BUCK (GURDON.)

HISTORY

OF A CASE OF

PARTIAL

RECONSTRUCTION OF THE FACE.

By GURDON BUCK, M. D.,

SURGEON TO THE NEW YORK HOSPITAL AND ST. LUKE'S HOSPITAL, &C., &C.

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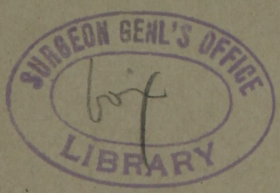

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VAN BENTHUYSEN'S STEAM PRINTING HOUSE.

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1864.

CASE OF PARTIAL RECONSTRUCTION OF THE FACE.

[Read before the New York State Medical Society at their Annual Meeting, February, 1864.]

The subject of the following narrative was Carleton Burgan, a native of Maryland, aged 20 years, a private in Co. B., Permell Legion, Maryland volunteers.

The following particulars of his antecedent history were furnished by Robert F. Weir, M. D., Assistant Surgeon U. S. A., in charge of the Army General Hospital at Frederick, Maryland, where Burgan had been a patient before coming to New York. He was taken sick June 5, 1862, with rheumatic pains from exposure to wet and cold while serving with his regiment. He continued ailing till July 4, when he was sent to hospital and reported with typhoid fever.

On the following August 3, he was transferred to the general hospital at Frederick, Md.

August 10. Although his general condition at this time appeared to be improving, a small black slough, attended with fœtor, shewed itself upon the gum at the root of the first right upper bicuspid tooth; the slough spread rapidly towards the cheek outward, and the roof of the mouth inward; both bicuspids, and the canine tooth fell out; the outer surface of the cheek became swollen, red and glistening; the right eyelids also became swollen and closed; the gangrene continued spreading till it had involved and destroyed the right half of the upper lip, the adjacent portion of the cheek, and the ala of the nose, and denuded the entire superior maxillary bone.

It was ascertained that before coming under Dr. Weir's charge, patient had recently taken within the space of two weeks, for the relief of tenderness in the right side, Hydrarg. Massae gr. lxv. Calomel, two scruples, Hydrarg. cum Creta, one scruple.

During the separation of the sloughs, the fœtor was excessively offensive, and scarcely tolerable at a distance of two yards. The sloughs having all come away, and the parts from which they

separated having assumed a healthy action, the patient's general condition steadily improved during the summer of September.

On the 1st of October, the right superior maxilla was removed entire, with the vertical plate of the os palati attached to it, and a narrow strip belonging to the left maxilla, where the two bones articulate at the suture in the median line.

By the middle of October, contraction of the healing parts had taken place to such a degree, that the hole in the face was diminished nearly one-half in size. On the 23d December, Burgan was discharged from the hospital in Frederick, and from the service of the United States to go on to New York.

December 31, 1862 When admitted into the New York hospital, his general health was good, and continued so; at the date of the first operation, March 26, 1863, the condition of his face was as follows:

The right eye is destroyed and sunken, the right half of the upper lip, the right ala of the nose, and the adjacent portion of the cheek, besides the entire right superior maxillary bone are gone, leaving an extensive opening directly into the cavity of the mouth, and right nasal fossa. The margin of the opening, which is everywhere cicatrized, consists below of the border of the lower lip, which is prolonged on the right side, obliquely upwards and outwards, and adheres to the malar bone, at a point where the superior maxilla has separated from it. From this point, which corresponds with the middle of the cheek, the margin of the opening extends upwards and inwards in a curved direction to the side of the nose, approaching within a finger's breadth of the inner canthus of the eye, continuing thence along the ridge of the nose to its tip and a little to the right of the median line. The columna nasi being destroyed, the lower edge of the left ala, and the rounded margin of the left half of the lip, bound the opening in this direction.

