On harelip and cleft palate / by Francis Mason.

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BY

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WITH SIXTY-SIX ILLUSTRATIONS

LONDON

J. & A. CHURCHILL, NEW BURLINGTON STREET

1877

To the Memory

OF

SIR WILLIAM FERGUSSON, BART., F.R.S., LL.D.,

SERJEANT-SURGEON TO THE QUEEN,

ETC. ETC.

IN ACKNOWLEDGMENT OF NUMEROUS ACTS OF KINDNESS AND ENCOURAGEMENT AFFORDED IN EARLY PROFESSIONAL LIFE, AND IN TENDER RECOGNITION OF A SINCERE FRIENDSHIP THAT KNEW NO DEVIATION FOR A PERIOD OF TWENTY-THREE YEARS,

I most humbly Dedicate

THIS VOLUME, AS A TRIBUTE OF

AFFECTION, GRATITUDE, AND RESPECT.

PREFACE.

The two papers constituting the present volume appeared in substance in the 'St. Thomas's Hospital Reports' for 1875 and 1876. At the suggestion of several friends they are now published, with a few additions, in a separate form, so as to be more accessible to those members of the profession who take interest in cases of Harelip and Cleft Palate.

In submitting my own experience I have endeavoured to do justice to the labours of others, and I am anxious to place on record here my grateful appreciation of the teaching of the late Sir William Fergusson, from whom I learned many valuable lessons, both as a pupil and former colleague, and more especially as his confidential assistant in private practice for about twelve years. These lessons are incorporated in the accompanying work, and I earnestly hope they will

prove as useful to others as they have been advantageous to myself.

I may add that, in order to facilitate reference, I have appended a copious index of the contents of this volume.

FRANCIS MASON.

5, Brook Street,
Grosvenor Square;
September, 1877.

ON

HARELIP AND CLEFT PALATE.

PART I—HARELIP.

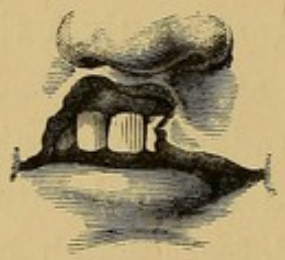
THERE are few subjects in surgery that have attracted more attention than the congenital malformations known as harelip and cleft palate, and it is not to be wondered at that these deformities should have excited so much interest, inasmuch as they are physical defects which greatly distress the patient's parents as well as the patient himself, who throughout life is more or less painfully conscious of his condition.

The principal objects of the first part of this work are, first, to give the results of inquiries made into the history and literature of the subject of harelip, briefly referring to such topics as are not usually included in works on systematic surgery; second, to illustrate by cases that have been under

observation, at the hospital and elsewhere, some practical points in the treatment of the malformation; and lastly, to group together the most important operations that have been devised and practised for the relief of the deformity.

Harelip is a congenital malformation, arising from an arrest of development of the fœtal structures. Some writers speak of it as being produced by accidental wounds, as from burns, ulcerations, &c., in which the edges have not united,[1] but the term harelip should be restricted to the congenital variety. It would, for example, be obviously improper to speak of such a case as this (Fig. 1, taken

Fig. 1.



from a photograph) as one of harelip. The patient was a girl, aged 14, under my care at the hospital, the greater portion of whose lip had been bitten off by a woman. The wound healed slowly, and ultimately there was very little deformity. Pigné draws a suggestive distinction between the two conditions, in saying that an accidental harelip

[1] Samuel Cooper's First Lines, p. 501.

may affect indefinitely all kinds of shape and position, but the congenital form is always more or less perpendicular to the free edge of the lip, and has a red margin.[1]

The various forms of harelip are too well known to require a lengthened description. The fissure may be on one side only, and therefore called unilateral or single harelip, or on both sides—bilateral or double harelip, and in rare cases it may extend towards the cheek, constituting commissural harelip. A case of this kind is reported by Mr. N. Ward.[2] The extent of the fissure into the cheek differs, but if it involve Steno's duct, then the persistent discharge of saliva causes great discomfort to the patient.[3]

The cleft in the upper lip may be a mere notch, single (Fig. 2) or double (Fig. 3), or it may extend

Fig. 2.

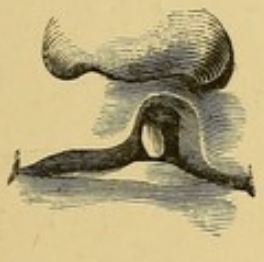
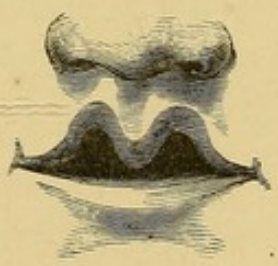


Fig. 3.



into one nostril (Fig. 4), or into the nostril on both sides (Fig. 5). In some instances of double harelip the fissure reaches the nostril on one side only,

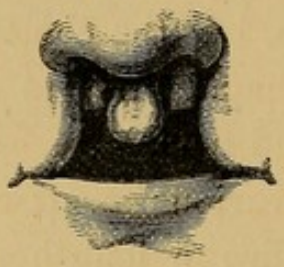
[1] Costello's 'Cyclopædia of Practical Surgery,' art. "Lips."

[2] 'Lancet,' vol. i, 1859, p. 536.

[3] Follin et Duplay, 'Traité élémentaire de Pathologie externe,' t. 4, p. 639.

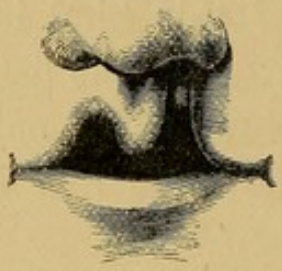
Fig. 4.

Fig. 5.



leaving a simple notch on the other (Fig. 6); and in cases in which the intermaxillary bones project, the

Fig. 6.



soft tissue may either be united to the bone, thus (Fig. 7), or be perfectly free, thus (Fig. 8). Any of

Fig. 7.

Fig. 8.

these varieties may be complicated with a cleft in the hard or soft palate or in both.

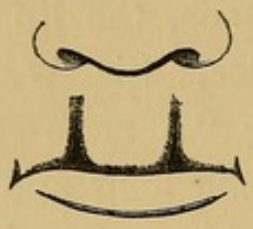
The upper lip is, as a rule, the seat of the deformity, and if a careful examination of the part be made, it will be found that in many cases there is in reality very little want of tissue, the lip being simply cleft on one or both sides. Sir W. Lawrence spoke of harelip as being "a mere separation"[1] of the parts, and M. Louis long ago drew attention to this point, remarking that in the deformity, whether the fissure be in one or both sides, "it is not accompanied by any loss of substance."[2] Although this theory does not invariably obtain, I have nevertheless seen several examples to make me believe that there is much truth in such statements; for instance, I was particularly struck with the appearance of the part in a case of double harelip, which was sent to me in the summer of 1875 by my friend Mr. John Teale, of Scarborough. The accompanying engravings (Figs. 9, 10) show very well how closely in contact the fissures were, and taking a side view it will be observed that the deformity is scarcely perceptible.

All surgeons are, I believe, agreed that the left side of the upper lip is by far the commonest situation for the deformity, and I am enabled to

[1] 'Lancet,' 1829, vol. ii, p. 813.

[2] Louis, "Mém. sur le Bec-de-lièvre" ('Mém. de l'Acad. Roy. de Chir.,' tt. 4 and 5).

Fig. 9.



Full face, to show close approximation of fissure.

Fig. 10.

Side view of ditto.

corroborate this from personal observation; thus, of 65 cases that I saw in succession, 35 were on the left side, 19 on the right, and 11 were double or involved both sides.

The other varieties of the deformity are rather surgical curiosities; thus, instances are on record in which the cleft was situated absolutely in the median line, which, as is well known, is the normal condition in the hare, and from which the malformation no doubt derives its title. Mr. Hazard, of Litcham, Norfolk, refers to such a case,[1] and M. Sanson cites an instance from Moscata, which he considers authentic, of "median harelip."[2] MM. Follin et Duplay, too, allude to such cases. "Nicati[3] has seen a child two years of age in whose

[1] 'Med. Times,' July 2, 1864.

[2] 'Lancet,' 1834, vol. ii, p. 665.

[3] 'De Leporini Labii nature et origine,' Amsterdam, 1822.

upper lip there was a congenital fissure exactly in the middle line, and Blandin has observed the same condition in the embryo.[1] MM. Bouisson and Nélaton saw two analogous cases in the museums of Strasburg and of Tübingen, and others are reported by Ammon, Leuckart, and by Bitot, of Bordeaux.[2] This condition must, however, be rare, inasmuch as Sir William Fergusson states that he never saw an instance of the defect in the mesial line.[3] Chaussier, Dupuytren, and Cruveilhier, too, regard such cases as impossible.

In some instances the upper lip is altogether absent, as in a specimen at the Royal College of Surgeons, in which that part and the palate are entirely wanting.[4]

More rare still is a fissure involving the lower lip. About fifteen years ago I had the privilege of assisting Sir William Fergusson to operate in a case of this kind, which is the only instance that has come under my observation. The case is admirably depicted in his work on 'Surgery' (5th ed., p. 506). There are not many examples of this kind recorded, but Ranvier alludes to them.[5] One result of such a deformity is that the saliva dribbles away, which is not only an annoyance, but

[1] 'Dict. de Méd. et de Chir. Pratiques,' art. "Bec-de-lièvre."
[2] 'Journ. de Méd. de Bordeaux,' 1851-52.
[3] 'Lectures on the Progress of Anatomy and Surgery,' 1867, p. 56.
[4] 'Ter. Series,' No. 158.
[5] 'Comptes Rendus de la Société de Biologie,' 3rd sér., t. iii, p. 93.

is detrimental to the patient's health. Mr. S. Cooper refers to a patient under the care of M. Tronchin, who had a fissure in the lower lip, and who suffered from dyspeptic symptoms, all of which were removed after an operation had been performed.[1]

An instance is recorded, by Parise (de Lille), of fissure of the lower lip combined with fissure of the lower jaw, and fissure of the tongue.[2]

Vrolik, in his beautiful work,[3] gives several illustrations of commissural harelip and other deformities about the face; and M. Guersant figures a remarkable example, in which the fissure on each side extended to the eyelids[4] (Fig. 11).

There is another complication of harelip that I have occasionally met with, and to which I can find no reference in the text-books on surgery. It is a cyanotic condition of the child. This was well marked in a case that was sent me by my friend Mr. Haynes, of Waterloo Road. The late Mr. Edwards, of Edinburgh, alluded to this point; and Mr. George Lawson has published an interesting case, in which the cure of the cyanosis was effected by the operation for closing the fissure in the lip. During the operation for the harelip the child fainted; and Mr. Lawson believed that the recovery

[1] Costello, loc. cit., p. 811.

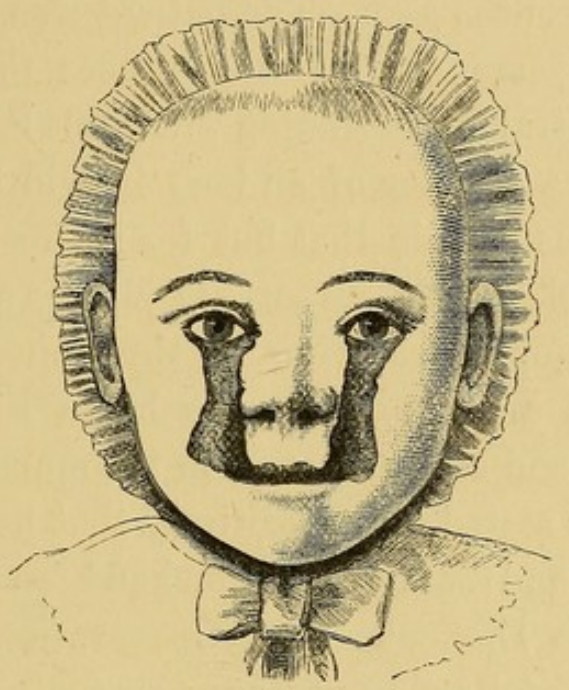
[2] 'Bull. de Thérap.,' 1862.

[3] 'Tabulæ ad illustrandum embryogenesia hominis,' 1849.

[4] 'Dict. de Médecine et de Chirurgie Pratiques,' t. 4, art. "Bec-de-lièvre."

from the cyanosis was due to the lull in the circulation produced by the faintness, and which allowed

FIG. 11.



the foramen ovale to close, and thus establish the double current.[1]

Again, other deformities sometimes coexist with harelip; thus, once I saw a child who besides a harelip had an extra thumb on each hand, and another who had a bad internal squint, and a third who had a large nævus on the buttock.

