütter,[2] Velpeau and others, pared the edges before putting in the needle, and used leaden wire as sutures; Gräefe, Souchet, Jousselin, and Alcock, and more recently Sir W. Fergusson and Mr. Pollock, advocate the use of silk sutures, and this practice I most cordially endorse, after having tried silver, iron, and other materials, to bring the edges together. Mettauer recommended metallic sutures, and Sir Philip Crampton beads of metal. Iron, platinum, and silver wire have their supporters, but whichever is used it should be pliable. The wire such as florists employ is a very good material. Mr. Brooke used glass beads, and Mr. T. Smith prefers horsehair. Dr. Mason Warren and Professor Smith employed the surgeon's knot, believing that the first turn being double there is less risk of the thread slipping.

To favour union Dieffenbach made a longitudinal incision at four lines external to and on each side of the fissure. He says, "The side incisions are furthermore of particular importance. Only when the sides of the soft palate are pierced through is the operation, with anything or any way secure, and while without them we can only hope to close small openings in the palate, with them we are able to cure the largest, because by reason of the wide openings of the side incisions nature

[1] 'Lancet,' 1835, vol. i, p. 694.

[2] 'Brit. and For. Med. Rev.,' vol. xix, 1845, p. 412.

is forced to a regeneration by filling them up with granulations, so that the palate gains what it was deficient in breadth."

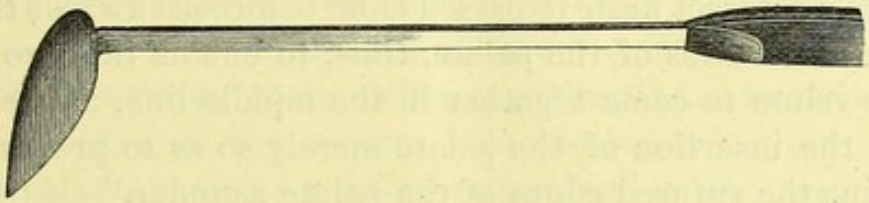
I have purposely left the question of the division of muscles in order that I might do full justice to the suggestions made by Sir W. Fergusson, Mr. George Pollock, and others. Moreover, inasmuch as chloroform, or some other anæsthetic, is now so uniformly employed, it seems a question whether the division of muscles as a primary step is so very important, and whether it may not be deferred until the last, when the parts may be released by dividing the sides of the soft palate. I now almost invariably adopt the latter practice with regard to the divisions of the muscles so as to arrest their action. Much has been done by Dieffenbach, Roux, Sedillot, Pancoast, Mütter, Mason Warren, Botrel, Avery, Pollock, and others; but it is I believe incontestable that to Sir W. Fergusson is due the credit of having, as Velpeau puts it, "*methodically* applied *myotomy* to staphyloraphy." The all-important point in the operation is to insure temporary immobility of the parts; and Sir W. Fergusson, in his excellent paper published in the twenty-eighth volume of the 'Medico-Chirurgical Transactions,' 1845, placed his operation on a strictly anatomical and physiological basis; and proposed, "as an important accessory to the operation of staphyloraphy, that the surgeon should, on strictly scientific grounds, and in accordance with the modern principles of myotomy, so conduct his incisions as to destroy all motory power in the soft palate for the time being, and thus permit that repose of the stretched velum which is so essential to a happy result; in other words (says Sir William), I advise the division of the levator palati, the palato-pharyngeus, and the palato-glossus muscles. The first of these steps I deem of the greatest importance, the second scarcely less so, and the third may be effected or not as circumstances seem to demand." That Sir William Fergusson's views may not be misunderstood it will be best to give them in his own words :[1]

"Previous to paring the edges of the cleft, a knife such as this (fig. 19) is passed through the fissure, so that its point can be laid on the tissues immediately above the soft velum, midway between its attachment to the bones and the posterior margin, and about halfway between the velum and the lower

[1] 'A System of Practical Surgery,' 5th edit., p. 526.

end of the Eustachian tube; the point is then thrust deep, and carried half an inch or more backwards and forwards, so as to

Fig. 19.



cut the levator palati; next the uvula is seized with a pair of long hook-beaked forceps, and drawn forwards, so as to put the posterior pillar of the fauces on the stretch, which is then snipped across with long curved scissors, about half an inch behind the tonsil, by which cut the principal part of the palato-pharyngeus muscle will be divided; then, if it seem desirable, the anterior pillar of the fauces is touched with the scissors, so as to make the section of the palato-glossus, a proceeding which I scarcely deem requisite."

With regard to the actions of the muscles in cases of cleft palate, Sir William gives these as his conclusions:

"1st. That the flaps are slightly drawn upwards and to the sides, when the levator palati contracts.

"2nd. That when the levator palati and palato-pharyngeus act strongly and together, the flaps are so forcibly drawn from the mesial gap, that they can scarcely be distinguished from the sides of the pharynx.