The integument and sub-cutaneous tissues adjacent to the margin of the opening, are soft and lax throughout their whole extent. The walls of the cavity exposed to view are formed on the left side, at the median plane, by the septum nasi, deflected somewhat to the left side, incomplete, however, anteriorly and inferiorly, where its cartilaginous portion has been destroyed, and where the anterior portion of the left inferior turbinated bone and the passage to the nasal duct are seen.

Upwards, the scrolled inferior edge of the middle turbinated

bone of the right nasal fossa presents itself. The right wall is a smooth, uniform surface which is lost below in the general cavity of the mouth. The palatine process of the os palati, which constitutes the posterior part of the bony roof of the mouth, and supports the velum palati, remains intact, and presents its anterior cicatrized edge stretching horizontally across the middle of the cavity. The middle incisor of the left superior maxilla is wanting; with the exception of this and one molar, the teeth of that side are complete. The lining membrane of the cavity has everywhere a remarkably healthy aspect. The velum still retaining its bony support, performs its functions in deglutition undisturbed. The patient's speech, however, is very indistinct, and resembles that of a person with a bad cleft palate. [Fig. 1.]

In devising a plan for the restoration of this extensive destruction of parts, it was judged indispensable, as a pre-requisite to any surgical operation, that an artificial substitute should be adapted to the cavity of the mouth to supply the place of the right maxillary bone, and afford a solid support to the soft parts that would require to be transposed for the reconstruction of the mouth and the closure of the cheek and nostril.

Mr. Thos. B. Gunning, an eminent dentist, residing at No. 41 East 21st street, to whom the case was submitted, generously undertook the execution of this delicate and difficult work. The result which he has achieved, after patient and persevering labor, displays remarkable ingenuity and skill, and cannot fail to elicit universal admiration. The fixtures which he has adapted are made of vulcanite, and consist of two principal pieces, one superposed above the other. The upper piece, being first introduced, occupies the nasal fossa and fills out the right half of the nose. It is hollow, and open in front and behind for the free passage of air. [Pl. VII, fig. 2.] The lower piece forms an artificial palate covering the entire bony portion of the roof of the mouth, and supplying the right half of the dental arch with the teeth belonging to it. Its left margin takes support from the existing teeth of that side, some of which it embraces. [Fig. 1.] The surfaces of both these pieces, where they come in contact with the walls of the nasal and buccal cavities, are channeled with furrowed lines to facilitate the flow of the secretions back into the fauces. Their accurate adjustment to each other and to the walls of the cavities which they occupy, permits them to be worn without causing the least irri-

tation. A third supplementary piece completes the arrangement. It caps the molar teeth of the lower jaw on the right side, and is connected with the opposite portion of the palate piece above by a bent spiral wire spring. [Fig. 3.] The improvement of the speech produced by these fixtures, as well as the increased facility of mastication afforded by them, were results highly gratifying to the patient, and satisfactory to the surgeon. The material of which they are constructed is admirably adapted by its lightness and indestructible nature to its present use.

After our patient had worn them constantly for more than two weeks, to test and become habituated to them—he himself removing and replacing them, for the purposes of cleanliness, with the greatest facility—it was decided to perform the first operation on the 26th of March. In order to guard by every possible precaution, against attacks of erysipelas, the patient was transferred to an outbuilding on the hospital premises which had not been in use for several weeks, and where, with his attendant, he would be the sole occupant.

First Operation.

Ether having been administered, the first operation was performed as follows:

First step.—The liberating and shaping of the left half of the upper lip.

The lining mucous membrane was divided along the line of its reflection from the jaw, outward toward the middle of the cheek. An incision was made through the entire thickness of the lip, from its junction with the ala nasi, in a line parallel with the vermilion border, outward to the same distance. This flap was detached from the bony surface beneath, throughout its whole extent, and its free extremity squared.

Second step.—To supply material for the right half of the lip.

