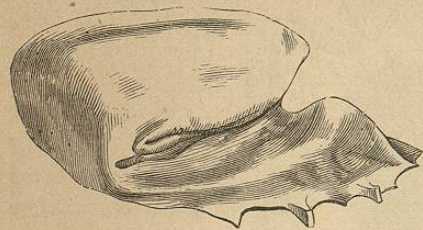


formity. The attempt had been made twice to bring the soft parts together by surgical operations, both of which failed. Fig. 346 exhibits the appearance of the parts very clearly,—the letters A and B showing the thickened muscles as they hung down on the sides of the pharynx.

For this case an obturator was constructed, Fig. 347, the plate of which covered the whole of the roof of the mouth, with a bulb attached, to extend up

FIG. 347.

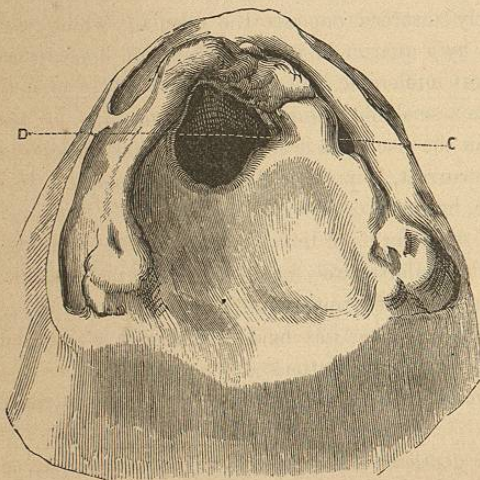


into the posterior nares and well back toward the posterior walls of the pharynx, leaving but a small space between the two. This obturator enabled the patient to eat and drink with convenience; without the instrument in place food would pass into the nares and occasion much trouble. It also greatly assisted the voice, as many of his

words could not be understood when it was not worn,—articulation was with great distinctness when it was in the mouth. Dr. Buckingham remarked that he had been more successful in restoring speech in this case than in any other he had treated, and attributes it to the fact that the person, having once had perfect voice, was always endeavoring to speak as he had formerly done. In the congenital cases patients do not, he inclines to think, try to overcome the difficulty.

The fourth case is that of a lady with an opening in the anterior part of

FIG. 348.



parts, C representing the smaller opening, and D the larger one; between these two points is the depression referred to.

the hard palate, a little larger than a ten-cent piece, and also a second small one exposing the left antrum. All the teeth in the superior arch had been long removed, and absorption of the alveolar process, opposite the smaller opening, had progressed to such an extent as to present at that point a deep depression; the remaining part of the alveolar ridge had not been absorbed more than is usual where the teeth have been lost.

Fig. 348 shows the appearance of the different

This lady had never worn any mechanical appliance, but had been in the habit of closing the larger opening with loose cotton or pieces of linen. Without having it filled, she could scarcely be understood when speaking. For this case there was made, first, a plain plate to extend over both the openings, but not into them; upon this plate, at the point where the process had been absorbed, wax was arranged so as to restore the alveolar ridge to its natural fulness. By using the plate with the wax attached for a mould, metallic dies were obtained. A second plate was then made to fit over that part of the first one which was covered by the wax; these two plates being next soldered together. The object in forming a double plate was to fill up that part where absorption had taken place, so that the plate when worn would resemble the roof of the mouth, and not be deeper on one side than on the other.

This obturator was very successful; the voice was much improved, the patient was able to eat and drink as well as persons ordinarily can who use upper sets of teeth; and, what was more remarkable, she could wear the piece without springs, or any assistance whatever, to retain it in position.

A fifth case by this same practitioner relates to a gun-shot wound.

A gentleman was handling a gun loaded with buckshot, when it was discharged in his hands. The gun being pointed toward his head at the time, the load struck him at the angle made by the ramus and body of the inferior maxilla on the right side, passing upward and outward on the opposite side of the face. The only way the patient could eat or drink was to lie on his back and let the food run down his throat.