Dr. Morell Mackenzie has met with a case in which there was a congenital fissure between the arytenoid cartilages, with a trilobate epiglottis occurring in conjunction with harelip and cleft palate.[2]

[1] 'Lancet,' June 7, 1862, p. 599.
[2] 'Med. Times,' April 19, 1862, p. 402.

Occasionally the surgeon meets with malformations which may be best termed incomplete. I was much struck with a case of this kind at the hospital some few months ago. The patient was a little girl about six years old, in whose nose there was a decided central dip extending the whole length of the organ, and a quarter of an inch in width, in which the skin was so thin that but for it the nose would have been cleft. Mr. Streatfeild reports a somewhat similar example occurring in the upper lip. The patient was a boy, aged 9, who had a notch in the prolabium, and also a cicatrix in the mucous surface. His mother stated most positively that he never had had harelip and that no operation had been performed.[1]

Lastly, in Dieffenbach's "Observations on Cleft Palate," the following passage as a footnote occurs: "We have lately had an opportunity of examining a very remarkable case of a child about a year old, in whom, from the appearance which it then presented, it was evident that harelip existed in utero, but was closed by some process of union which took place prior to the birth, for there was a well-marked cicatrix in the usual situation, extending from the left side of the root of the septum to the red border of the lip, where a slight cleft, as after the surgical operation, still remains."[2]

[1] 'Med. Times,' Nov. 13, 1858, p. 499.

[2] 'Dublin Journal of Med. Science,' vol. xxviii, 1845, p. 227. On the same point see also 'B. M. Journal,' of March 24th, 1877, p. 376, and of April 7th, 1877, p. 442.

It would be foreign to the purport of the present volume to enter into the minute details of the development of the upper jaw and the intermaxillary bones. The reader is, therefore, referred for information on this subject to the works of Kolliker, Leuckart, Nesbitt, Vicq d'Azyr, Quain and Sharpey, and others, and especially to an excellent pamphlet by Dr. T. Hamy,[1] and to a paper by Prof. C. O. Weber, "On the Intermaxillary Bone and its relations to Harelip and Cleft Palate."[2]

M. Coste[3] gives perhaps the clearest account of the changes that take place, and the following summary may be briefly referred to. He states that from the twenty-fifth to the twenty-eighth day of fœtal life the mouth is formed. The frontal lobe becomes much enlarged, and shows a great hollow which divides into two smaller lobes, called by him the incisive centres, and from which the incisive bones and the middle portion of the upper lip are developed. The centres for the superior maxillæ, which form the lateral parts of the upper lip, converge one towards the other and come nearer to each side of the corresponding incisive centre. At the fortieth day the two incisive centres in the substance of which the incisive teeth are developed unite the one to the other in the middle line, and thus complete

[1] 'L'os Intermaxillaire de l'homme à l'état normal et Pathologique,' 1868 Paris.

[2] 'Med. Times,' Jan. 4, 1862, p. 18.

[3] 'Histoire générale en particulière du developpement des corps organisés.'

the superior lip in its middle. Thus, if the two lateral portions do not unite to the incisive portions, we have a double or bilateral harelip; if only one of these sides fail to unite, then we have a single or unilateral harelip.[1]

The ossification of the upper jaw taking place at so early a period in fœtal life—about the sixth or seventh week—anatomists are still somewhat undecided as to the exact number of points of ossification in the superior maxillæ; yet, arguing upon pathological facts alone, it appears certain that the intermaxillary bones exist, as first pointed out by Goëthe in 1786, as separate bones in man.[2] A case of Mr. Bryant's further tends to prove the fact; the patient was a child, aged three years, who had necrosis of some portion of the upper jaw which followed a severe attack of measles. With a pair of dressing forceps the dead bones were readily removed, and they proved to be perfect specimens of the incisive or intermaxillary bones.[3] Dr. Hamy refers to a similar case.[4]

Mr. Callender believes that the vomer and intermaxillary bones are developed in the membrane which covers the internasal cartilage, and at the anterior extremity of the vomer the process of ossification extends to form the intermaxillary bones.[5]

[1] Follin et Duplay, loc. cit.

[2] 'Dem menscher wie den thieren, ist ein Zwishenknocken der obern Kinnlade Zuzushreiben.'

[3] 'Path. Soc. Trans.,' vol. x, p. 216.

[4] Op. cit., p. 76.

[5] 'Phil. Trans.,' 1869, p. 166.

These bones are generally described as containing the four incisor teeth, two on each side. Mr. Thomas Smith, referring to these bones, says,[1] "the junction between the superior maxillary bones on either side and the intermaxillary bone in the centre takes place between the incisor and canine teeth, so that the intermaxillary bone carries in it the germs of the four incisor teeth; the cleft, therefore, if it exist in the bone, is always found on one or both sides between the incisor and canine teeth." And referring to operative treatment, he adds, that "by removing the prominent part we deprive the patient of one or more of his teeth, therefore the part should be retained."

In Mr. Erichsen's work[2] there is a woodcut showing the intermaxillary bones containing the four incisors, but from the specimens of single and double harelip that I have examined I feel sure that one or both of the lateral incisors are almost invariably absent, or, if present, are slightly if at all developed. Mr. Callender remarks on this point that the intermaxillary bones "assist in forming no inconsiderable portion of the sockets for the incisor teeth; but that they do not completely form them is a fact occasionally confirmed by the imperfect character of the sockets which lodge these teeth in those cases of cleft palate which have the inter-

[1] 'Lancet,' Dec. 21, 1867, p. 761.

[2] 'Science and Art of Surgery,' 5th ed., vol. ii, p. 348.

maxillary bone isolated from the superior maxillæ."[1] M. St. Hilaire, writing on this subject in 1833,[2] says: "In the greater part of these cases the lateral fissure constantly corresponds with the point between the external incisor and canine teeth, or, in other words, to the line where the intermaxillary and maxillary bones should be united; but in some cases of more rare occurrence the fissure is found much nearer the median line between the *central and lateral incisors*."[3] Nicati, too, refers to similar examples. And, again, Dr. Hamy[4] observes that the fissure traverses sometimes between the central and lateral incisor; then he speaks of the fissure being in some cases between the lateral incisor and canine on one side, and between the central and lateral incisor on the other.

It remains to be proved if this latter condition is so very rare, for it is certain that in most cases that present themselves to the surgeon the central incisors are usually well marked, whilst the lateral incisors seem to have no existence. In order to strengthen this statement the reader is referred to the different works on surgery, and he will find, I venture to say, that in almost all the woodcuts illustrating the deformity of harelip, the two central incisors only,

[1] Op. cit., p. 169.

[2] 'General and Particular History of Anomalies in the Organisation of Man and Brutes.'

[3] 'Lancet,' 1833, vol. ii, p. 531.

[4] Op. cit., p. 55.

and not the lateral incisors, are depicted. For example, Dewar, in his cases published in 1830, speaks of the "projection of the alveolar process, which was covered by its ordinary thin and red membrane, and crowned with *two teeth*."[1] And Syme, in 1842,[2] remarks that in most cases of harelip the projection comprehends an equal portion of both superior maxillary bones, the portion, namely, which in the lower animals is occupied by two distinct bones, the ossa incisiva or intermaxillary bones; but in the woodcut that accompanies his remarks the central incisors alone are shown. Again, Dr. Stolworthy narrates a case[3] in which he removed the central portion, and in which the *two front* teeth, perfectly formed, were found; and M. Blandin reports a case of double harelip with projecting intermaxillary portion in a boy about ten years old, in which the *two middle* incisors were found.[4] Again, Sir William Fergusson, in his works on surgery, gives several woodcuts illustrating the presence of the central, and not the lateral, incisors, and all the specimens presented by him to the Royal College of Surgeons show the two central incisors only in various stages of development.

I have carefully dissected several examples of the

[1] Cases of Harelip. 'Edin. Med. and Surg. Journ.,' 1830, vol. xxxiv, p. 88.
[2] 'Principles of Surgery,' 3rd ed., 1842, p. 475.
[3] 'Lancet,' vol. ii, 1842-43, p. 326.
[4] 'Gaz. des Hôpitaux,' 'Lancet,' 1843-44. Vol. i, p. 71.

intermaxillary bones removed in double harelip, and have been led to the conclusion that the lateral incisors are almost invariably absent. The accompanying illustrations demonstrate these points. The specimen (represented in Fig. 12, in which the anterior part of the bones has been cut away to show the teeth) was taken from a child aged five

FIG. 12.

FIG. 13.

months. The other specimen (Fig. 13) was removed from a child aged fifteen months. In these cases there was not a trace of the lateral incisors. Now, as it is generally known that the central incisors of the upper jaw are cut about the seventh month after birth, and that the lateral incisors follow pretty closely, appearing at from the seventh to the tenth month, the inference to be drawn is, that the lateral incisors are either wanting or are so ill-developed as not to be recognised; in other words, the cleft on each side seems to take their place. The same rule applies to single harelip, involving the jaw, as in the case of a child, aged two and a half years, whom Dr. Maybury, of Richmond, kindly sent me in April, 1875, and in which the lateral incisor was deficient. I may here say, after inquiring about this period, at the several museums connected with the metropolitan

schools of medicine, that, with the exception of the specimens at the College of Surgeons and those at St. Thomas's Hospital, just referred to, the only other examples of intermaxillary bones removed in cases of harelip are to be found in the museum of Guy's Hospital, and these latter well illustrate the apparent absence of the lateral incisors.

Mr. Salter directed attention to this point in a case of double harelip with cleft palate, which he brought before the Pathological Society on March 6, 1855. The specimen was from a child eighteen months old, and contained the germs of the central incisors, and not the lateral as previously imagined. He adds, "From the general aspect of this specimen I was inclined to consider it as the incisor or intermaxillary bone separated by a lusus naturæ from the mouth proper; a section of it, however, throws some doubt on that opinion, as the rudiments of the lateral incisors are not contained in it, and such an idea is only tenable by imagining the laterals altogether suppressed." He made a vertical section, and in the cut surface were the imperfectly developed and rudimentary germs of the superior central incisors of the temporary and permanent set, the former advanced in development, the latter in a very early condition.[1]

And further, on this point, Mr. Pollock remarks,[2]

[1] 'Path. Soc. Trans.,' vol. iv, 1855, pp. 177, 178.

[2] Holmes' 'System of Surgery,' vol. iv, Art. "Diseases of the Mouth."

"If the nodule be dissected between the sixth and eighth month after birth, in it will be found not only the temporary incisors, but also the germ of the permanent ones; not always the lateral, but invariably those of the central incisors."

I may add that my friend Mr. George Parkinson has kindly permitted me to examine his collection of over fifty models of the jaws in cases of harelip and cleft palate, and these abundantly prove that in most instances of harelip involving the jaw there is an absence of one or both lateral incisors. It should, however, be borne in mind that, apart from any congenital deformity of the lip, the lateral incisor is one of the teeth frequently wanting; thus, Mr. Tomes and Mr. Salter know several families the members in each of which are destitute of lateral incisors in the upper jaw.

There has been much speculation as to the *causes of harelip*. As a rule it is attributed to some shock or impression made on the mother during pregnancy. Sir William Fergusson used to look for, and generally find, a partial defect in the upper lip and jaw of one or both of the parents, and since he directed my attention to this point, I have observed it in many instances.

I am myself somewhat slow to believe in the theory of maternal impressions, but I may allude to

[1] See 'Dental Surgery,' by Tomes, 2nd ed., 1873, p. 207.

a case in which the coincidence was so marked as to leave little doubt that such impressions may have some influence in producing the deformity. In November, 1874, a child with single harelip was brought to me at St. Thomas's Hospital. The mother stated that whilst she was riding in an omnibus she was shocked at the appearance of a boy who had had harelip, and who had been operated on in early life. She had only been married a month, and spoke to her husband, mother, and sister of her fear that if she had a baby it might have harelip. When the child was born her first inquiry was, "Is he all right, or has he got a harelip?"

Again, in one of Dewar's cases, already referred to, the mother of the child resided previous to her marriage near a boy on whom he had operated for harelip, and she was perfectly familiar with the child's appearance. Soon after she became pregnant with her second child she was strangely impressed with the idea that her infant was to be born deformed, and she had repeatedly assured him that the case of the boy was rarely absent from her imagination. Indeed, which is of more importance, she mentioned to some of her friends previous to her confinement the unaccountable presentiment she entertained of the child's deformity.[1] Sir James Paget, too, refers to another striking

[1] Loc. cit.

example. These cases may, of course, be only coincidental, but they are interesting to notice.