An incision one inch in length was made across the lower lip at its right extremity, where it adhered to the malar bone, and at right angles with its margin. From the termination of this incision, another was carried toward the chin, in a direction parallel with the border of the lip, and an inch and a half in length. This constituted a square flap, lined with mucous membrane, and was intended to be doubled edgewise on itself, and made to match the flap already constructed from the left half of the upper lip. In attempting this adjustment however, it was found necessary

to make a section across half of the breadth of the flap at its root, commencing at a point where the second incision terminated, and extending obliquely forwards and upwards towards the edge of the lower lip. This had the desired effect of liberating the flap, and allowing it to be turned edgewise, so that the free ends of the two flaps could be adjusted in a perpendicular seam below the nose and to the right of the median line. This adjustment was acccurately secured by two suture pins wound in figure of 8 turns with cotton yarn, and an intermediate silver wire suture, to which were subsequently added two fine silk thread sutures at the vermilion border.

The mouth thus reconstructed was of sufficient dimensions : its right-half however, formed a semicircular turn instead of an angle, and pouted forward at its margin.

Third step.—To bring forwards the middle and lower portions of the right cheek and adapt them to the newly transposed neighboring half of the mouth, was the object of the third step, and was executed as follows :

A transverse incision was made through the cheek, on a line with the commissure of the mouth, terminating at a finger's breadth above the angle of the jaw. It extended through the lining mucous membrane, as far as the anterior edge of the masseter muscle, and beyond through all the tissues covering that muscle. In order still further to liberate the two flaps thus formed, and facilitate the gliding of them forward, their lining membrane was divided perpendicularly, on a line with the anterior edge of the masseter, in the upper flap, and horizontally along the line of its reflection from the jaw to the cheek in the lower flap. Numerous bleeding vessels upon the deep surfaces of these flaps required ligatures.

After applying them, the flaps were advanced forwards, and their anterior edges shaped and matched to the outer edge of the newly formed right half of the mouth. To secure these several edges in exact coaptation, numerous interrupted sutures were inserted. At the points requiring the greatest support, the sutures were of silver wire, the intermediate spaces being occupied by fine silk sutures, at distances varying from a line and a half to a quarter of an inch. A single twisted suture was inserted at the right side of the chin, to hold securely the angle of one of the flaps.

Previous to the adjustment of the flaps, the several ligatures, amounting to at least one dozen, were twisted closely into a skein, and brought out at the outer extremity of the principal horizontal incision. Two or three other ligatures were disposed of at other points.

Nothing further was attempted at this operation. It occupied at least two hours and a half; much of the time, however, was employed in the readministration of the ether, in order to keep the patient quiet. No adhesive plasters were applied, the sutures being exclusively relied on. Warm water dressings were directed to the parts.

March 27. Patient's condition favorable; pulse 90; swelling of the parts moderate, without much tension at any one point. The threads with which the two suture pins joined the upper lip were wound, being deeply imbedded in the swollen parts, were carefully removed, and the furrowed surface allowed to recover itself, after which fresh yarn was applied.

Patient takes drinks and liquid nourishment with facility, he experiences no uneasy sensations from the presence of the dental fixtures. Injections of cold water through, and by the side of these fixtures, are used morning and evening to cleanse away the secretions.

March 28. Progress favorable; pulse 90; swelling extends to the right side of the neck below the jaw; there are no indications of sloughing at any point; removed the alternate thread sutures, and a silver wire suture from the upper lip.

March 29. Progress still favorable; pulse 104; a copious suppuration is taking place from the track of the ligatures which emerge near the angle of the jaw, and is accompanied with fœtor. On the right side of the chin, where several sutures were clustered to secure two angular flaps, the sutures have ulcerated and left a suppurating surface of the size of the thumb nail. To-day several sutures were removed from points where they could be safely dispensed with. The upper part of the seam, uniting the two halves of the lip, sustains the greatest degree of tension, and at this point the new adhesions are most liable to separate; to strengthen them a fresh needle was inserted between the two already in situ, and wound with yarn, after which the old ones above and below were removed.