"3rd. That the flaps are forced together and the edges come into contact, when the superior constrictor muscle contracts during the act of deglutition.

"4th. That the circumflexus palati possesses but a feeble power over the flaps.

"5th. That the fibres of the palato-glossus are very imperfectly developed in the specimen in his possession."[1]

It is well to remember that, from some constitutional cause, and quite independently of muscular action, the parts may break open. On this point Avery[2] remarks, "It should be particularly noted that this separation does not always take

[1] 'Brit. and For. Med. Rev.,' April, 1845, No. 38, p. 415.

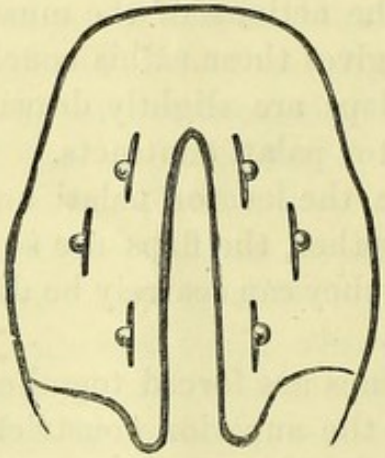
[2] 'Lancet,' 1852, vol. ii, p. 31.

place because the parts are *torn asunder*, but because they have failed to unite."

Pancoast, referring to his method,[1] says, "When the knots are prepared for tying, but before they are finally secured, Wenzel's cataract knife is passed from before backwards through the attached sides of the palate, thus, to enable the two halves of the velum to come together in the middle line, as well as to divide the insertion of the palate merely so as to prevent their straining the sutured edges of the palate asunder."

Warren divided the anterior and posterior pillars, and M. Sedillot, alluding to his own practice, says,[2] "My incisions pass through the entire thickness of the velum palati, and are a continuation of the lateral divisions of Dieffenbach, Pancoast, Liston, and Warren, of the anterior and posterior pillar of the fauces. Mettauer released the parts by a number of small lateral incisions (fig. 20). (This woodcut is copied from his paper.) Dr. Smyly[3] recommended the division of the muscles

Fig. 20.



something after Sir William Fergusson's method, only that he put the knife along the floor of the nose.

Mr. Callender, in order to obviate the difficulty arising from hæmorrhage, says,[4] "I divided the levator palati on either side, and five days after I passed four wires through the side of the fissure, and the palate being held forward and steadied

[1] 'American Journ. of Med. Science,' vol. xxxii, 1843.
[2] 'Med. Times,' 1850, p. 375.
[3] 'Med. Times,' June 7th, 1862.
[4] 'Clin. Soc. Trans,' vol. i, p. 173.

by means of the wires, I proceeded to pare the margins, and subsequently brought them together by twisting the wire."

Mr. Pollock arrests the action of the muscles in the following manner:—"First, he says, a suture is passed through one section of the soft palate at the root of the uvula, the ends secured together by a knot, and held outside the mouth. A second suture is then passed through the opposite side at a corresponding point. One of the sutures, now firmly holding one half of the soft palate, is drawn gently forwards and to its opposite side, so that the section of the palate is well stretched towards the median line. A thin, narrow, sharp-pointed knife, fixed in a long handle, is then introduced into the palate, close to the hamular process, a little in front and to its inner side. This process can be distinctly felt in the substance of the soft palate, internal and a very little posterior to the last molar tooth. Running the knife upwards and backwards, and somewhat inwards, the point may at last be seen in the gap, having passed through the entire thickness of the soft palate, and having cut, if not wholly, at any rate partially, through the tendon of the tensor palati: the knife should now lie above most of the fibres of the levator. If the handle of the knife be next raised the point becomes depressed; and if the blade be drawn forward, while it is at the same time made to cut downwards, it travels through a considerable section of a circle on the posterior surface of the palate, and insures the division of the greater portion of the levator palati. As the knife-blade travels downwards, the tension of the palate gives way, and often the division of the muscle is felt to be suddenly effected; the ligature being no longer pulled upon by it, though previous to division it will be felt sensibly and spasmodically contracting. As the knife is withdrawn through the wound, the division of the levator muscle should be thoroughly effected. The wound in the front of the palate need be no more than the width of the knife; whereas the wound behind is necessarily much longer, for the fibres of the levator have there to be divided by the sweep of the knife. Provided the muscle be effectually divided, as soon as the knife is withdrawn it will be found that all voluntary and involuntary movements of the palate have ceased; it has become pendulous and flaccid; pulling on it now should produce no spasmodic

contraction of its fibres. Should any resistance still be observed, the knife must be again introduced through the anterior wound, and the fibres a little more freely cut in a downward direction."[1]

2. Closure of the Hard Palate.

a. By Uraniscoplasty.
b. By Osteoplasty.

a. Uraniscoplasty.