Harelip seems in many instances to be *hereditary*, for it is not very uncommon for a surgeon to operate on two or three members of a family. Liston operated on four;[1] and in the case which Mr. John Teale sent me (already alluded to) of double harelip not involving the palate, the mother had been very successfully operated on as a child for a single harelip on the left side, and I have at the present time (February, 1876), under my care at St. Thomas's Hospital two children, sisters, aged fifteen months and one week respectively with the deformity.

There are remarkable examples recorded to show that harelip appears to run in families. Thus, M. Demarquay related a case at the Surgical Society of Paris, in which from the grandparents downwards eleven children had been born with harelip;[2] and the same surgeon refers[3] to a singular malformation of the lower lip which was hereditary. The case was that of an infant affected with double harelip, and there existed on each side of the middle line of the lower lip a narrow channel containing clear mucus; a probe could be readily introduced and passed obliquely under the mucous membrane

[1] 'Med. Times and Gazette,' 1865, vol. ii, p. 333.
[2] 'Lancet,' May 16, 1868, p. 642.
[3] 'Dictionnaire de Méd. et Chir.,' tome 4.

nearly as far as the frænum. The mother had the same deformity; she had had seven children, amongst whom four were born with harelip, and with precisely the same deformity of the lower lip as above described.

A correspondent in the 'British Medical Journal'[1] also states that in his family harelip had been handed down from one branch of the family to another for the last hundred years. He says, "I have a brother who has harelip, with complete division of the palate and alveolar process; and he has had three children out of seven affected with the same deformity, in every case as badly as himself. Another brother of mine," he adds, "who is now dead, had a daughter also affected with the malformation. I had also a cousin who was similarly affected, and he had a daughter affected." Again, Dr. Bellingham, of Dublin, operated on two brothers whose relations on both sides had been similarly affected, and these were all males; thus their father's grandfather had harelip, and a second cousin of their father's was similarly affected. On the mother's side two of her second cousins (both boys) had harelip.[2]

With regard to the period of life at which the operation for harelip should be performed, the circumstances of each case are so widely different,

[1] 'Brit. Med. Journ.,' April 18, 1863, p. 412.

[2] 'Dub. Med. Press,' vol. 33, 1855, p. 161.

that it is impossible to lay down any definite law. Generally speaking, it should be undertaken about the second or third month after birth, and this was the view taken by Lawrence,[1] Dupuytren,[2] Houston,[3] Rocca, and Mestenhauser.[4] Sir W. Fergusson prefers about the end of the first month,[5] and assuredly before teething. Others recommend leaving the operation until childhood; thus, Mr. South[6] remarks, "I would never perform it before two years old; but if the parents can be persuaded to wait till the child is six or eight it is preferable;" and Dieffenbach advised that the operation should be postponed until dentition was accomplished.[7]

On the other hand, Paul Dubois, Malgaigne, Bandon,[8] Giraldès,[9] and Abernethy,[10] all approve of a very early operation, that is, immediately or soon after birth. Guersant[11] gives as a special reason for dealing with the deformity at this early period, *that children can do without the breast for four days*, an opinion shared by Mr. Douglas, of Stratford, who operated on a child two hours

[1] 'Lancet,' 1829, vol. ii.
[2] Ibid., 1833, vol. ii, p. 293.
[3] 'Med. Press.,' 1842, vol. vii, p. 274.
[4] 'Lancet,' 1846, vol. ii, p. 159.
[5] 'Lectures on the Progress of Anatomy and Surgery,' 1867, p. 64.
[6] Chelius by South, vol. i, p. 596.
[7] 'Lancet,' 1846, vol. ii, p. 159.
[8] 'Lancet,' 1846, vol. ii.
[9] 'L'Union Médicale,' 1865, p. 138.
[10] 'Lancet,' 1850, vol. i, p. 694.
[11] Ibid., 1826, vol. xii.

after birth.[1] M. Guersant further adds that, of seven children operated on immediately after birth, he failed only once, whilst out of seven children one month old he failed five times. Dr. Dawson, of Dungannon, operated on a child seven hours after birth.[2]

In some bad cases of double harelip the operation ought, in my opinion, to be done within the first three months, or even earlier, in fact, as soon after birth as possible, in order to save the life of the child. I have recently had under observation instances which have led me to this conclusion. I believe that in a great many examples we place patients in a worse condition to bear the operation by delay. They get thin and half starved and are then unfit to undergo any surgical procedure (see p. 99). Mr. Holmes, speaking of the indications that demand an early operation, says: "If the child is suffering from want of nourishment in consequence of the food running out of the cleft in the nose and mouth, no time should be lost in operating, whatever the age of the child may be."[3] Mr. Henry Smith gives cogent reasons for an early operation.[4] He thinks the child can suck better, and that in consequence of the lips being united the bones in the cleft palate (if it exist) become approxi-

[1] Ibid., 1854, vol. ii, p. 456.

[2] 'Dub. Med. Press,' 1845, p. 359.

[3] 'Surg. Treatment of Children's Diseases,' p. 115.

[4] 'Med. Times,' 1854, p. 286.

mated. He refers, in illustration, to Mr. Bateman's patient, who was operated on four hours after birth. In answer to Mr. Smith's inquiry as to the condition of the patient, Mr. Bateman replied that the child had died at the age of three years of hooping-cough, and that at the time of death the fissure, which at birth was so large that the mother could put her finger into it, had contracted so much that it could scarcely admit the edge of a sheet of writing-paper.

Sir Astley Cooper,[1] Syme,[2] Colles,[3] and others, believing that convulsions are common after the operation, deprecated the practice of operating immediately after birth. The idea that the operation induces convulsions appears to be more imaginary than real; and Sir William Fergusson, with his very large experience, states that he has never met with a single instance.

It is not often that an adult applies to have the operation performed, excepting as a secondary measure, and with the view of improving the lip, but such cases are occasionally met with. Three years ago I operated on a man aged 25, and Mr. Haynes Walton records a case of operation in a patient aged 40.[4] In some rare exceptions the patient goes through life without seeking surgical

[1] 'Lancet,' 1823.

[2] 'Principles of Surgery,' 1842, 3rd edit.

[3] 'Dub. Med. Press,' March 20, 1844, p. 177.

[4] 'Lancet,' August 22, 1857, p. 198.

relief; thus, I was told at the hospital in December, 1875, by the mother of a child with harelip, that a cousin aged nearly 50, residing in the country, had harelip on which no operation had been performed.

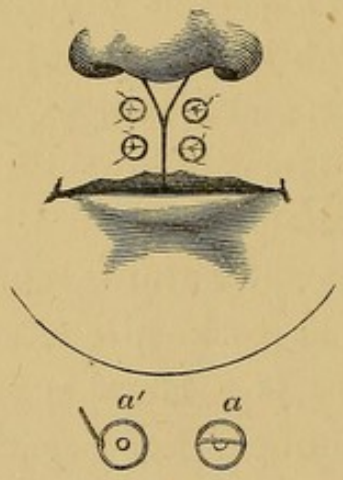
In bringing the edges together the twisted or harelip suture of silk is usually employed, and if used it is better to take the thread round the needle in the form of a figure of 8, and not, as is sometimes described and practised, in a circular fashion, round and round the needle. This form of suture is especially advantageous in cases of double harelip when support is required. Its chief disadvantage is that it is apt to cause ulceration. In suitable cases the single interrupted suture is preferable, and is commended on the high authority of Sir Astley Cooper,[1] Erichsen, Giraldès, and Guersant, and I have myself had several cases recently in which I have employed it with very satisfactory results. Some surgeons dispense with pins and sutures, and rely *entirely* on plaster so placed as to keep the edges in contact.[2] The simple suture is preferable to the twisted, in bringing the edge of the lips together when divided for removing tumours of the upper jaw, &c.; but the twisted suture is better adapted for bringing the parts into apposition after the removal of epitheliomatous growths, &c., from the lips, and also in cheiloplastic operations after burns.

[1] Ibid., 1823, p. 97.

[2] 'Lancet,' vol. i, 1855, p. 485.

Various substances besides fine silk have been used, such as catgut, horsehair, fishing twine, india rubber, &c. Some surgeons, especially MM. Giraldès, Depaul, Verneuil,[1] Ansieux,[2] and others, prefer metallic sutures either of iron, silver, or silver-gilt. Others employ modifications of the shot suture of Bozeman and Sims. Mr. Brooke advocated bead sutures,[3] Mr. Pollock suggested a "gun-nipple" button, and Mr. Wood, of Gloucester, a suture which consists of one silver disc with a hole in it and a cross bar fixed at each end, and another disc, leaving the cross bar movable[4] (Fig. 14, *a' a*). I

Fig. 14.



have myself occasionally employed ordinary shirt buttons, which support the lip admirably. Van Onzenert used a piece of leather, with the same

[1] 'Med. Times,' August 27, 1864, p. 226.
[2] 'Brit. and For. Med.-Chir. Rev.,' vol, xxx, 1862, p. 543.
[3] 'Lancet,' May 21, 1859, p. 509.
[4] 'Med. Times,' Jan. 3, 1857, p. 4.

view,[1] and Dr. Hammer employed a quilled suture, keeping the parts together with silk ribbon.[2] M. Mayor used a ball of cotton for the same purpose.

Passing by the old practice of treating harelip by blisters and actual cautery, &c., I have now to refer to the various operations that have been suggested and practised to remedy the deformity of harelip; and in the first place I shall allude to that which I believe to be the simplest and most rapidly performed, and attended as it is with the most satisfactory results to be the best. It is the one I myself almost invariably employ, carrying out the details as directed by my respected friend and teacher, Sir W. Fergusson. Let it be supposed that the patient is a child, say six weeks or two months of age, with a single harelip on the left side. The surgeon, being seated, first covers his knees with a towel or mackintosh. He then places the child, who is enveloped in a cloth or mackintosh, in the recumbent posture, the head being directed towards him, and resting on his lap, the feet being in charge of a nurse, who sits facing him. Chloroform or ether may or may not be administered. The surgeon then proceeds to free the fissure on each side, thoroughly dividing any frœna or adhesions between the soft parts and the jaw which seem likely to interfere with the easy adaptation of the parts. He then directs an

[1] 'Costello's Surgery,' art. "Lips," p. 599.
[2] 'Med. Press,' Aug. 2, 1865, p. 106.

assistant who kneels on his right to grasp the right side of the cleft between the forefinger and thumb of his right hand. The surgeon now grasps the other side of the cleft with his left forefinger and thumb, and introducing a sharp-pointed narrow knife at the nasal extremity of the cleft, commencing on the left side or that over which he himself has control, carries the knife from above downwards towards the prolabium, removing as much of the edge as he thinks necessary (Fig. 15). The same

FIG. 15.

steps are repeated on the opposite side. The assistant, still retaining his hold on the lip, now seizes with his left hand the loose flaps of skin with forceps, and the surgeon removes them at their nasal extremities with one or two touches of the knife. Some surgeons prefer scissors for paring the edges. Up to this point, if care be taken, there should be scarcely a drop of blood lost. The surgeon now desires the assistant to relax his hold of the right side, and passes one or more harelip pins from side to side, rather more than a quarter of an inch from the raw margin, the first needle being introduced just above the red portion of the lip or

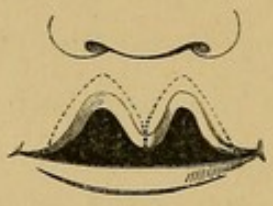
prolabium. A piece of unwaxed silk, rather coarse and nearly a yard in length, is then to be applied in the figure of 8 fashion, commencing at the nasal extremity, and the edges of the wound brought accurately together. Some surgeons prefer a separate thread for each pin, and put one point of interrupted suture through the mucous membrane of the lower part of the fissure just inside the mouth.[1] Others put interrupted sutures between the pins. Whatever plan be adopted, the threads are to be tied and their ends removed, after which the projecting portions of the needles are to be clipped, and if necessary a small piece of lint or plaster may be placed under their ends in order to protect the subjacent skin. Collodion may or may not be employed to cover the needles and thread. Several years ago I adopted a very simple and most efficacious plan of restraining the movements of the lip, by coating each cheek with a thickness of collodion about the size of a five-shilling piece, or larger. Broca refers to a somewhat similar method in 'Gaz. des Hôpitaux,' June 8, 1872.