The teeth in the upper jaw were all gone, excepting the left second molar and dens sapientiæ; both antra were fully exposed, the remainder of the mouth being left almost flat. The lower jaw-bone was wanting on the right side, from the second bicuspid back, and also the condyloid process; about three-quarters of an inch of the coronoid remained, which was drawn in so as to partially cover the roof of the mouth. The molar teeth were lost on the left, and also all on the right side from the symphysis. In taking hold of the lower jaw it could be moved either backward, forward, or laterally, to a considerable distance.

Figs. 349 and 350 show this case,—the letters A and B are the openings in the antra, and C the end of the lower jaw-bone. The distance between the points A and C, with the mouth closed, was just two inches.

The gentleman had been wearing a partial upper set of teeth which had been attached to the molars, but the clasps of the artificial work had loosened these, and it was therefore necessary to replace the piece with a set that could be supported in some other way.

This was found a difficult case to treat. One of the obstacles encountered was the obtaining of a correct impression. To accomplish this the antra were first filled with loose cotton, to prevent the material used from passing into them; next as good a wax impression of both the upper and lower jaws

as could be got was taken; from these cups were improvised, to be used in securing the plaster moulds. There was found very little difficulty in obtaining

FIG. 349.

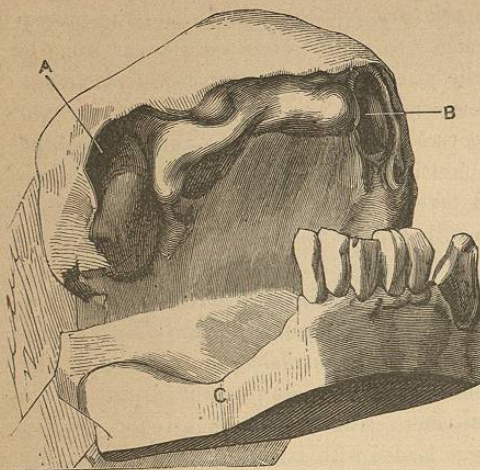
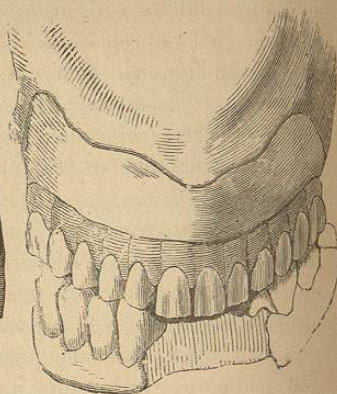


FIG. 350.



an impression of the upper jaw with plaster (the antra being filled with cotton as before), but it was far more difficult to secure a good one of the lower jaw. The distance from the points of the teeth down to the point marked C, as shown in Fig. 349, was so great that when any material was forced down to take the impression, removal was almost impossible without alteration that rendered it valueless. After several trials a fair one was secured with plaster. This, however, had to be broken before its withdrawal from the mouth; but, by carefully putting the pieces together, an answerable mould was obtained.

Next a plate to extend over the roof of the mouth and cover both the cavities opening into the antra was made; on this plate wax was arranged, bringing it down to where the alveolar ridge should have been; then, from a metal cast was struck another plate to fit over the first; these were soldered together, and upon them were placed single gum teeth as would have been done had there been no more absorption than is usually found in upper cases.

There was nothing peculiar in the formation of the lower teeth, except that these had to be very long on the right side (for this a block was made), and the plate not allowed to extend farther back than to the position once occupied by the second bicuspid. The under teeth were put in more for the purpose of attaching springs for the support of the upper than for use.

What success attended this case the operator was not able to report, as the gentleman left the city immediately upon the insertion, and has not been seen since.

Vulcanite is the material now almost universally used for making obturators.