The idea of closing the hard palate is said to be due to Dr. Mason Warren, but, as already stated, M. Krimer effected this object in 1824, and in the following manner:—"He made a semi-elliptical incision comprising the whole thickness of the palate on each side, two or three lines from the fissure; he then dissected off the two flaps and reversed them (Procedé par renversement, as the French surgeons call it) from without inwards towards the middle line, and then united them with a suture."[2] M. Beaufils made a *single* flap, and twisted it upon itself to fill the aperture.

"The method of proceeding originally proposed by myself (says Mason Warren) in 1843 was as follows:—First, when the bones composing the arch of the palate were divided, to dissect off the mucous membrane covering them on each side as far as the alveolar processes if necessary, stretching it across the fissure, and confining it in this situation by sutures; the flaps, it must be understood, being made continuous with the fissured halves of the soft palate. Second, in the above cases, and in fact in all where the lateral halves of the soft palate are too small to be easily brought in contact, as generally happens where the bones are involved, to cut away the posterior pillars of the palate with strong curved scissors, and continue the dissection behind the soft palate until the latter yields and

[1] 'Holmes's System of Surgery,' vol. iv, article "Diseases of Mouth."
[2] 'Dictionnaire de Médecine et de Chirurgie Pratiques,' vol. xv, 1836, p. 19.

allows itself to be drawn across the chasm, which, by the above proceeding, will be found practicable, even in those fissures which at first do not seem to offer the slightest hope for a successful operation."

In cases that are complicated with harelip it is, I believe, the best plan to operate as early as possible on the lip, for in this way the cleft in the palate becomes in a short time very much diminished in size, and much more amenable to treatment by operation. Further, I am convinced of the advantages of closing the lip, whether there be a cleft in the palate or not, as soon after birth as possible, for whilst the little patients seem to fade away before surgical interference, they thrive immediately and gain flesh rapidly after the operation. I have now under my observation several cases to prove this point.

Passavant, of Frankfort, relates the case of a child whose harelip was closed at the age of nine weeks, and a year after the palate was found to be so approximated without further operation that it presented a mere fissure (raphé).[1] Duplay and Rouge express their opinion thus:—"That in bad cases in which life is involved the lip should be dealt with as soon as possible after birth, and not to close the hard palate until about the end of the first year, and to reserve the operation on the soft palate, say until six or seven years of age."

Prolonged compression on the two maxillæ has been strongly recommended, and is no doubt of service in certain cases. Dupuytren, Jourdain, Levret, have much confidence in this practice, and MM. Autenrich and Mannoir employed an instrument which is very like that known to English surgeons as Hainsby's compressor.

Langenbeck, in his 'Archives de Clinique Chirurgicale,' 1861, t. ii, p. 230, states that in 1845 he tried what he terms "*the bony suture*" in a child aged three months, who had cleft palate and double harelip, with the intermaxillary bones quite isolated. He says, "I turned the piece back after cutting through the cartilage, and I fastened it on each side to the alveolar border with a leaden thread, which I twisted in the mouth. I then operated on the harelip: the case succeeded very well. On the sixth day after, the lead sutures were removed; suppuration, however, took place in their track, and at length three

[1] 'Archiv. f. Klin. Chirurgie,' t. v, p. 52.

teeth came away." He candidly admits, however, "that as the sutures had traversed the dental follicles, an accident which cannot be provided for, he had not thought fit to repeat the operation."

On the other hand, some authorities[1] recommend that the palate should be closed before the lip is interfered with, on account of the increased accessibility of the parts.

Assuming the case to be one of fissure extending through both the hard and soft palate, the question has arisen whether the soft part should be closed first, or whether the hard part should take precedence—the cure being completed in two operations—or whether the whole of the fissure should be closed at one operation. Here again there is difference of opinion. Thus Sedillot and Passavant recommend staphyloraphy first, then uraniscoplasty. Langenbeck, Erhmann, Rouge, and Pollock, on the other hand, advocate closing the hard palate first; indeed Mr. Pollock,[2] writing in 1856, says, "The attempt to unite the hard and soft palate at once is an extremely injudicious proceeding, and will most likely end in failure." He further prefers to commence with the anterior part when the fissure extends in the maxillary bones. I have, however, in several instances closed the entire fissure at once with the best results, and have found that, even if the soft part breaks open, the hard palate as a rule unites very favorably. M. Rouge found that out of twenty-eight cases he had seen of uranisco-staphyloraphy done at one operation, only ten were completely closed at once. Billroth had only three successes out of eight, and Langenbeck one only out of four.

Pancoast[3] thus describes his method of staphyloplasty:—It consists, he says, in a partial division of the two sides of the cleft near their bony connection, so as to admit of the middle strips being readily brought together, or by the raising of flaps from the side or the roof of the mouth, which are to be turned over and fastened by suture in the middle line.

Langenbeck[4] claims the right of priority for this kind of operation, and states that he was the first who *completely* closed

[1] Rouge, op cit.