In cases of double harelip the proceeding is much the same. If the intermaxillary bones so project as to prevent the edges of the wound from coming nicely in contact, they may be removed or dealt with in one of the ways that will be referred to presently. It is, then, necessary to pare the central

[1] 'Erichsen's Science and Art of Surgery,' p. 350.

portion, so as to make a continuous raw surface of a V shape (Fig. 16). As a rule, both sides of the

Fig. 16.



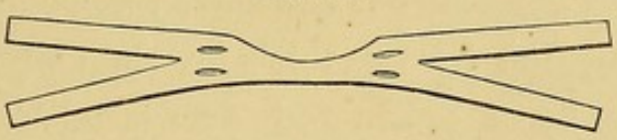
fissure may be closed at the same time. The lateral portions of the fissures are to be made raw in the same way and in the same order as already referred to in describing the operation for single harelip. The harelip pins, which in double harelip are almost essential, are introduced as before from below upwards, the surgeon taking care to include the central portion by transfixing it with one or more of the needles. Or the posterior surface of the central portion may, in some cases, be brought upwards, and its lower end backwards, as recommended by Dieffenbach, so as to form a quasi septum to the nose.[1] The operation is concluded, as already described.

The pins may be removed by a rotatory motion with an ordinary pair of carpenter's pliers on or or about the third or fourth day, or even earlier, leaving the thread to drop off. I think that, as a rule, the pins should be taken out between the second and third day. Subsequently a little

[1] 'Holmes's Surgical Treatment of Children's Diseases,' p. 107.

zinc ointment may be applied, although not always necessary. In some cases it is desirable to support the edges of the wound with a strip of plaster, and, if used, it should be cut in this form with four tails (Fig. 17). If the patient be carefully watched it

Fig. 17.



seldom happens that failure occurs; and even in those cases which do not unite by first intention it is remarkable what very satisfactory results follow if even the least particle of the sides adhere by granulation. I have seen some of the worst looking cases of double harelip turn out well with care and attention; indeed, there is often less deformity after the operation for double harelip than there is after that for the single; at all events the deformity is more symmetrical. I have in some instances re-introduced the needle, but the plaster has generally answered the purpose best, if there be the least attempt at union.

If the case is such as to demand the removal of the intermaxillary bones, they may be taken away with scissors or forceps either a day or two before or at the time of the operation, and as there is sometimes free hæmorrhage attending this procedure, the actual cautery should be at hand. Mr. Wardrop

referred to the removal of the bone in 1826;[1] and Franco recommended the entire excision of the bony mass, followed by an attempt to unite the two upper maxillary bones in the middle line.[2] Mr. Houston in 1842 operated on the intermaxillary bones by "paring off the outer lamina and removing the teeth, because the deformity it presented was such as could not be remedied by Desault's method of pushing it into place by a graduated pressure."[3] Guersant forced the projection backwards violently. Blandin took a V-shaped piece out of the vomer and at once pushed the bones backwards.

Sir W. Fergusson strongly advocated the removal of the intermaxillary bones, and in suitable cases took them away by a kind of subperiosteal operation, enucleating either the whole of the bones or simply gouging out the incisor teeth.[4]

On the other hand, Mr. Collis states that the bone should never under any circumstances be taken away. This, he adds, "is so well established an axiom in surgery that it need not be insisted on;"[5] and Mr. Butcher in his work[6] figures certain instruments for "cutting through the projecting pieces in complicated harelip without dividing the soft parts and the vascular supply behind, previous to bend-

[1] 'Lancet,' vol. xii, 1826, p. 800.
[2] Ibid., 1843–44, vol. i, p. 71.
[3] 'Dub. Med. Press,' 1842, p. 131.
[4] 'Brit. Med. Journal,' Dec. 25, 1875, and Jan. 1, 1876.
[5] 'Dublin Quart. Journal,' 1868, p. 299.
[6] 'Essays on Op. Surgery,' p. 715.

ing them back;" Langenbeck pared the edges of the prominent tubercle, and also the side of the maxillæ, and then transfixed the parts with a harelip pin.[1] My own view of this question is, that, provided the projecting part be of small size, it may safely be pushed back and retained; if, however, it be prominent it had better be removed, because if allowed to remain the result of the operation for the harelip is placed in jeopardy by the pressure that the prominence exerts on the needles and on the freshly united surfaces.

In witnessing the operation for harelip a bystander might suppose that the proceeding is a very simple affair, but there are a few practical points to which attention may be directed. It is of importance thoroughly to free the lip from the jaw on each side, so that the edges of the wound may be brought into contact without any strain on the pins or sutures, and in doing this the surgeon should remember to apply his knife quite close to the maxillary bone, as suggested by Franco,[2] for in so doing the risk of hæmorrhage is diminished. Moreover, a sufficient quantity of the edge of each cleft should be taken away. As a rule too little is removed; hence an unsightly vertical dip is left. Then the incision should be made somewhat concave, with the concavity directed towards the fissure, and a sufficient

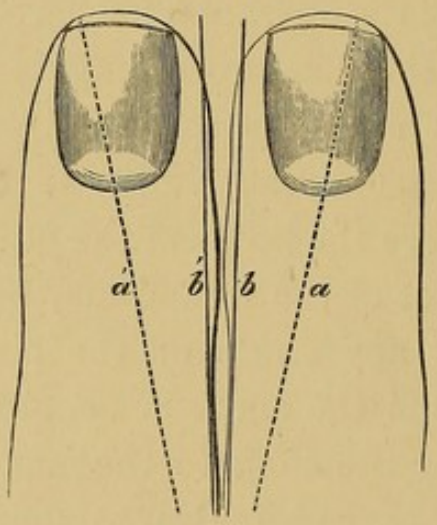
[1] 'Archiv,' vol. ii, p. 230.

[2] 'Costello's Surgery,' vol. ii, p. 813, 1861.

amount of the prolabium should be taken away, which obviates the V-shaped dip so often noticed after the operation. This concave incision was practised by Dieffenbach and others, and Syme mentions it in the third edition of his 'Principles of Surgery.' The idea, however, seems to have been first suggested by M. Husson, jun., in 1847.[1]

In describing the operation to pupils, I am in the habit of making them place the forefinger of each hand in apposition, thus—

Fig. 18.



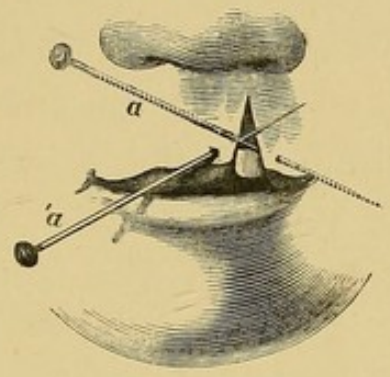
and of assuming that the two fingers have to be united to make one perfect finger. It is clear that if this object is to be effected the incision must be carried in the direction of the dotted lines (*a' a*, Fig. 18), so as to include the greater portion of each finger, for if a narrow strip only is taken (*b b*, Fig. 18), it is evident that a groove will be left

[1] 'Path. Ch.,' vol. ii, p. 703, 1847.

between the fingers and also a V-shaped gap at their extremities.

Then, in introducing the needles, the first should

Fig. 19.



be placed nearest the prolabium, and it should be inserted on the right side from below upwards, and on the left side from above downwards (*a' a*, Fig. 19). This manœuvre tilts down the prolabium, and thus brings the margin into a straight line. Dupuytren referred to this point in 1833 and he remarked that it was then not new.[1] Further, the needle should not go through the mucous membrane, but with that exception should transfix the whole of the lip. There are two reasons for carrying the needles to this particular depth: first, in order to give the greatest support to the sides; and, secondly, to secure the superior coronary artery which lies close to the mucous membrane. M. Giraldès passed the stitch through the whole thickness of the lip.[2]

[1] 'Lancet,' 1833, vol. ii, p. 295.

[2] 'Bull. Gén. de Thér.,' 15 Août, 1863. 'Brit. Med. Journal,' Sept. 19, 1863.

The ligature should not be drawn too tightly, otherwise the compression may cause ulceration. The edges should simply be brought together neatly, and if the precaution of thoroughly dividing the adhesions to the jaw, as already described, be attended to, there will be very little tension on the parts. In cases where the tension is very great it may be useful to follow the practice of Ambrose Paré, and make a vertical incision on each side of the ala nasi, but such a proceeding is seldom necessary.

Finally, with regard to the duties of the assistant. He should be especially careful to compress the side entrusted to him firmly, and not relax his hold until he receives the signal from the surgeon. Moreover, in grasping the lip during the paring of the edge he should take care not to drag the part away, but rather to push it inwards towards the cleft, so that the knife may make the necessary curve with the concavity towards the fissure as already stated.

There are yet two other points that have especial reference to the patient. It often happens after the operation that the upper lip will necessarily be so tightly drawn that the nostrils become temporarily closed, and the lower lip so contracted as to pout to such a degree as to overlap the upper, and thus interfere with respiration. In such cases it is only necessary to charge the nurse or mother to press gently from time to time the lower lip or chin down-

wards, so as to allow the air to enter the mouth. This may appear a simple matter, but it is as important to the comfort as it is to the safety of the child. Again, the position of the child in sucking is one of some consequence, for in severe cases of harelip, complicated with cleft palate, if the patient be placed in the recumbent posture the food is apt to pass through the nostrils instead of down the pharynx, hence there is risk of death from starvation. Under such circumstances it is only necessary to raise the child to the upright position, when deglutition can be readily accomplished.

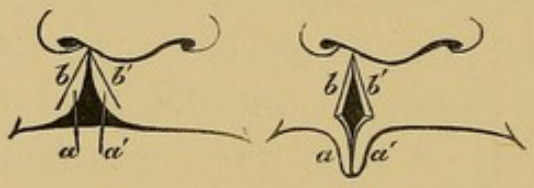
It is obvious that one particular kind of operation cannot be universally applicable for every example of harelip. It is, therefore, fortunate that the surgeon has a choice of numerous modes of procedure which have been successfully practised, and which may, no doubt, be again as successfully employed in suitable cases. To these I will now refer:—1st, as to the operation known as Malgaigne's. It appears that this operation was, as M. Roux states, previously performed by Clémot,[1] but Dr. Maurice Collis, of Dublin, writing in 1868, claimed it as the device of an English surgeon. Alluding to this (M. Malgaigne's operation) he says: "I learnt it twenty-one years ago from a fine old English surgeon, the late Samuel Smith, of Leeds. He told me that he had devised it some twenty or

[1] Nélaton, 'Path. Chir.,' vol. ii, p. 703. 'Costello's Surg.,' vol. ii, p. 821.

thirty years previously (that is, about 1820). Whether he ever published it I do not know. This improvement consists in reserving the lower portion of the parings at each side and turning them downwards so as to form a prominence along the margin."[1]

Malgaigne's operation is thus described:—He commences the incision at the superior part of the lip, and performs it from above downwards (Fig. 20, *b*, *b'*) employing scissors in the same

Fig. 20. Fig. 21.



Malgaigne's operation.

manner as in the ordinary operations, only when he arrives as low as possible (Fig. 20, *a*, *a'*), without detaching the cut piece, he stops. The same plan is followed on the other side of the labial fissure. There are then two small flaps which are adherent to the lip by a pedicle. After having reunited, by the aid of pins, the two margins of the cleft, in their whole extent, except towards their free border (that is, towards the bottom), these flaps are brought from above downwards, and approximated face to face (Fig. 21, *b*, *b'*). The operator

[1] 'Dublin Quarterly Journal,' May, 1868, p. 294.

then judging of the length which it will be proper to leave them, in order to prevent the furrow, which is always so much dreaded in this point, shortens and finishes them as he thinks fit, preserving a piece varying in size according to the extent of vacuum

Fig. 22.

Henry's operation.

which he has to fill (Fig. 21, *a a'*). Union is afterwards effected by approximating them with one or two interrupted sutures, or with a fine insect pin. If care is taken to place these uniting agents very near the free margin of the lip, the cicatrices will be scarcely visible.[1]

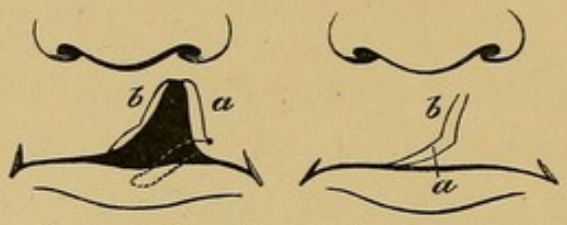
A slight modification of the above operation has been suggested by M. Henry, of Nantes. The chief point of distinction is that the flaps are cut in a slanting direction, from skin to mucous membrane, as will be best indicated by the accompanying diagram (Fig. 22).