Advantages claimed are: its cheapness, its lightness, its capability of being moulded into the most irregular positions, and its resemblance in color and feel to the natural parts. Objection is its liability to become offensive. The manipulation of the material is so easy, as has been shown, that the surgeon attempting the manufacture from it of surgical appliances gives himself a source of recreation rather than work. To make an obturator from vulcanite, an impression of the mouth in wax is taken, and from this a plaster model is made precisely as before described. Gutta-percha is now moulded over this model to the form required. Plaster is next run over this first model, the gutta-percha plate being between. The model and counter-model thus made are separated, and the place of the original plate is supplied with vulcanite. The models are now put together, and the vulcanite between subjected to pressure. The whole, with a few ounces of water added, is then placed in an apparatus termed a vulcanizer, and the temperature is raised to about 325°. When taken from its steam-bath the plate is found as hard as bone. A finishing process consists in the polishing of the piece; this last is a simple manipulation, and requires only one or two files, a scraper, a burnisher, and some patience. (See previous chapter.)

M. Desirabode, a French surgeon, proposes a palatal obturator for congenital fissure, by which he thinks the sides of the alveolar border may be so approximated as to favor a union of the separated parts. This consists of a platina plate fitted to the vault of the palate and bent upon the alveolar borders in such a manner as to maintain the whole pressure. It is fastened to the teeth by means of three clasps soldered to each side, so as to cap the canines, the bicuspidati, and two of the molars. After the plate with these appendages has been well adapted, it is to be divided from before backward along the median line, and a piece removed from either side, so that the two edges are separated about half an inch. The two parts are now united by means of a thick and resisting band of caoutchouc, made fast by riveting. Thus united, the piece forms a smaller obturator than the plate before it was divided, so that it can only be applied by putting the caoutchouc on the stretch, which is effected by means of two sticks so contrived as to force the plates asunder. After the piece is properly adjusted, these sticks are removed, when, by the contraction of the caoutchouc, the sides of the alveolar borders are gradually approximated.

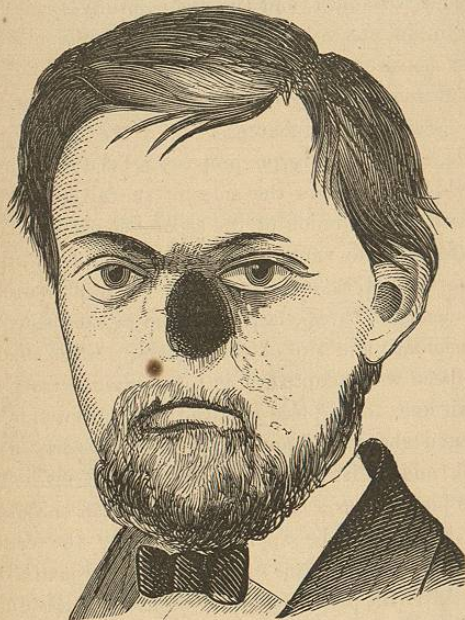
This contrivance of Desirabode looks very plausible, but, unfortunately, all experience is against its employment.

In the first place, to correct by pressure a fissure in the hard palate implies the very earliest use of force. A child is five or six years old before its first dentition is properly completed; and even at this period one would not dare apply any such apparatus, because of the physiological process of absorption, which has already commenced in certain of the teeth. Then if, on the contrary, he meant his instrument to apply to a more advanced period, he would have to wait until at least the sixteenth year, as before this age the

fangs of the anterior molars are not perfected. The bones by this time have, as a matter of course, become much less amenable to treatment. And again, even besides this, as the author knows from practical experience, his apparatus would in less than a week's time produce such ulitic and periosteal trouble that no human being would, or could, bear the continuance of the pressure; or, even admitting there should be found a patient resisting enough to endure the treatment, the apparatus would have its usefulness destroyed in less than two weeks by the teeth, to which it was attached, coming away. In other words, the instrument is useless, because the teeth, being the weaker and more yielding, would give way first.

The late Dr. E. Wildman, an able mechanical dentist, kindly furnished a description and cuts of a case which, as a study, will repay attention. The

FIG. 351.—THE FACE WITHOUT NOSE.



obturator in this instance holds in place an artificial nose, which in turn holds it in place. The description of manufacture affords the principle of constructing all such character of work.