[2] 'Med. Chir. Soc. Tr.,' vol. xxxix, 1856.

[3] 'American Journ. of Med. Science,' vol. xxxii, 1843, n. s. 6.

[4] 'Med. Times,' Jan. 11, 1862.

the hard palate by *déplacement* or *glissement*. Duplay, however, remarks that although Dieffenbach, Avery, Baizeau, and Langenbeck claim the priority, yet Baizeau was the first to put the plan clearly before the profession. Langenbeck appeared to be the first to insist on including the periosteum with the mucous membrane. According to Rouge this was first done by Langenbeck in 1860. Yet, referring to a case published by Mr. Avery,[1] the writer says:—"The most interesting portion of the operation was the difficult task of detaching the tough tissues adherent to the hard palate and lined with mucous membrane." And Mr. Pollock comes to the rescue of his countryman when he says,[2] "I should not be doing justice to the memory of the late Mr. Avery if I omitted to mention that he was the first surgeon in this country to close entirely a complete cleft of the palate, and that the operation which Professor Langenbeck proposed, and to which he gave the name of 'the operation of muco-periosteal flaps,' appears to be identical with the method of operating introduced by Mr. Avery."[3] He further states that in 1848 Mr. Avery first succeeded in closing clefts of the hard palate by operation, and that in 1853 Messrs. Weiss made raspatories for the performance of the operation. I need not add that the separation of the mucous membrane without including some of the periosteum is well nigh an anatomical impossibility because the two structures are so intimately connected.

Pollock says the incision for closing the hard palate should be made close to and parallel with the alveolar ridge, and extend from a point opposite to the last molar forwards to the canine tooth. Writing in 1856, Mr. Pollock says that he separated the soft parts in a direction "from the fissure to the alveolus," and then made a cut along the alveolar border. This takes off all tension. But more recently (1870) he remarks:—"I have adopted the plan of commencing from the incisors and proceeding inwards, terminating when the edge of the gap has been attained." "The flap," he adds, "should consist of all the

[1] 'Lancet,' vol. ii, 1852.

In Holmes's 'Surgery,' p. 436, footnote.

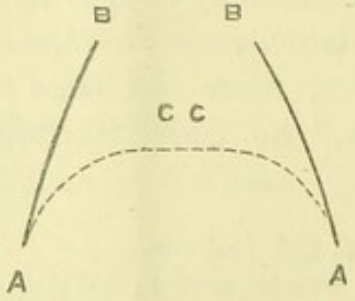
See Prof. Langenbeck's treatise entitled "Weitere Erfahrungen im Gebiete der Uranoplastik mittelst Ablösung des Mucös-periostalen Gaumenüberzuges," Berlin, 1863.

soft tissues covering the bone—mucous membrane, areolar tissue, &c." It is highly probable that Dieffenbach performed a very similar operation many years previously, for he states: —"If the opening in the hard palate be large, and the edges covered with a thin skin, the borders are cut round within about a quarter or half an inch of the edge. The skin is pushed away from the bone with a scraper, and the opening fastened by a suture. The side wounds are filled up with charpie and treated as usual."

The great advantage that Langenbeck claimed for the separation of the periosteum was that the new palate is composed of bony substance. "The osseous formation," he remarks, "takes place about the third week after the operation. It is completed at the end of the fourth week, and afterwards attains considerable solidity."[1] He tried it with a needle, and believed that ossification had really taken place. Doubts, however, have been thrown on this point, for it was supposed that the toughness was due merely to cicatricial tissue, which is well known to be very unyielding. To prove this point M. Marmy tried some experiments to ascertain the results of operation on dogs' palates, and found that although union was exceedingly tough, and almost as hard as bone, yet there was no true osseous tissue formed. The nature of the material is, however, of little practical importance, and M. Ollier, the originator of the subperiosteal resections, puts the case in its proper light in saying: —"If there may be doubt as to ossification, all must admit that it forms a very resisting surface which has the strength and takes the place of bone."

The success of the operation depends greatly on the extent of the arch of the palate, for if the part be of this shape (fig. 21)

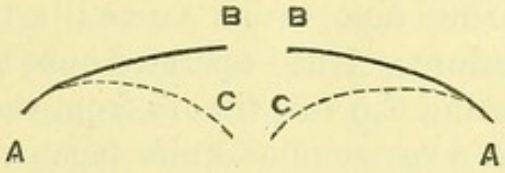
Fig. 21.



[1] 'Archiv für Klinisch. Chir.,' vol. v, 1er cahier, p. 3.

it is obvious that when the sides (A B) are detached they will fall together more readily (A C) than if the arch be formed thus

FIG. 22.