March 30. Doing well; pulse 105; began removing ligatures, several of which were detached and came away; suppuration

diminishing, and no longer fœtid; removed the two thread sutures from the vermilion border of the lip. All the sutures have now been removed, except the one introduced yesterday; applied adhesive straps to support the parts.

March 31. Pulse 88; removed the twisted suture last introduced; reapplied adhesive straps.

April 1. Pulse 88; all the ligatures have come away; introduced a fresh needle with twisted suture high up in the upper lip, and a single fine thread suture.

April 2. Pulse 84; substituted two thread sutures for the twisted suture in the upper lip.

April 4. Removed sutures, relying alone on adhesive plaster for support.

April 9. No further dressings required.

The result of this operation is shown in Fig. 2.

Second Operation.

April 23. The parts involved in the first operation being free from swelling, and having regained their suppleness, it was decided to perform a second operation, the object of which was to improve the mouth by extending it toward the right side, and converting the circular turn into an angle. This was accomplished in the following manner, the patient having first been etherized: The right half of the mouth was circumscribed by an incision in the line of the vermilion border that divided the thickness of the lip, except the mucous membrane on the inner side, and extended further toward the left angle of mouth in the under lip than in the upper. The border thus detached contained fibres of the orbicularis muscle.

The knife was then passed flatwise, between the lining mucous membrane and the cheek, in the direction in which the mouth was to be extended, and the membrane detached to a certain distance above and below the line. The blunt-pointed blade of a strong scissors was then placed along this tract, and the cheek divided on the line with the commissure of the mouth to the extent of nearly one inch. An obtuse angled flap being thus formed, above and below, became everted, and was pared off. The detached vermilion border was then seized with a hook, and drawn to the right side, so as to fill up the new angle of the mouth, and was secured there by a silver wire suture. The rest of the vermilion border adjusted itself, with perfect accuracy,

in its new position, and was secured by twelve fine thread sutures, inserted in close proximity to each other.

The improvement thus effected was highly satisfactory, the symmetry of the mouth, and its normal dimensions, being in a good degree restored, and the pouting condition of its border remedied. The suture served to control the hemorrhage, so that no ligatures were required.

April 24th. Patient doing very well, swelling of the parts moderate. Removed three alternate sutures from the upper lip, and as many from the lower.

April 25. Removed two sutures from the lower and two from the upper lip.

April 26. Removed the two remaining thread sutures, the silver wire suture alone being left at the angle.

April 27th. Removed the silver wire suture which had commenced ulcerating.

April 28th. Slight suppuration has taken place at the angle of the mouth, and the vermilion border has somewhat receded from its adhesions at this point; a thread suture was therefore introduced to hold it in place. (Fig. 3.)

The dental fixtures having now been worn for more than six weeks, were removed to day. An accumulation of viscid secretion was found to have taken place in the cavity of the nose piece, but without causing obstruction to respiration. Their removal was also rendered necessary in consequence of the injurious effect of pressure exerted by the palate piece upon the left upper teeth, from the use of pieces of sponge introduced between the right cheek and the artificial teeth for the purpose of counteracting the contraction of the newly cicatrised parts. During the eight weeks that had elapsed since the removal of the dental fixtures, the newly transposed parts, being deprived of support, had undergone certain changes which it is necessary to notice before we proceed to describe the third operation.

Wherever the cicatrices, resulting from the first operation, had involved the mucous membrane, tense, resisting bands had formed on the inside of the mouth. One of these crosses the middle of the cheek horizontally; another stretches upwards and backwards, terminating deep below the orbit. Both are continuous with the free upper border of the right half of the upper lip. This free border, which now constitutes the lower margin of the opening into the cheek, stretches tightly from above the left

outer incisor tooth to the middle of the right cheek. On opening the mouth these bands become tense, and prevent the separation of the teeth beyond a finger's thickness. A firm adhesion on the right side of the chin, between the cheek and lower jaw, is an additional obstacle to the separation of the teeth. This condition of the parts is an insuperable obstacle to the re-introduction of the dental fixtures, and requires to be overcome preparatory to the performance of any new operation. It was accomplished in the following manner, and before proceeding to the administration of ether.