M. Mirault, of Angers, employed one flap only :— thus, a flap is taken from above downwards, but left

[1] 'Gazette Médicale de Paris.' 'Prov. Med. Journal,' vol. viii, 1844, p. 260.

attached to the prolabium (Fig. 23, *a*). On the other side of the cleft the margin is completely removed (Fig. 23, *b*). The flap *a* is now turned down,

Fig. 23. Fig. 24.



Mirault's operation.

and from being perpendicular is now horizontal, and forms the margin of the lip[1] (Fig. 24, *a*, *b*).

Mr. John Dix refers to a slight modification of this. He remarks that in cutting the flap *a* it should so slope as to take away more of the skin than of the mucous membrane, and in treating the flap *b* the converse plan should be employed of cutting away a large piece of mucous membrane. In this manner he believes the sides may more readily overlap.[2]

M. Nélaton[3] devised and practised a simple, and in some cases a useful, procedure, but which is only practicable in cases in which the cleft does not extend into the nostril. It is, perhaps, most serviceable as a secondary operation in instances in which a V-shaped notch has been left. A semicircular incision is made above the fissure, thus (Fig. 25):

[1] 'Dictionnaire de Médecine et de Chirurgie Pratiques,' p. 701.
[2] 'Costello's Surgery,' vol. ii, p. 815.
[3] 'Med. Times and Gaz.,' July 2, 1859, p. 10.

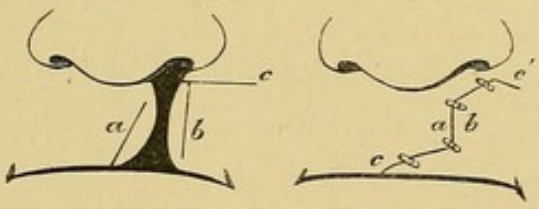
Fig. 25.

Nélaton's operation.

The fissure is then pulled down, leaving a diamond-shaped wound. One or two needles are then placed across, and the raw surfaces adjusted.

M. Giraldès devised a plan known as the mortise operation.[1] It may be thus described. Supposing the fissure to be on the left side, a flap is made by carrying the knife through the right side of the fissure commencing from below upwards, and is left adherent above (Fig. 26, *a*). On the opposite side

Fig. 26. Fig. 27.



Giraldés' operation.

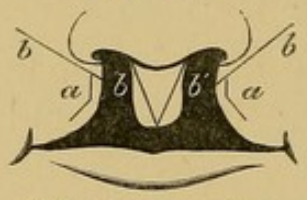
an incision is made in the reverse direction, that is, from above downwards, and left attached by a pedicle at the prolabium (*b*). In some cases the flap may be increased by making a transverse incision (*c*), as recommended by Paré, Guillemeau, and Van Horne.

[1] 'Dictionnaire de Médecine,' p. 703. See also M. Coste, of Marseilles, 'Lancet,' vol. ii, 1851, p. 203.

The flap *a* is now brought up horizontally, and the flap *b* is brought down, and when united the parts have the appearance represented in Fig. 27.

For double harelip Sédillot suggested a cheiloplastic operation. The sides of the central tubercles being pared, a flap of soft tissue is taken from each side, as shown in the engraving (Fig. 28). The flaps *a a* are brought down to form the red margin of the lip, and the raw surfaces *b b* come in contact with the raw surfaces on the sides of the central tubercle *b′ b′*.

Fig. 28.



Sédillot's operation.

Friedberg performed a somewhat similar operation in cases of single harelip.

Dr. Allen Duke proposed an operation by which the skin is not involved. It is thus described by him :[1]—" The edges are pared, not in the usual way, but by an oblique incision from before backwards, slightly concave, and are to be brought together neatly by two or more sutures, each armed by two curved needles, which are to be introduced immediately under the skin, carried through the remaining

[1] 'Lancet,' March 20, 1858, p. 287; and Prof. Soupart's observations thereon, 'Lancet,' July 17, 1858, p. 64.

thickness of the lip, and firmly tied *internally*. To facilitate the removal of the two upper ones, the ends of the suture should be brought out at the angle of the mouth, and secured externally by adhesive plaster, strips of which are to be applied the more firmly to bring and retain in contact the skin."

Dr. M. H. Collis, of Dublin, speaks thus of an operation,[1] which he calls "the æsthetic treatment:" He says "I never throw away a particle of the parings. My incisions are made so as to make every fragment of them useful. On one side they are preserved to make the thick lip, and on the other to increase its depth. The method is somewhat complex, but a reference to the accompanying figures will make it intelligible (Figs. 29, 30). When dealing with single

FIG. 29. FIG. 30.

Collis's operation.

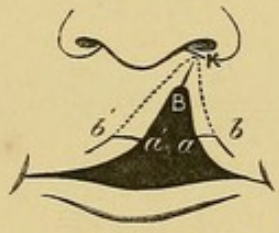
harelip, I take the larger portion, that which includes the middle bit, and pare it freely from the nostril round the margin from *a* to *b*, until the point of the knife comes opposite the frænum. The incision goes through all the tissues of the lip *except* the mucous membrane. It follows the curved line of the margin

[1] 'Dublin Quarterly Journal,' vol. xlv, 1868, p. 296.

of the fissure, and leaves a long wound, which is curved towards the fissure. The flap is left loose and attached only by mucous membrane. On the other or smaller side of the lip, where we generally find the tissues thin, especially as we approach the nostril, the treatment is quite different. I transfix the lip at *d* close to the nostril; and carrying the knife along parallel to the margin, as far as *f*, I detach a moderately broad flap, which I leave adherent above to the ala nasi, and below to the free margin of the lip well beyond or external to the rounded angle at the fissure. This flap, which (unlike the one at the opposite side) comprises *all* the tissues of the lip, is now divided into two at its centre (*c e*). I thus get two loose flaps, a superior (*c d*), attached to the ala nasi, and an inferior (*e f*), hanging on to the free margin of the lip. The loose end of the upper flap is turned up so that its raw surface faces the wound in the opposite side of the fissure, and the lower end of the lower flap is similarly turned down. The point *c* is brought up to *a* and fastened there. The point *e* is brought down to *b* and fastened there. I have thus got on the small side of the lip a wound as extensive as that on the larger side. The upper flap completes the outline of the nostril. The lower one supplements the outline of the free margin of the lip. I thus get a lip nearly double in depth which I could possibly have got by the ordinary incisions."

Dr. Stokes's operation (Fig. 31) is a modification of that just described. He says,[1] "I seize the edge of the cleft at its lower extremity with a double hook, draw the parts forward and make an incision through the entire thickness of the lip, taking care, however, to stop about two or three lines above the red border of the lip. I then make a similar incision on the opposite side. The two points *a'* and *a* can thus be brought down below the red border of the lip, thus forming a projection. The next step consists in

FIG. 31.



Stokes's operation.[2]

making a vertical incision (K B) through the entire thickness of the lip with scissors at the upper angle of the cleft; but this is only necessary in cases where the labial cleft does not extend into the nose. The making of the *partial* incisions at the edge of the cleft on either side constitutes the third stage of the operation. These incisions are made going through fully two thirds or three fourths of the

[1] 'Dub. Quart. Journ.,' vol. l, 1870, p. 4.

[2] In referring to this woodcut it should be remembered that the incisions which go through the *entire* thickness of the lip are indicated by *black* lines, and those which do *not* go through the entire lip are indicated by dotted lines.

thickness of the lip from the upper point of the vertical incision K down to *b* on one side, and from K to *b′* on the other, and taking care not to injure the mucous membrane. The two quadrilateral flaps K B *a b* and K B *a′ b′* can then be turned back, and the broad raw surfaces of each brought into apposition."

Lastly, I may refer to an operation recommended by Mr. Thomas Smith.[1] It is useful, he says, in suitable cases of double harelip. The lateral sides are pared in the manner shown in the Fig. 32 *a′ a*,

FIG. 32.

T. Smith's operation.

and two flaps are taken from the central tubercle, but are not to be detached at their lower margins. "The wound is closed by drawing down the flaps from the side of the central tubercle and attaching them to the raw surface on the lower margin of the lip."

Various instruments have been devised to restrain the hæmorrhage during the operation, and others to keep the parts in apposition in the after treatment. In most of the operations just described the proceedings are somewhat tedious, and in these cases the

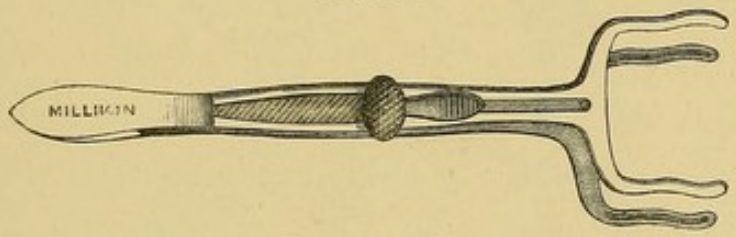
[1] 'Lancet,' Dec. 28, 1867, p. 799.

sides of the lips may be compressed with some convenient instrument made in the form of forceps, such as this (Fig. 33).

Fig. 33.

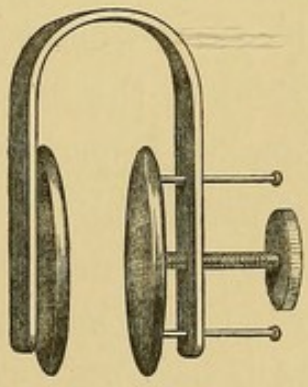
Or this, suggested by Mr. T. Smith (Fig. 34)—

Fig. 34.



Or by using the lip tourniquet of Mr. Augustin Prichard, of Bristol (Fig. 35).

Fig. 35.

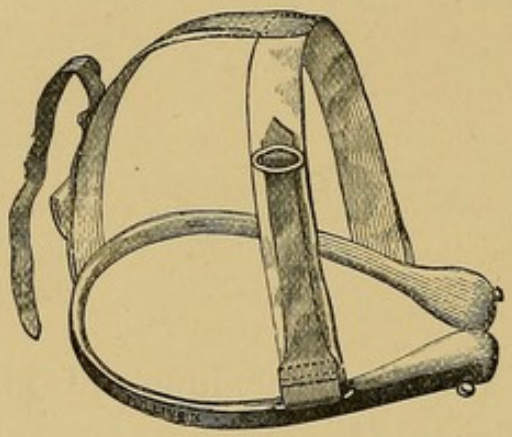


Such instruments are, however, scarcely required provided the surgeon has trustworthy assistants

about him. Liston was alive to this point when, in referring to operations on the lips, he remarked that "there were many kinds of forceps for holding the lip whilst cutting it, but he advised his pupils always to use their fingers. Instruments, many of them, were invented for those whose fingers were useless."[1]

The instrument known as Hainsby's compressor (Fig. 36) is in some cases invaluable, but in most

FIG. 36.



Hainsby's compressor.

instances of single harelip it may be dispensed with. It is, I think, most useful if worn *before* the operation, so as to bring the sides of the fissure nearer the one to the other and also to approximate the superior maxillæ. The chief drawback of the instrument is that it does not always fit accurately, and in many cases I have observed that as the spring encircles the back of the head it is subject to pressure during the nursing of the child, and hence the cheek pads

[1] 'Lancet,' 1835, vol. i, p. 598.

are apt to get displaced. In Mr. Dewar's paper on harelip, already referred to, he describes an instrument that is somewhat similar in construction, but it is not quite clear from the description (for there is no woodcut) that the spring came from behind forwards, as in Hainsby's instrument. Mr. Dewar speaks thus of the apparatus:—"It occurred to me that as a very slight degree of pressure on the cheek on each side near to the corner of the mouth relaxes the upper lip, a narrow piece of steel having a spring might be so adapted as effectually to answer the purpose. I had a spring made, nearly resembling a pair of sugar-tongs, and so padded as to press upon the cheek near the mouth. It was kept in its place by a narrow tape tied *over the chin*, and by three tapes, which were fastened, one *behind* and *one on each side*, to a piece of leather placed on the crown of the head."[1]

Other and more complicated instruments have been devised to support the lip, but, as a rule, a well-applied strip of plaster answers the purpose most efficiently. It should have four ends, and the centre should be narrowed so as not to compress the nose. It is also useful to make small holes in the situation of the points of the needle, so as to avoid pressure on them (see Fig. 17), and a pad of lint may be placed on each cheek, so as to give the lip additional support. I am indebted to my colleague,

[1] 'Ed. Med. and Surg. Journal,' 1830, p. 89.