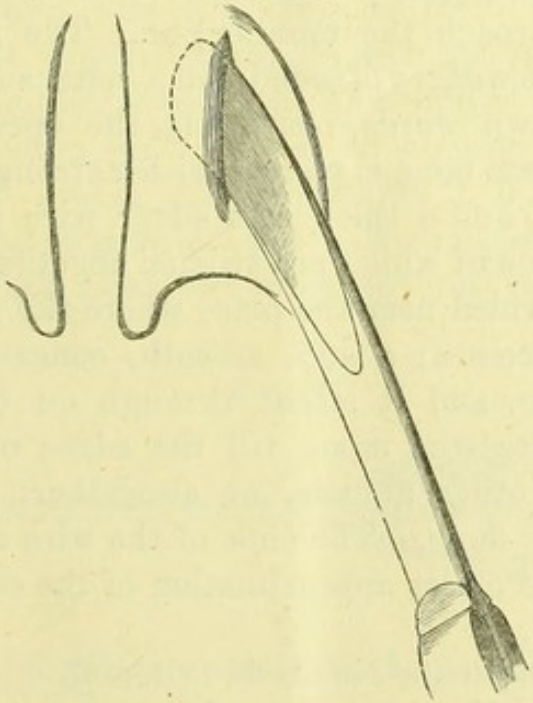


(A B, A C, fig. 22). Mr. Pollock remarks on this point, that "The more complete the cleft the nearer the perpendicular are

FIG. 23.

the sides of the palate, and consequently, when the soft tissues are detached from the bone, the flaps formed fall inwards, and very readily meet in the median line."

FIG. 24.



With reference to these different operations of uraniscoplasty

I am decidedly in favour of the so-called Langenbeck plan. I feel sure that a much thicker and stronger flap can be taken away if the raspatory be introduced near the alveolar border of each side and made to work its way towards the fissure. In 1865 I had under my observation a case illustrating the advantage of that procedure. I had operated once before on the same patient by separating the soft tissues from the hard palate, dissecting it off with a rectangular knife (such as that depicted in fig. 23) *from the fissure towards the alveolus on each side.* The operation failed signally. In about a month I operated by the so-called Langenbeck method, using an instrument of this kind (fig. 23) and applying it as here depicted (fig. 24), and obtained a strong, thick flap from either side, and the success was all I could possibly expect.[1]

b. Osteoplasty.

With regard to osteoplasty there is little doubt that Dieffenbach was the first to suggest this practice. In 1826 that surgeon detached on each side with a saw or scissors a straight portion of the hard palate to free the osseous portions, and to make them approach the middle line. The parts were kept together by little wedges of wood and a metal suture.[2] Here are Dieffenbach's own words respecting the operation:[3]—"The edge of each palate bone is pierced with a strong, straight, three-cornered punch, and a thick soft silver wire put through the opening, the ends of which are twisted together. The mucous membrane is divided near the place where the palate bone joins the alveolar processes; a thin, smooth, concave chisel is then put to the bone, and it is cut through on both sides. The wires are then twisted again till the edges of the bony cleft approach each other a little, or altogether. The first alone can generally be done. The ends of the wire are then cut off. The effect of the closer approximation of the edges of the cleft

[1] 'Med. Times and Gazette,' January 28, 1865, p. 87.

[2] Rouge, op. cit., p. 15.

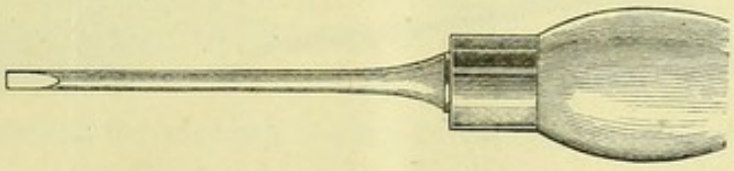
[3] 'Die Operative Chirurgie,' von Johann Friedrich Dieffenbach, Erster Band, 1845, p. 856.

in the bone is immediately perceptible in the soft palate. The side slits in the bone, which are at first filled up with lint, close themselves by means of granulations, according to the same process. When the space in the bone is either closed or diminished so much that the cleft in the soft part is considerably lessened, the sawing of the palate may then be undertaken according to the direction already given, and side incisions made in the soft palate before the sutures are put in. The operation may be continued from time to time until the cleft is removed."

In a very interesting and practical paper by Sir W. Fergusson, entitled "Observations on Harelip and Cleft Palate,"[1] this distinguished surgeon refers to an operation which he believed to be novel, but which is in reality very similar to that proposed by Dieffenbach. Sir William's results appear to be much more encouraging than those of the continental surgeons; thus, Rouge speaks of five cases in which this method of procedure was adopted, and all of which failed from necrosis; again, from 1849 to 1856 Langenbeck operated on three cases with unsuccessful results.

Adopting Sir William Fergusson's plan, I found, in the first two or three cases on which I operated, that there was some exfoliation of bone, and I venture to think that the necrosis depended on the somewhat rough way in which the bone was divided. By simply pushing the instrument through the bone it is apt to splinter, and in order to obviate this I have since adopted a very simple method, which I brought before the notice of the profession in 1874.[2] It consists in boring holes with an ordinary brad-awl (fig. 25) on each side straight

Fig. 25.