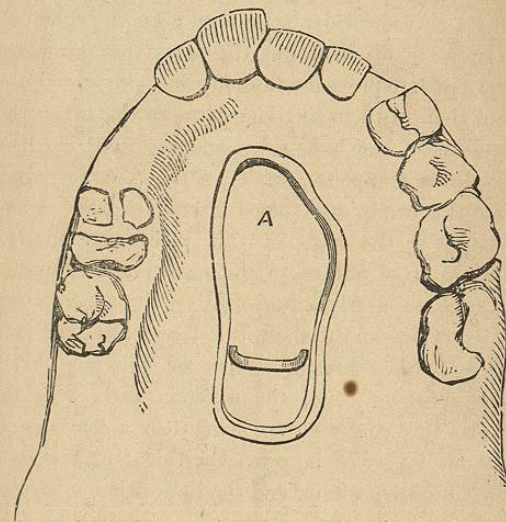
Fig. 351 conveys an idea of the external appearance of the patient, but not fully, as the whole upper lip was cicatrized, and the left cheek depressed near the border of the cavity.

In May, 1863, a young man, aged twenty-six years, presented himself to Dr. Wildman for the purpose of having an appliance made to repair a loss sustained by disease. Upon removing the black patch which he wore upon his face, and the cotton with which the cavity was filled (without the latter

he could not articulate a word), it was found that the entire external nose was gone,—that the nasal bones, the nasal processes of the superior maxilla, also a large portion of their palatine processes, the approximal parts of the palatine processes of the palatine, and the turbinated bones, had been destroyed. The soft palate, the uvula, and the tonsils were uninjured. In looking into the nasal cavity, the walls of the antrum on the left side were found deficient, and ends of the roots of the incisors exposed and decayed. The tongue was visible through the opening in the palatine arch. The size and shape of this orifice are represented by the outer central line in Fig. 352.

Although desirable, it was deemed unsafe to remove the diseased roots, owing to the yielding nature of the superior maxillary bones. The disease

FIG. 352.—INTERNAL VIEW OF SUPERIOR ARCH.



appeared to be arrested, and the parts in a sufficiently healthy condition to warrant the application of the substitute; and time has verified this, as, with the exception of the exfoliation of a small scale from one of the superior maxilla, no change has taken place up to this date.

A first step in the operation for remedy was to procure an impression that would secure a perfect model of all the parts involved, and their surroundings, in their relative positions. For this purpose plaster was first used, but, its employment being found precluded by the acrid secretions in the nasal cavity, wax and paraffin were substituted. Owing to the rigidity of the upper lip, Dr. Wildman was unable to employ the ordinary impression-cup with success, and found himself obliged to take a rough impression of the palatine arch, from which a cast was made, and a metallic tray swaged.

A sufficient amount of paraffin and wax being thrown into warm water, and

an assistant aiding to keep the mixture at the proper temperature, the mode of procedure was as follows: A proper quantity of the compound was placed in the cup, introduced into the mouth, and pressed up firmly against the arch; the portion forced into the palatine fissure was at the same time pressed with the finger, introduced through the nasal cavity, so that it should give an accurate impression of the region. A groove was then cut in this to serve as a key, and, after oiling it, a piece of the compound was introduced through the orifice of the nasal cavity, and passed down to make the impression of the floor of the nasal cavity. When sufficiently hard, it was carefully removed, the upper surface trimmed, placed in cold water to secure its greatest firmness, then introduced into the cavity, and pressed into its proper position. The metallic cup containing the impression of the palatine arch was then removed. The next step was to take an impression of the sides of the cavity, then the top, using a curved wooden spatula to press the compound in proper position, being careful to mark or key the parts that came in contact, and have their surfaces oiled, to prevent adhesion; and also that the pieces should be thinner in front than in their posterior parts, so that when the four pieces forming the impression of the base, sides, and top were in their proper position, they would leave a tapering cavity, with its largest diameter at the front orifice. Into this orifice was forced a plug, or cone of the compound, filling it completely; in the front of this piece were inserted pieces of match-sticks, to cause it to adhere to the next piece, or mask. The head was now thrown back to nearly a horizontal position, wet tissue-paper was placed over the eyebrows and lashes, the face oiled, and plaster mixed thick was batted on with a brush. When set, this was removed, drawing with it the central plug or cone; the different parts were then carefully removed, and thrown into cold water to give them a consistency that would bear handling without danger of injury. On this central cone all the parts were placed in their proper position, and the impression of the palatine arch was adjusted in its proper place. From this a plaster model was made, giving the upper part of the face, cavities, palatine arch, all correctly in their relative positions.