Mr. Croft, for introducing to my notice a preparation known as adhesive india-rubber plaster, which is well adapted for keeping the parts in apposition.

I have occasionally used Louis's bandage with advantage (Fig. 37). It consists of a double-headed roller about an inch wide, and two yards in length. The centre of the bandage is placed on the middle of the forehead, the two ends are then carried behind the head over the ears to the occiput, where they are made to cross and are brought forward again. Two slits are now made in one end, and the other end split into two. The two ends are then passed

FIG. 37.

Louis's bandage.

through the two slits, and thus by making traction on the ends the edges of the lip are brought together. The bandage is completed by carrying the ends back again to the nape of the neck, and there fastening them. This bandage may be modified to suit particular cases.

PART II—CLEFT PALATE.

In discussing, in the foregoing pages, the subject of harelip, 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 seemed 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, the original paper of which appeared in the 'St. Thomas's Hospital Reports' for 1876. One year having elapsed between the publication of this article on cleft palate and the previous one on harelip, I venture to hope 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 that I am in a still 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 article 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 principle object of the present communication is to review the subject of congenital malformations, 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. 38). In another it will involve more or less of the soft palate, stopping

FIG. 38.

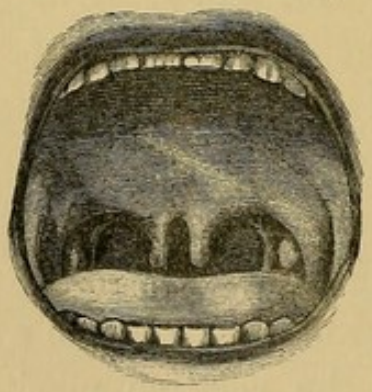
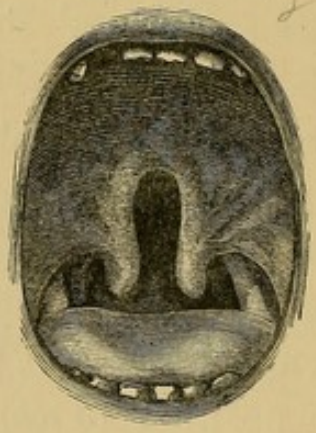


FIG. 39.



short at the margin of the palate bones (Fig. 39).

In a third the fissure will include a portion of or even the whole of the hard plate (Fig. 40). In other examples, in which the deformity is complicated with harelip, whether single or double, the alveolus

Fig. 40.

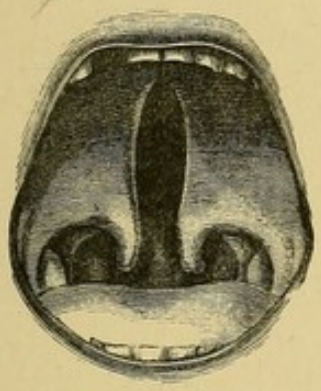
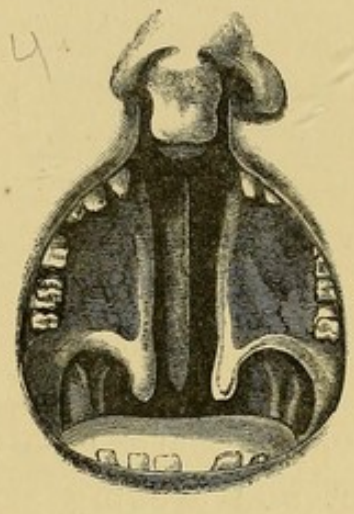


Fig. 41.



in front will be more or less involved (Fig. 41). 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. 41 and 42); 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 buccal cavity (Fig. 43). Referring to this point, Rouge[1] states that the vomer is most frequently attached to the right side. Lastly, there may be fissures of variable size extending through

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

FIG. 42.

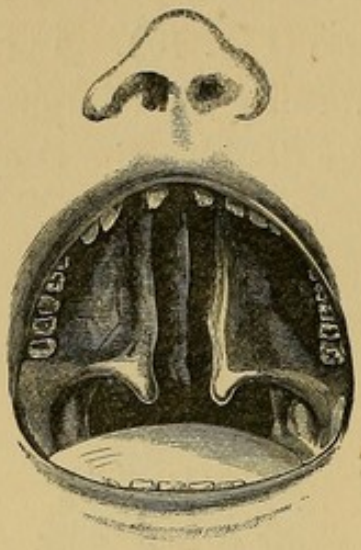
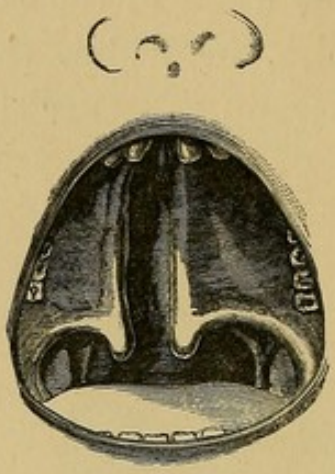


FIG. 43.



the alveolus (Fig. 44); 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.

FIG. 44.

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.[1]

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 there are even exceptions to this rule; thus, I find reported "two cases of total absence of the uvula, one in a Hindoo girl, and another in the practice of Mr. Wallace, at Bow,"[2] and M. Ancelet[3] 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. A still more remarkable case was under my care in the spring of 1877, at the hospital. The patient was a girl, aged 6, who had a congenital fissure extending through the soft palate, and involving the hard to a very slight degree, but there was *not a vestige of*

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

[2] 'Lancet,' 1840–41, vol. i., p. 555.

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

uvula on either side—the soft palate being continuous on each side with the pharynx. It is further of interest to note in connection with the case that the child's voice was not very much impaired. In dealing with this deformity it seemed useless to try and unite the edges, so I was content to divide the sides in the manner described at page 114. I did this with the view of improving the voice, and the improvement was well-marked.

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 up the apertures and turning them back so that the discharge might enter the cavity of the mouth.[1] 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.

[1] 'Brit. Med. Journ.,' August 20th, 1859, p. 666. This case is probably somewhat similar to the one referred to at p. 20.

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 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 (Fig. 45). It consists of an ordinary

Fig. 45.

teat attached to a feeding bottle. 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]

According to Mr. Atkinson,[2] 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 in-

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

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

stinctively 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, and I find that the infants' food of Messrs. Savory and Moore agrees with such patients remarkably well; better, perhaps, than any other preparation of the same kind.

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,[1] speak of extreme fetor 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

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

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 volume, which is intended to be of a practical character, were I to enter into the consideration of the development of the mouth. For minute and elaborate description of this the reader is referred, amongst others, to M. Coste's[1] excellent work, to Mr. Goodsir's exhaustive article,[2] and to an excellent résumé by Dr. T. Hamy.[3]

It is, however, not difficult to find the explanation of the origin of fissures of the lip and palate when it is remembered that in the normal development at an early period of fœtal life the nose and mouth form one common cavity. At about the eighth or ninth week the horizontal plates of the superior maxilla of each side unite in the median line, and also with the incisive bone; further, 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[4] put the case very plainly when, after giving an elaborate account of M. Coste's

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

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

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

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

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 the development extends to the bones and soft parts. If the separation is persistent between the superior maxilla and the intermaxillary bones there may be a labio-alveolar fissure, and if it encroaches further back it will be a labio-palatine. 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."[1] 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

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

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 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. 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

[1] Rouge, op. cit.

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."[1] 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,[2] says that "there are few cases in which the operation is required."

Further, Mr. Syme, writing so recently even as 1854,[3] believed the operation was of doubtful expediency, and states, in his 'Principles of Surgery,'[4] "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 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

[1] 'Lectures on the Progress of Anatomy and Surgery,' 1867.
[2] 'Lancet,' vol. ii, p. 959.
[3] 'Association Med. Journ.,' March 10th, p. 230.
[4] 'Principles of Surgery,' 1856, 4th edit.

involuntary efforts of the patient." How vastly different is our experience in the present 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 a cleft palate, and there were three other children by the same father whose palates were perfectly normal. In another case 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. Lastly, in the summer of this year (1877), I saw a young gentleman, aged 15, who had a fissure extending through the uvula only. The palates of his parents were normal, but of the patient's three sisters two

[1] Op. cit.

had fissured uvula, and of two brothers one had the like condition. 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 of cleft palate was not hereditary, and further mentioned 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 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 understand. She assured me that this occurred at about the sixth week of gestation.

The merit of having first performed the operation of closing a fissure of the palate has been claimed both by Professor Gräefe, 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 towards 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 Staphyloraphie,' 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] a dentist, named Lemonnier, 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; all these facts, in spite of the somewhat vague expression of Robert, scarcely permit us to doubt that this dentist truly had recourse to staphyloraphy and not to suture of a simple perforation of the palatine vault."[2] Eustace (of Beziers) is said to have performed the operation in 1770, and in 1801 Désault reports the case of a child in which the palate was closed twenty-seven days after the operation for harelip.[3] 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 operating on 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.[4]

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

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

[3] 'Œuvres chirurgicales,' p. 204.

[4] Op. cit.

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, and Sir W. Fergusson, the last distinguished surgeon's experience having, perhaps, surpassed that of 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. M. Velpeau[1] thus expresses his opinion on this point: —"Toutefois, l'opération échoue encore assez souvent; une jeune fille que j'ai vue à l'Hotel Dieu l'a

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

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. 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.[1]

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. The first was that of a child five days old, in whom the hard and soft palate were closed at the same time. The hard palate united, but the soft broke open. The second case was that of a child aged nine months. In this the harelip and palate were both operated on at the same time with a successful result. The third case occurred in a

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

child aged twenty weeks, and the result was a failure. In another case of uraniscoplasty, the child, aged six days, died eight days after of diarrhœa.

M. Ehrmann, writing in 1870,[1] 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. Mr. Marsh operated on a case with partial success at the age of sixteen months,[2] and I operated successfully at St. Thomas's Hospital on a child aged two months.[3]

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

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

[1] 'Lancet,' August 20th, 1870, p. 259.
[2] 'Brit. Med. Journ.,' November 6th, 1869, p. 520.
[3] Ibid., January 6th, 1872, p. 15.

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 involved the soft palate only. I am, however, inclined to think that unless there be good reason 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 then 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. Closure of the Soft Palate.

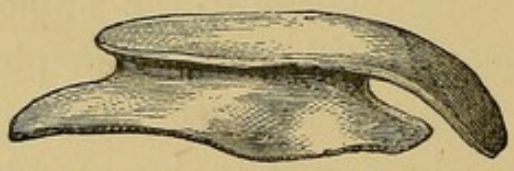
Staphyloraphy.

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, 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. 46),

Fig. 46.



has been used 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;[2] and Mr. George Parkinson, who has had considerable experience in such cases, refers espe-

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

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

cially to this method of treatment.[1] On the other hand, Mr. William Donald Napier, after numerous trials in these cases, has arrived at the conclusion that the value of mechanical apparatus is very much overrated, and he 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 means of muriatic and sulphuric acid, but the results were not favorable.[2]

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.

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

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

The merits of this procedure have also 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. nit. sp. gr. 1·500, and about six of the acid. nit. sp. gr. 1·420." Mr. H. G. Armstrong, too, of the Royal Berks Hospital, Reading, states that in three cases in which he applied the treatment he was quite satisfied of considerable improvement. In 1855 M. Jules Cloquet published an essay on this subject, 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 May, 1860, a case was brought forward by Professor Benoît, of Montpellier, which had been treated by applying the acid nitrate of mercury and the solid nitrate of silver. 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, and the whole cleft united save that of the uvula.[1]

Tyrrell reported a case in which he closed a small congenital aperture of the roof of the mouth

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

(a very rare deformity), situate about the centre, in a girl seventeen years old. 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 useful in the after-treatment, as it renders the parts less sensitive. 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

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

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 if required 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 unconsciousness. 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.