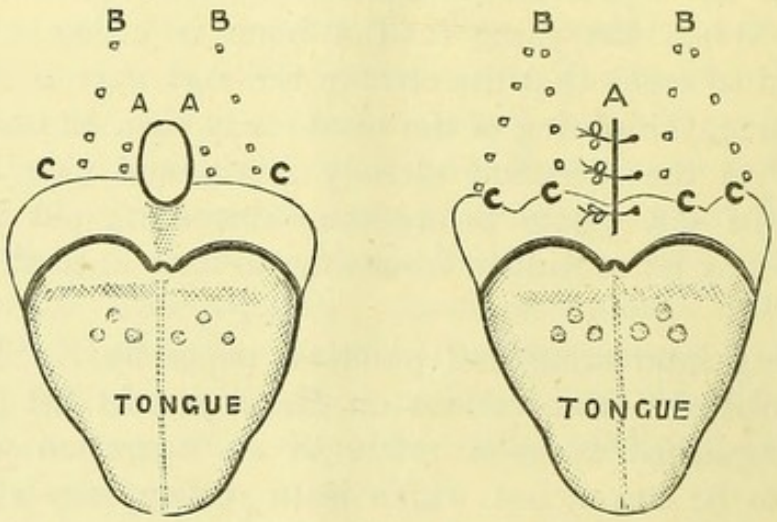
through the hard palate, exactly in the line in which the chisel

[1] 'Brit. Med. Journ.,' April 4th, 1874.

[2] 'Lancet,' October 24th, 1874, p. 578.

is to be applied (fig. 26, B C). The least pressure with such an

Fig. 26.



instrument as this (fig. 27), which is really nothing more than an ordinary screwdriver with a sharp edge, will at once divide the bone without splintering. The proceeding is extremely simple, and may not be inaptly compared to the perforated edges of postage and other stamps.

Fig. 27.

The sutures may be applied with a pointed needle, as already described, or one with a blunt point, such as this (fig. 28) may be employed.

Fig. 28.

In closing the hard palate by this method there is often a good deal of hæmorrhage. Hence the operation should be performed as speedily as possible, but without undue haste. Either in the so-called Langenbeck's operation of uranisco-

plasty, or in Dieffenbach's osteoplasty, the bleeding may be instantly arrested during the passage of the sutures by stuffing the sides with a piece of lint of suitable size; I am sure from experience that this is a most useful expedient, and the lint may be allowed to remain after the operation or another piece of proper size introduced in order to give support to the sides. As already stated, Dieffenbach in 1826 used little wedges of wood for this purpose, and MM. Sedillot and Gustave Simon inserted small pads of cotton wool in the incisions.

If osteoplasty be performed without chloroform it does not seem to be attended with so much suffering as uraniscoplasty, for in the latter the separation of the soft from the hard palate is a somewhat painful proceeding.

In selecting between the two operations above described for closing a fissure of the hard palate the surgeon must consider, first, the shape of the palate, and, secondly, the amount and thickness of the soft tissue covering it. My personal experience of Dieffenbach's operation of osteoplasty is that even with the greatest care exfoliation of bone to a greater or less extent not infrequently takes place, as already stated. The operation has not been received with favour by Continental surgeons, and whilst I advocate its performance in suitable cases, I am nevertheless satisfied, from the large number of patients under my observation, that uraniscoplasty — the so-called Langenbeck method—especially on account of the less risk of exfoliation if efficiently performed, is generally followed by equally successful results.

I may mention that in such cases as those in which the bone is adherent to one side of the palate a slight modification of the operation may be required, and the surgeon must be guided by circumstances. Thus, in the case depicted in fig. 6 I detached one side by a bridge-like flap including the bone, and denuded the opposite surface by the muco-periosteal operation. The case did very well.

The operation for closing a congenital fissure of the hard and soft palate is certainly not attended with any special danger to life. The hæmorrhage, it is true, will frequently exhaust the patient to a considerable extent; but in all the experience that I have by the kind friendship of Sir W. Fergusson derived I have never seen or heard of one single case of death as the

immediate result of the operation. There are, however, such cases reported, but only in very young children; thus, besides those to which I have already alluded Dr. Ehrmann mentions one instance of death from hæmorrhage in a child seven and a half months old,[1] and also refers to four fatal cases in infants in whom the operation on the hard and soft palate had been attempted, one of four days old, one of five days, and two of two months old.[2] In a case of M. Gustave Simon's the flap sloughed and the child died of septicæmia, then a patient of M. Berard's, as well as one of Maissonneuve's, died of erysipelas of the face.

On the Improvement of the Voice after the Operation.