Guided by the forefinger of the left hand, a blunt pointed scissors was introduced into the mouth, and the upper band divided at its termination deep below the orbit. The horizontal band on the inside of the right cheek was also freely divided in the same way at its remotest point, and the adhesions of the cheek to the lower jaw on the right si le of the chin were detached. This had the effect of relaxing the upper border of the lip, but not sufficiently for our purpose. To obtain a further relaxation, the left half of the upper lip was a second time dissected up from the jaw a distance of two inches toward the cheek, and divided horizontally through its entire thickness, at its junction with the ala nasi in the line of the incision made in the first operation. This had the desired effect of liberating the upper lip sufficiently to allow the replacement of the dental fixtures, which was accomplished by Mr. Gunning himself, who was present on the occasion.

Third Operation.

June 18th, at 3 P. M. The object of the third operation was to close the remaining opening in the cheek, and cover the side of the nose with a flap from the forehead.

Ether having been administered, the successive steps of the operation were as follows:

First step.—The inverted integument forming the outer circumference of the opening in the cheek, and extending from a point below the inner canthus of the eye downward to where the edge joined the superior border of the upper lip, was dissected up as far outward as the anterior edge of the masseter muscle. The skin, with a thick lining of adipose tissue was detached without the mucous membrane. The cheek, exclusive of the mucous membrane, was then divided by a horizontal incision carried forward from the edge of the masseter on a line one-fourth

of an inch below the level of the superior margin of the upper lip to a point within three-fourths of an inch of the median line, at which point the outer inferior angle of the patch from the forehead was to be secured. The strip of border thus detached was separated at its junction with the cheek, and left connected toward the median line for a use to be presently described. The integument of the cheek could now be easily glided forward so as to close the opening and meet the flap which was to cover the nose.

Second step.—Raising a flap from the forehead to cover the side of the nose.

A pattern of a triangular shape, exceeding in size the dimensions of the space to be filled up, was cut out of leather spread with adhesive plaster, and applied over the middle of the forehead; the base of the triangle being directed upwards and its truncated apex downwards between the eyebrows. An incision was then made from the tip of the nose along its ridge, skirting the cicatrised margin of the opening, and a narrow strip of skin removed. Continuing up on the forehead along the right edge of the pattern, the incision followed its outline around to its apex, and terminated at the inner extremity of the left eyebrow. The included patch of integument was dissected up from the pericranium and left connected between the brows by a neck three-fourths of an inch in breadth, its base being nearly two inches broad. The patch was then twisted at its neck and brought down to cover the side of the nose. Its right edge doubled upon itself was adapted to the newly incised edge along the dorsum nasi and secured in accurate coaptation to it by three insect pins inserted equi-distant from each other, and wound with floss silk. Between these twisted sutures interrupted sutures of fine thread were added. The dimensions of the flap proved ample, so that the twist at its neck suffered no strain. Its breadth allowed the left edge of the flap, in its new position, to be matched on to the adjacent margin of the opening in the cheek without any tension. Fine thread sutures inserted two lines apart were used to secure these edges in accurate adjustment. The skin covering the right nasal bone was dissected up toward the inner canthus and pared off to allow the neck of the flap to be adapted in its new relations. What had now become the inferior and outer angle of the transposed patch, was accurately adjusted with its outer edge stitched to the margin of the opening in the cheek, and its lower edge to