Of the different substances—leather, wood, wax, metal enamelled, and porcelain—used for making artificial noses, Dr. Wildman gave the preference to hard rubber in this case, on account of its rigidity, strength, lightness, and less liability to injury by accident.*

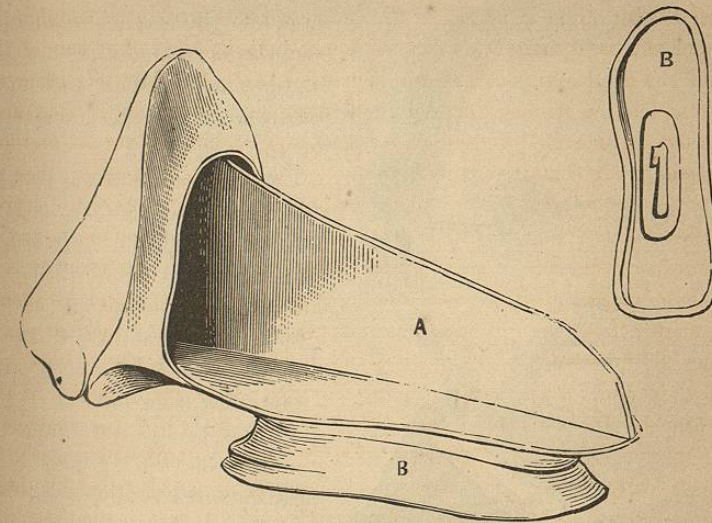
To prevent derangement, it was necessary to make the appliance as simple as possible; it consisted of two pieces: the external nose, septum, and floor of the nasal cavity constituted one, having a projection passing downward into the palatine fissure, as represented in Figs. 352 and 353, A; and the other, the obturator B, Fig. 354, with a projection rising upward into the palatine fissure. These projections were made hollow, so that when the two

* Celluloid yields a more natural appearance than does rubber.

parts were placed together, as in Fig. 353, there would be a cavity or box wherein the attachments could be placed.

Models were made of the compound of paraffin and wax, which were strengthened in the weaker parts by imbedding small strips of metal in their

FIG. 353, 354.—NOSE WITH ATTACHMENTS.



substance to give sufficient firmness to admit of the necessary handling without injury. The combined parts were then applied to the patient, and the nose trimmed so as to harmonize with his features. These were next imbedded in plaster in the usual manner for vulcanite work, with the exception that a stout curved wire passed through the artificial nasal cavities, extending beyond their borders, to give strength to the rods of plaster forming these cavities in the matrix, and thus to prevent their fracture in packing.

This appliance was vulcanized four hours, consuming one hour in attaining 280° Fahr., at which point it was held one hour, and occupying the third hour in elevating the temperature to 320°, where it was retained one hour. The work was rather overdone, but not so much as to injure it.

The two pieces were retained in position by a staple and slide-bolt. In the recess of the part of the floor of the nasal cavity projecting into the palatine fissure (A, Fig. 353) was inserted a gold staple. In the recess of the projection of the obturator passing into the palatine fissure (B, Fig. 354) were the gold catch and shield of the slide-bolt. The object of this shield was to prevent any foreign substances entering the slot and obstructing the movements of the bolt, also to give a base of support to the catch. The rectangular upright of the catch was soldered to the shield, passed through it and a longitudinal slot in B, and securely fastened to a rubber slide inlaid longitudinally,

and moving freely in the lingual surface of the obturator. On the anterior end of this slide was a small rounded projection, which enabled the patient, when the two parts of the appliance were placed in their proper position, with

FIG. 355.—THE FACE WITH NOSE.



the point of a finger introduced into the mouth, to force the slide backward, thereby to pass the catch into the staple and firmly secure the apparatus, or, by drawing the slide forward, detach the parts when desirable to remove them.