The chief object of the operation, whatever plan be adopted, is obviously to improve the voice of the patient, and I have no hesitation in saying that in many instances the voice is very materially altered for the better. It is too much to expect that the sufferer should speak as fluently as his neighbours whose palates are normally developed. Langenbeck thought that the nasal twang in cleft palate was due to want of nerve supply, but there is reason to suppose, as Passavant and Gustave Simon do, that it is attributable to the shortening of the palate.

As to the improvement in the voice after the operation, Mason Warren[2] refers to the case of a young man who spoke at a public meeting about two years after the operation, and it was difficult to discover the least imperfection of his speech, although previously he had been excluded from society. Again, in a curious case of Mr. Wardrop's[3] it is stated that "the patient, a girl, aged twenty-one, who was passionately fond of music, was able to sing with considerable execution." And another remarkable case is recorded[4] in which a patient, a Frenchman, could express himself equally well in French and in English, but his voice had a nasal twang when he spoke French, and was almost normal when he spoke English.

[1] 'Lancet,' August 20th, 1870, p. 259.

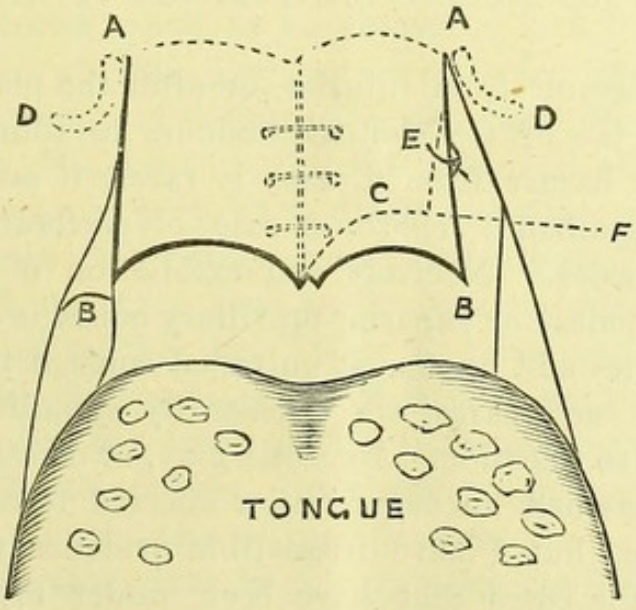
[2] 'American Journ. of Med. Science,' April, 1848.

[3] 'Lancet,' vol. xii, p. 350.

[4] 'Dictionnaire de Médecine et de Chirurgie Pratiques,' vol. xv, 1836.

I venture to think the voice may be still further improved by the simple operation I suggested in 1869, an account of which was published in that year.[1] Referring to this point I may be permitted to remind the reader that a cleft in the palate is not a mere rent or slit in the parts, but an actual deficiency or want of tissue. Hence, however well satisfied the surgeon may be with his work, the soft palate still remains as a tight curtain stretched across between the mouth and posterior nares. The result is that, in speaking, the air instead of passing into the mouth gains ready access to the nostrils, and thus the peculiar nasal twang is occasioned. In order to obviate this I release the soft palate in the following manner. The operation may be performed at any time after the complete closure of the soft palate, say a month or more:—A small curved spatula is first placed behind the soft palate; it keeps the part steady and also serves as a *point d'appui.* A sharp-pointed knife is then introduced from before backwards at A (fig. 29), in about the position of the inner edge of the

FIG. 29.



hamular process in the normal palate (D), and the soft palate is cut completely through from above downwards from A to B. The same thing is repeated on the other side, and the operation is then concluded. In the first few cases on which I operated

[1] 'Lancet,' vol. ii, 1869, p. 198.

I hemmed the mucous membrane, back and front, as indicated in the diagram E, but I have long since abandoned this practice as unnecessary, for when the parts unite they do so at the V-shaped angle where these are in immediate contact (dotted line F). The operation is very simple and may be repeated as often as necessary, is perfectly free from danger, and almost painless. The rationale of the proceeding is easily explained. The palate becomes converted into a huge uvula, so to speak. It is shortened and puckered up, the point B being drawn up to C, so that if it does not actually touch the back of the pharynx it approaches it so nearly as to divert the current of air to a considerable extent from the nose into the mouth, and thus greatly diminishes the disagreeable guttural voice that is more or less observable in all patients who are the subjects of this distressing deformity.

Still, the improvement depends to a great extent on the care and intelligence of the patient. I have met with some cases in which the voice has been almost perfect.

Acquired or Accidental Apertures in the Palate.