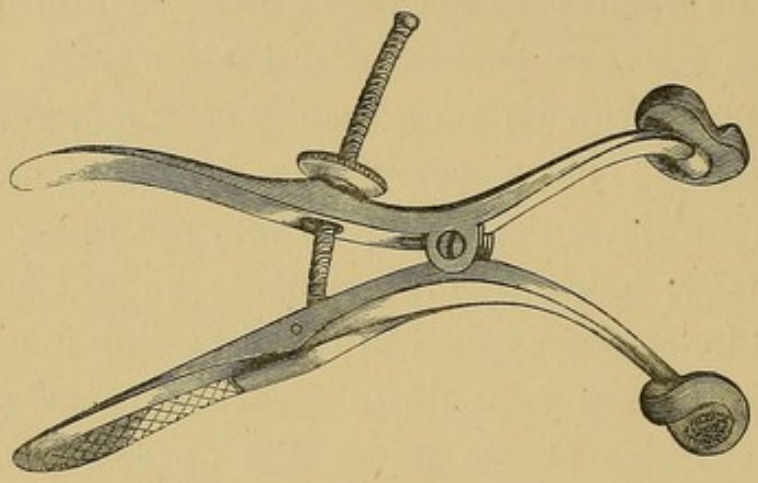
I may say that in selecting the kind of anæsthetic

it is well to bear in mind that ether excites the salivary secretion. I therefore prefer chloroform 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 or *staphyloraphy* is sufficiently easy, and may be thus performed:— Although some operators 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 carried under the left thigh of the patient and then secured to his left wrist. I may add that for this simple and efficient method of securing the patient I am indebted to Mr. J. T. Clover, the well-known chloroformist, who, by the way, in administering anæsthetics for operations on the mouth commences with ether and then keeps the patient under the influence of chloroform. These appliances, 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 in some cases, but the gag I am in the habit of employing (fig. 47) is simpler in con-

Fig. 47.



struction, and being more universally applicable I find answers the purpose remarkably well. It was originally made for me in 1870, and was slightly modified subsequently by Sir William Fergusson.[2] I was not aware, until my attention was directed to the fact, that my friend Mr. Alfred Coleman 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.,' vol. i, 1876, pp. 4, 59, and 117, and vol. ii, 1877 p. 31.

[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 troublesome; 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.

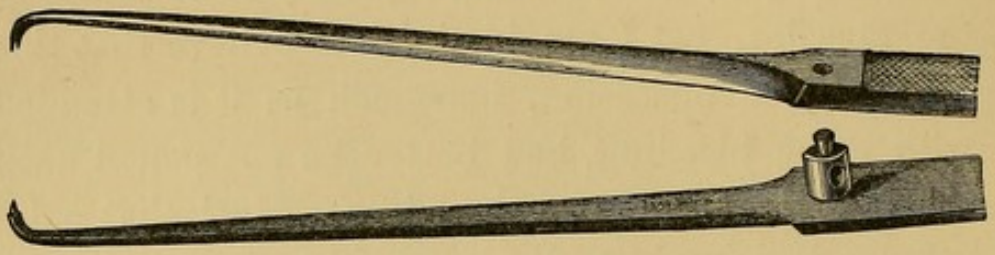
The instruments to be employed should be of the simplest character. Roux evidently had a horror of complicated surgical apparatus. He says, after an experience extending over nearly half a century, "Je crains toujours dans la pratique des opérations les instruments qui tiennent trop du jeu des machines. Partout ou 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 the 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

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

patient, commences by seizing with a pair of hook-forceps (Fig. 48), the edge of the cleft on the patient's

Fig. 48.



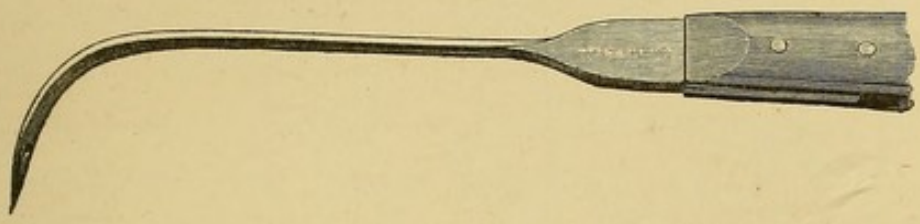
left side, a little below the centre. A knife, such as here depicted (Fig. 49), is then made to transfix

Fig. 49.

the margin of the cleft, and is carried downwards to the extreme point of the uvula. The instrument being now reversed, pares the remaining part of the edge upward 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 in-

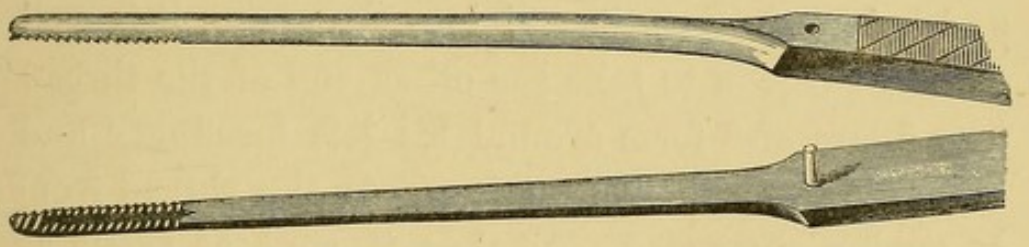
strument the parts are more or less bruised.[1] A needle like this (Fig. 50), armed with a thread,

Fig. 50.



is then passed through the palate at about a quarter of an inch from the free edge. The thread is grasped with either the hook-forceps or with a pair having serrated blades (Fig. 51), and the needle

Fig. 51.

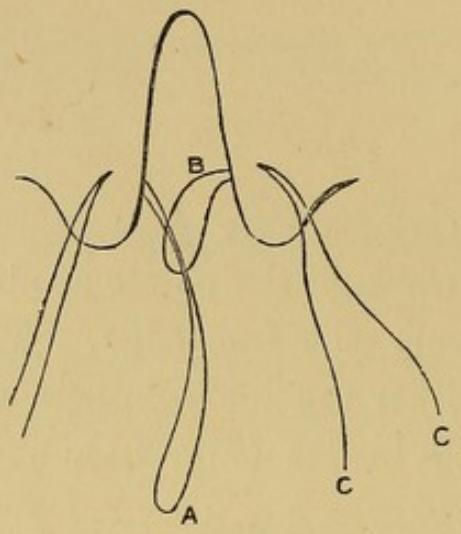


withdrawn. The needle is now re-threaded (or another may be used), and is to be passed through the opposite side exactly on the same level. If now the end A (Fig. 52) be passed through the loop B, and traction made at CC, the end A will be brought through the opposite side of the fissure. It now only remains to pull through one side of the thread, when it has the appearance represented at B (Fig. 53). When sufficient threads, say three or four,

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

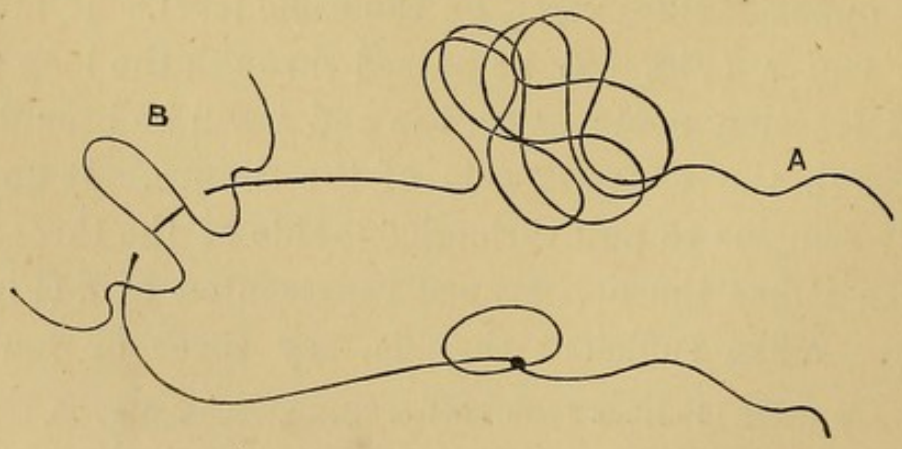
have been introduced, the next step is to approximate the edges. A slip knot is perhaps the best;

Fig. 52.



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 becoming entangled, and thus it runs as easily as possible (Fig. 53). Coloured threads may or may

Fig. 53.



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 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 tying 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 tied, if this has not already been done as the first step of the operation, or by taking the tension off the stitches by making a vertical incision, as Dieffenbach did, about half an inch in length on each side of the fissure. It is generally advisable to divide, in addition, the anterior and posterior pillars of the fauces, with some fibres of the palato-glossus and palato-pharyngeus. The accompanying woodcuts (Figs. 54, 55) 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

FIG. 54.

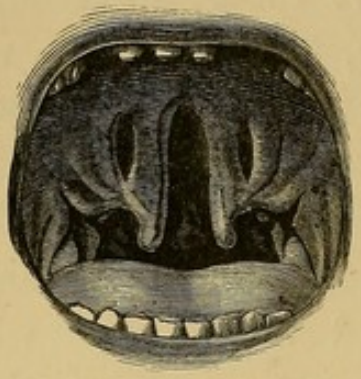
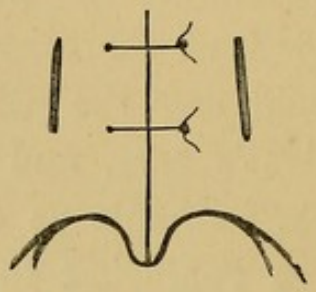


FIG. 55.



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 grasped with the forceps. Various instruments have been divised to catch the thread, but they are unnecessary, as a pair of forceps such as those already referred to answer the purpose. 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 brought in apposition 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 Sir William Fergusson, in some cases, took a curved knife and ran it along the cut

surfaces. He thought that, by this means, there was 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 advised their removal about the third or fourth day; but, nevertheless, 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.

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

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

suspension of speech, is, I venture to think, somewhat overrated. Roux would not even allow the patient to swallow 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 to certain patients, and is really severe in very young children. There is in some cases considerable nausea and retching after the operation, hence it becomes necessary in many instances to administer beef tea and other nutriment in the form of enemata.

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, of Helston, and upon whom I operated. She continued to retch violently, and after two days 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

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

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 chance of sloughing is increased. 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 also 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 needles, 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 uses glass beads, and Mr. T. Smith prefers horsehair. Dr. Mason Warren and Professor W. 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, as already stated, made a longitudinal incision at four lines external to and on each side of the fissure. He says, "The side incisions are 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

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

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

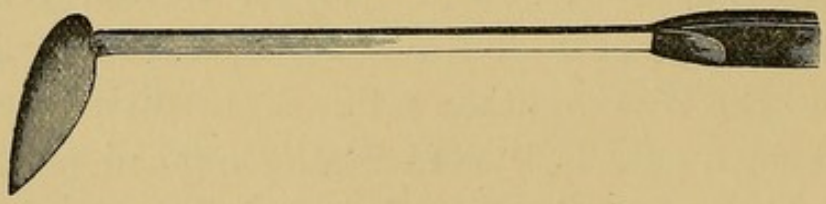
openings of the side incisions nature is forced to a regeneration by filling them up with granulations, so that the palate gains in length what it was deficient in breadth."

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. Inasmuch as chloroform, or some other anæsthetic, is now so commonly 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 vertically. 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, Sédillot, 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. 56) is passed through the

Fig. 56.



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 end of the Eustachian tube; the point is then thrust deeply, and carried half an inch or more backwards

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

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

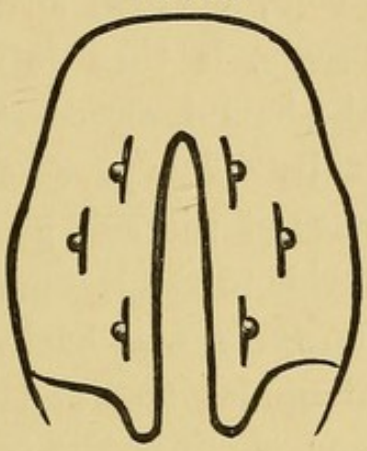
Pancoast, referring to his method,[3] says, "When the knots are prepared for tying, but before they are finally secured, Wenzel's cataract knife is passed from before backwards through the attached sides of the palate, thus, to enable the two halves of the velum to come together in the middle line, as 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. Sédillot, alluding to his own practice, says,[4] "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 pillars of the fauces. Mettauer released the parts by a number of small lateral incisions, as indicated in the ac-

[1] 'Brit. and For. Med. Rev.,' April, 1845, No. 38, p. 415.
[2] 'Lancet,' 1852, vol. ii, p. 31.
[3] 'American Journ. of Med. Science,' vol. xxxii, 1843.
[4] 'Med. Times,' 1850, p. 375.

companying woodcut (Fig. 57), which is copied from his original paper. Dr. Smyly[1] recommends the division of the muscles something after Sir William Fergusson's method, only that he puts the knife along the floor of the nose.