The external nose was painted with an oil color, to give it as nearly a flesh tint as possible, although this is not wholly attainable upon an opaque ground. Flesh being translucent, a true imitation can only be made upon a translucent ground.

The apparatus was introduced on June 30, 1863, giving to the patient great satisfaction and comfort. His appearance was much improved, as may be judged by comparing Fig. 351

with 355, both being engraved from photographs. The man breathes freely through the nose, and speaks with ease; the only imperfection in his speech is a nasal twang, and this is less now than when the instrument was first applied. The obturator at first extended too far back, and caused some irritation of the velum: this defect was readily remedied.

The operation proved entirely satisfactory, with two exceptions: first, the color of the nose was not as natural as desirable, for the reason already stated; second, in deglutition and speech, when the tongue pressed forcibly against the posterior part of the obturator, an unpleasant vibratory movement of the apex of the nose was noticeable. This could have been remedied by an elastic attachment coupling the two parts of the apparatus, but this mode was objectionable by reason of its producing constant pressure upon the delicate parts, and thereby endangering absorption. A safer plan was adopted by inserting a small steel pin in the nose as near as possible to its apex, to which was attached the bridge of a pair of spectacle-frames, these being retained in position by an elastic cord attached to the bows and passing around the head. This arrangement answered the double purpose of counteracting the vibratory movement, and concealing the upper part of the joint where the nose came in contact with the face.

This apparatus is worn at the present date (twenty years later) with ease and comfort by the patient.

FIG. 356.

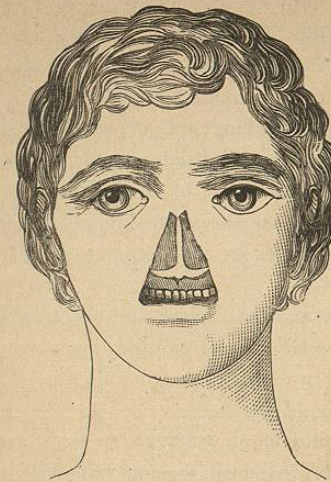


FIG. 357.



Fig. 356 is introduced as a study in mechanical appliances. This diagram represents a patient in the practice of the author as first seen by him.

Fig. 357, although not taken from life, is yet wonderfully correct as a likeness after treatment of the lip by operation.

Fig. 358 is from a photograph taken after treatment of the case was completed by adaptation of an artificial nose, which, with the assistance of the ingenious surgical artist, Mr. Kemble, was prepared for the lady. In this case the piece was temporarily employed in anticipation of a more promising condition of the general health for restoration of the organ by operation. The effect in life is quite as good as shown in the photograph.*

Fig. 359 represents an artificial nose, together with a common manner of hold-

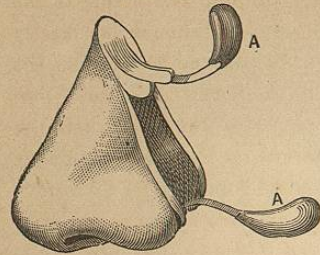
FIG. 358.



*The cut differs from the photograph only as parts aside from the seat of operation are concerned, it being necessary to prevent a recognizable likeness. This case is recited in previous editions of this work; the patient remains satisfied with her artificial nose, not yet having returned to have a natural one made by operation as contemplated.

ing such a piece in place. In employing springs, A, A, as here shown, great care is to be exercised that pressure be so applied as to insure if possible

FIG. 359.



against an irritation which is apt to result either in inflammation or absorption of the tissues, thus in a double direction rendering the piece useless. Better, however, than the upper spring for fixing the piece is the use of a pair of spectacles; these, through the employment of an elastic band passed around the head, not only prevent all motion on the part of the artificial nose, but also conceal the line of break. The author is satisfied that the use of the spectacles is the best means of fixation yet devised.