These may result from injuries, or after the partial removal of the upper jaw or from antral tumours invading the mouth, but complete fissure from disease is rarely if ever seen. M. Jobert (de Lamballe) reports a case of perforation after an attack of measles. Necrosis and exfoliation of the palatine plates of the palate or superior maxillary bones is attributed by high authorities and by almost universal consent to a syphilitic taint. That such cases are necessarily syphilitic is in my opinion open to question. Necrosis may, of course, occur in a person who has had his constitution affected through the true infecting sore, but I have irresistible evidence to show that in most of the cases that have been under my observation there has not been a particle of history of that disease. I now take the opportunity of repeating my own experience (and it is my individual experience only) that with nearly twenty years' hospital and other practice I have never yet met with a single patient who has been under my care, or whose case I have had the opportunity of watching, *from the first* with

an infecting sore (followed by psoriasis of the palms of the hands accompanied with sore throat, condylomata, &c., these symptoms being, I presume, typical of constitutional infection), who has ever returned to me, or has been brought to me, with exfoliation of the bony palate or of the nasal bones. With such facts before me I must hesitate before I accept the broad-cast belief that syphilis is in such instances the *fons et origo mali.*

I have invariably noticed that ulcerations of the palate complicated with exfoliation of bone occur in pale, ill-nourished, and cachectic people who, if there be ulcerations on other parts of the body, say the face or in the neighbourhood of the joints, are soon, I may almost say instantly, benefited by five-grain doses of iodide of potassium, with some preparation of iron administered thrice a day. It might be argued that because the administration of iodide of potassium is curative, that this fact is proof positive that the case is syphilitic; but such an argument is untenable. The truth is that the drug is useful in all diseases in which iodine is indicated. It certainly has a marvellous effect on such ulcerations.

Apertures in the hard palate are admirably suited for mechanical appliances, such as an obturator, but the instrument should be fitted with the greatest accuracy lest the pressure on the lowly vitalized part should induce further ulceration. Mr. W. D. Napier, Mr. Hamilton Cartwright, and other surgeons practising dental surgery, have drawn attention to this point. It often happens that in these cases patients stuff the opening with some soft substance, such as lint, sponge, wax, cork, crumb of bread, papier maché, &c. This is, however, a most pernicious practice, for simple and efficient as are the means employed to improve the voice, yet the improvement is effected at the expense of the opening, the continued pressure causing a steady increase in the size of the aperture.

Various obturators have been suggested, the first instrument of the kind probably being one used by Petronius in 1565. At the present day there seems to be no end to the ingenuity displayed in making such apparatus. Ambrose Paré in his marvellous work published in 1649 (English edition) gives two woodcuts, one in which there is a plate of silver to which is attached a piece of sponge, by the swelling of which

the plate is held in the aperture, and another on whose upper side there is "a button, which may be turned when it is put into the place, with an instrument like a small raven's bill."[1] In the 'Lancet'[2] will be found illustrations of Weiss's instruments. Some appliances are fastened by rings, some by bolts, and some are fixed to the teeth.

The impairment of the voice depends greatly on the position of the perforation; thus the voice is perceptibly altered if there be even the smallest hole in the bony palate, and to a less extent if an aperture be in the soft palate. I may here refer to the singular fact that the voice is, in many instances, comparatively scarcely impaired, even if there be extensive adhesions of the soft palate to the back of the pharynx. I have had under my observation at the hospital and elsewhere numerous cases illustrating these points.

Some strangely heroic operations have been suggested and even performed for closing such apertures, which, however, scarcely merit imitation; thus, in 1836 Regnoli closed a hole in the palate after resection of the superior maxilla by taking a piece of skin from the upper lip, and Blasius took a flap of skin from the forehead in a case where there was no nose. Again, at a medical meeting at Leipzig Professor Thiersch showed a patient in whom uraniscoplasty had been performed for acquired defect of hard palate where obturators could not be borne. The cleft was closed by transplantation of the skin of the cheek. The flap healed perfectly. There were still some small fistulæ between the nose and mouth. The epidermis bristling with hairs was seen in the cavity of the mouth.[3]

Respecting small holes in the soft palate which remain either after the operation of staphyloraphy or after ulceration, the application of either nitric acid or lunar caustic will in most cases effect their closure. Dieffenbach believes that the best application is the tincture of cantharides.

Any attempt at closing an aperture in the soft palate acquired by constitutional disease by operation will almost invariably fail. I have had the privilege of assisting Sir W. Fergusson in

[1] Lib. xxiii, p. 579.

[2] 'Lancet,' 1827, vol. iii, p. 325.

[3] 'Med. Times and Gaz.,' January 16th, 1869, p. 75.

many operations of this kind, and he was invariably of the same opinion. Indeed, Sir William's more recent experience may be summed up in the same words he used at a clinical lecture delivered in 1852 :[1]—"I must tell you, gentlemen, that in cases of this description, where there is an opening in the soft palate produced by disease, there is very little chance of doing good by an operation. I have tried on various occasions to close openings of this nature, but cannot flatter myself with being successful." I must confess that my personal experience tends to support this statement.

As frequent reference has been made in the above paper to the name of my esteemed friend the late Sir William Fergusson, I think it right to state that the article was completed before his death, and that it is now produced exactly as it was originally written.

[1] 'Med. Times,' vol. xxv, May 1.