Fig. 57.



Mr. Callender, in order to obviate the difficulty arising from hæmorrhage, says,[2] referring to a case, "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 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

[1] 'Med. Times,' June 7th, 1862.
[2] 'Clin. Soc. Trans.,' vol. i, p. 173.

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

[1] 'Holmes's System of Surgery,' vol. iv, "Diseases of Mouth."

incision comprising the whole thickness of the palate on each side, two or three lines from the fissure; then he 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 united them with a suture.'"[1] 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 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."

[1] 'Dictionnaire de Médecine et de Chirurgie Pratiques,' vol. xv, 1836, p. 19.

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. (See p. 23.)

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 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

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

MM. Autenrich and Mannoir employed an instrument which is very like that known to English surgeons as Hainsby's compressor (Fig. 36).

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. "I turned," he says, "the piece back after cutting through the cartilage, and 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 took place in their track, and at length three 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 preced-

[1] Rouge, op. cit.

ence—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 Sédillot 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,[1] 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, myself, 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[2] thus described his method of operating:—"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

[1] 'Med. Chir. Trans.,' vol. xxxix, 1856.

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

be turned over and fastened by suture in the middle line."

Langenbeck[1] claims the right of priority for this kind of operation, and states that he was the first who *completely* closed 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 laid great stress 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,[2] in 1852, 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 writes,[3] "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."[4] He further states

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

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

[3] In Holmes's 'Surgery,' vol. iv, p. 436.

[4] See Prof. Langenbeck's treatise entitled "Weitere Erfahrungen im

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.

Mr. 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, and, writing in 1856, remarks that he separated the soft parts in a direction "from the fissure to the alveolus," and then he made a cut along the alveolar border. This takes off all tension. But more recently (1870) he states:—"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 soft tissues covering the bone—mucous membrane, areolar tissue, &c." It is, however, highly probable that Dieffenbach performed a very similar operation many years previously, for he writes:—"If the opening in the hard palate be large, and the edges covered with a thin skin, the sides are cut about half an inch from the edge. The skin is pushed away from the bone with a scraper,

Gebiet, der Uranoplastik mittelst Ablösung des Mucös-periostalen Gaumenüberzuges,' Berlin, 1863.

and the opening fastened by a suture. The side wounds are filled up with charpie and treated as usual."

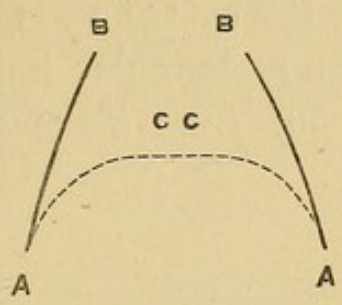
The great advantage that Langenbeck claimed for the separation of the periosteum was that the new palate is composed of bony substance. "The osseous formation," he remarks, "takes place about the third week after the operation. It is completed at the end of the fourth week, and afterwards attains considerable solidity."[1] He tested its strength by trying to pass a needle through it, and believed that ossification had really been effected. 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. In order to clear up this point M. Marmy tried some experiments to ascertain the results of operations 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, distinguished for his researches on 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

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

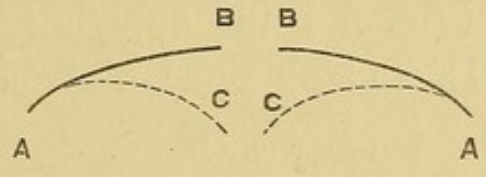
the extent of the arch of the palate, for if the part be of this shape (Fig. 58) it is obvious that when the

Fig. 58.



sides (A B) are detached they will fall together more readily (A C) than if the arch be formed thus (A B, A C, Fig. 59). Mr. Pollock remarks on this point,

Fig. 59.



that "The more complete the cleft the nearer the perpendicular are 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."

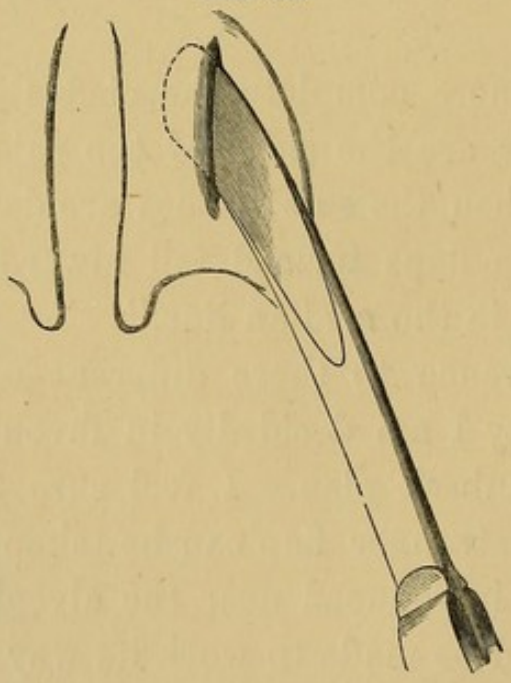
With reference to these different operations of uraniscoplasty I am decidedly in favour of the so-called Langenbeck plan. I feel sure that a much thicker and stronger flap can be taken away if the raspatory be introduced near the alveolar border of each side and be made to work its way towards the

fissure. In 1865 I had under my observation a case illustrating the advantage of this 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. 56) *from the fissure towards the*

Fig. 60.

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. 60) and applying it as here depicted (Fig. 61), and obtained a strong, thick flap

Fig. 61.



from either side, and the success was all I could wish.[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 in the bone is immediately perceptible in the soft palate. The

[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.

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 sewing of the palate may then be undertaken according to the directions 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."

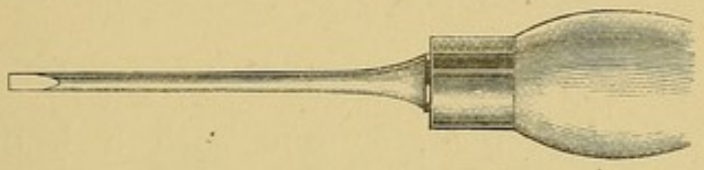
In a very interesting and practical paper by Sir W. Fergusson, entitled "Observations on Harelip and Cleft Palate,"[1] this distinguished surgeon refers to an operation which he believed to be novel, but which is in reality very similar to that proposed by Dieffenbach. My colleague, Mr. Mac Cormac, drew the attention of the profession to this subject in a concise and able contribution to the 'British Medical Journal' for June 20th, 1874. 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,

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

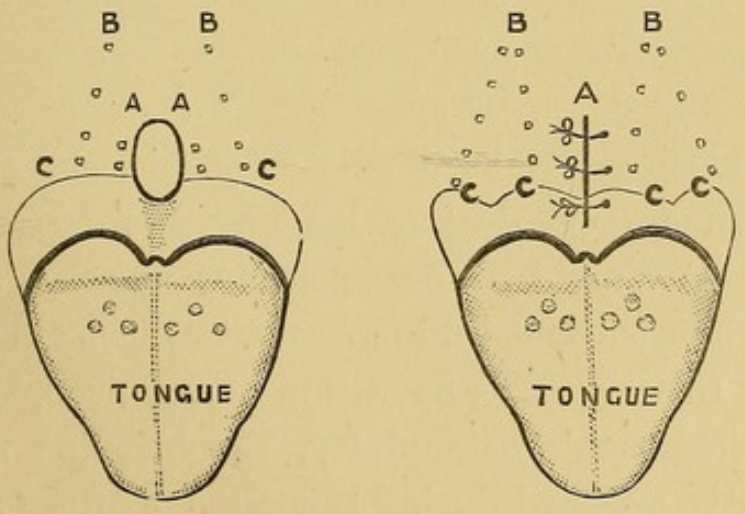
that there was some exfoliation of bone, and I venture to think that the necrosis depended on the somewhat rough way in which the bone was divided. By simply pushing the instrument through the bone the latter is apt to be splintered, and in order to obviate this I have since adopted a very simple method, which I brought before the notice of the profession in 1874.[1] It consists in boring holes with an ordinary brad-awl (Fig. 62) on each side

Fig. 62.



straight through the hard palate, exactly in the line in which the chisel is to be applied (Fig. 63, B C).

Fig. 63.



The least pressure with such an instrument as this

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

(Fig. 64), which is really nothing more than an

Fig. 64.

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.

The sutures may be applied with a pointed needle, as already described, or one with a blunt point, such as this (Fig. 65) may be employed.

Fig. 65.

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 uraniscoplasty, 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. Sédillot 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 a large number of patients under 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, if not better, results.

I may mention that in such cases as those in which the vomer 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. 43, 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. In a case of M. Gustave Simon's the flap sloughed and the child died of septicæmia, then a patient of M. Bérard's as well as one of Maisonneuve's died of erysipelas of the face.

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

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[1] 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[2] 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[3] in which a patient, a

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

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

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

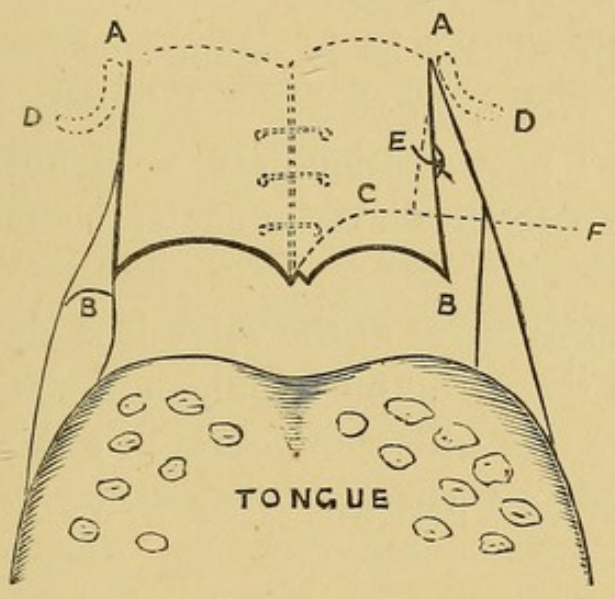
Frenchman, could express himself equally well in French and in English, but his voice had a nasal twang when he spoke French, and was almost normal when he spoke English.

I venture to think that 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 (A, Fig. 66), in about the position of the inner edge of the hamular process in the normal palate (D), and the soft palate is cut completely through from

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

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 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

FIG. 66.



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 obviates the disagreeable guttural voice that is more or less observable in all patients who are the subjects of this distressing deformity.

With respect to the after-treatment I have little to say, further than that it is diametrically opposite to that usually recommended after the operation of staphyloraphy. Instead of the patient being condemned to silence he is rather encouraged to use the voice freely, so that the soft palate may get fixed in its new position. He need not adopt any special course of diet; in short, he may live as usual.

The improvement of the voice depends to a great extent on the care and intelligence of the patient, but I have met with many 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 venture to hesitate before I accept the broadcast belief that syphilis is in such instances the *fons et origo mali.* In speaking thus somewhat boldly, I may add the experience of so high an authority as Sir James Paget. Nearly twenty years ago this distinguished surgeon, referring to perforating ulcers of the palate,

expressed his opinion in the following terms: "In some patients these ulcers follow other manifestations of syphilis, but *in the majority no history of syphilis can be traced.*"[1]

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, or if there have been, 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 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 sub-

[1] 'Med. Times and Gazette,' Feb. 6th, 1858. p. 136.

stance, 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 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

[1] Lib. xxiii, p. 579.

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

the singular fact that the voice is, in many instances, comparatively scarcely altered, 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, but there were still some small fistulæ between the nose and mouth. The epidermis bristling with hairs was seen in the cavity of the mouth.[1]

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

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

Any attempt at closing an aperture in the soft palate acquired by constitutional disease by operation will almost invariably fail. Nevertheless, a few successful cases are recorded, notably one by Field, of Brighton, in which after four operations a cure was effected.[1] I had the privilege of assisting Sir W. Fergusson in many operations of this kind, and he always held that they generally resulted in failure. Indeed, Sir William's later experience might be summed up in the same words he used at a clinical lecture delivered in 1852 :[2]—"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.

[1] 'Med. Times and Gazette,' Aug. 23rd, 1856, p. 190.

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

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