In gentlemen wearing whiskers and moustache, the lower spring is also to be replaced by means of a delicate silver wire painted the color of the beard, and kept tense by relation of the two ends through an elastic bandage, concealed by the hair as it passes around the head.

Obturator for the mouth, although employed by the ancient Greeks, and by every succeeding generation of civilized men, seem to have attained to a reasonable completeness only in our own age. Before the time of Ambrose Paré, the appliances were all of a temporary nature, if we except mention of one suggested by Petronius, in the sixteenth century, although whether that surgeon ever really made such a plate as he described we are not informed. To Paré, however, we are indebted for a written description of the metal obturator, crude, without doubt, but embracing the principles of the present instruments. "Made," says this author, "like unto a dish in figure, and on the upper surface, which shall be toward the hair, a little sponge must be fastened, which, when it is moistened with the moisture distilling from the brain, will become swollen and puffed, so that it will fill the concavity of the palate, that the artificial palate cannot fall down, but stand fast and firm as if it stood of itself."

Garangeot, in 1715, made an advance on the idea of Paré,—although, it must be admitted, a very slight one. He describes his instrument as having a stem in the form of a screw, upon which ran a nut. To make use of it, he cut a piece of sponge in the form of a hemisphere, with a flat surface; through this sponge the stem was passed, the nut holding it in place. When about to introduce it, he wet the sponge, then squeezed it dry, and forced it through the aperture, or break.

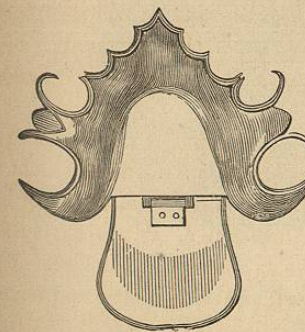
After the period of Garangeot, no special advance seems to have been made until 1828, when obturators were constructed by a Mr. Snell, prepared on casts, which were correct representations, or impressions of the special cases. In a monograph published by this surgeon, he says, My method of constructing an obturator is with a gold plate, accurately fitted to the roof of the mouth,

extending backward to the os palati, or extremity of the hard palate; a part of the plate, about an inch in length, being carried through the fissure. To that part of the plate, which answers to the nasal fossæ, are soldered two plates, meeting in the centre and carried upward through the fissure to the top of the remaining portion of the bones, to which it should be exactly adapted, and made to the natural shape of the nasal palatine floor: thus the fluids of the mouth will be carried backward into the fauces. A piece of prepared elastic gum is next attached to the posterior part of the plate where the natural soft palate commences, extending downward on each side as low as the remaining part of the uvula, and grooved at its lateral edges to receive the fissured portions of the velum; a movable velum is placed in the posterior centre of the elastic gum. That these may partake of the natural movements of the parts during deglutition, a sponge is affixed behind them, one end of which is attached to the posterior and anterior surfaces of the principal plate, and the other end rests gently against the posterior face of the india-rubber; this keeps it always in close apposition with the edges of the fissure during deglutition.

It is requisite to mention, he says, that the elastic gum should be placed in a gold frame, and not merely fastened to the posterior part of the plate, as it would shrink by remaining in the mouth. The frame should pass round its edges only, leaving the centre open.

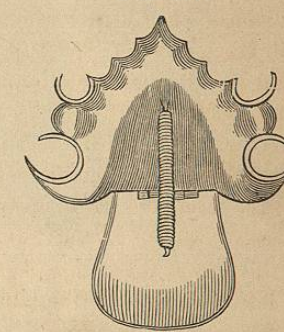
Vela.—Coming to the present period, attention is interested in the efforts made to compensate, through mechanical means, defects in the soft palate. The indication here is twofold: 1. To cover the break after such manner that food and drink shall be shut off from the nares and directed toward the throat. 2. To furnish ability for speech.

FIG. 360.



Palatine surface.

FIG. 361.



Nasal surface.

An obturator meeting the first of these indications reasonably well consists in an attachment to a metal plate of a flexible continuation made of rubber. Figs. 360 and 361 show the two surfaces of such a velum, and afford understanding of its construction.