the newly incised superior margin of the upper lip, as far forward toward the median line as the connection of the small detached flap already mentioned. This flap was now applied to the inner raw surface of the angle, and stitched to it. All that now remained to complete the operation was to secure the edges of the horizontal incisions that had been made through both cheeks, which was done with silver wire sutures. Four ligatures were brought out through the right cheek, and a single ligature at the twist in the flap. The denuded surface upon the forehead, from which the patch had been raised, was coated with collodion, Three strips of adhesive plaster were applied across the forehead near the brows, to approximate the edges of the triangular wound at its apex. Lint was stuffed between the cheek and lower jaw, on the right side of the chin, to prevent adhesion of the opposite surface. Warm water dressings were applied to the face and forehead, and dry warmth to the nose by means of a bat of cotton, and a vial of hot water suspended in contact with it. The operation occupied nearly three hours. The ether in this and in the preceding operation produced no unpleasant effects, though administered for so long a time.

June 19th, 7 A. M. A good night with some sleep; the nasal flap is cool to the touch ; difference in temperature, 10°, a moderate degree of swelling has taken place ; threads moistened with spirits turpentine were spread upon the flap and the other applications continued.

3 P. M. Temperature of the flap has improved, and nearly attained that of the adjacent parts.

June 20th. Progress favorable ; the swelling of the parts continues moderate ; no erysipelatous blush has shown itself ; the temperature of the flap is sustained at nearly the normal degree ; the swelling immediately surrounding the sutures that occupy the edges of the nasal patch is developed to the same degree as in the adjacent parts ; patient's general condition is good ; pulse moderately accelerated. Removed the threads from the pins on the nose and applied fresh threads.

June 21st. Doing well ; no increase of swelling; temperature of flap good ; removed the two upper pin sutures, also two silver wire sutures from the right cheek.

June 22. Still doing well ; removed the remaining pin from the tip of the nose, and alternate thread sutures from the seam that unites the patch to the cheek. The collodion scab covering

the wound of the forehead remains undisturbed, its surface is dry, and the neighboring skin but little swollen and free from redness. The bowels have moved freely for the first time, by the aid of castor oil; the lint between the cheek and the jaw on the right side is changed daily.

June 23d. Other sutures removed. The ligatures have all come away.

June 24th. Doing well; no appearance of suppuration has yet shown itself under the collodion scab; it has undergone a gradual elevation, and is now nearly on a level with the surrounding skin. A single wire suture alone remains; the inferior margin of the nasal patch and its two angles have retained their vitality perfectly; both its edges have adhered without suppuration.

June 26th. The only remaining suture was removed to day; narrow strips of adhesive plaster were applied to support the parts at different points.

June 27th. The collodion scab separated, leaving a healthy granulating surface, which had nearly reached the level of the surrounding skin; applied to it a glycerine dressing; patient allowed to leave his bed.

July 24th. Since preceding report, patient's progress has been favorable; the nasal patch, in its new connections, has become hypertrophied throughout its whole extent and attained a thickness of at least half an inch; the same hypertrophic action extends beyond the line of junction along the dorsum nasi into the adjacent integument for the distance of one-quarter of an inch; the surface of the patch is paler than the surrounding skin; the wound of the forehead is granulating and gradually contracting in size; between the eyebrows and over the upper part of the nose, the redundant integument produced by the twist of the patch forms an unsightly, baggy projection, to remedy which was the object of the fourth operation.

Fourth Operation.

August 8th. Parallel incisions were made, one on either side of the dorsum nasi, extending upward on to the forehead and the included tongue of skin dissected up; on either side of this tongue a narrow strip was pared away from the redundant integument; the tongue was now slid up upon the lower part of the forehead and secured in its advanced position to the neighboring edges by twisted sutures. To diminish also the excessive thick-

ness of the inferior border of the new ala, a strip of wedge-like form with its base at the margin and its apex running deep up between the surfaces, was cut out along the entire length of the border; the wound was then closed by fine sutures inserted near to each other; the removal of the sutures was commenced on the second day and on the fourth all were removed; a decided improvement of the parts was effected by this operation.

September 14. The scar resulting from the wound upon the forehead, which has now been cicatrised for a fortnight, does not exceed in its dimensions one-third the size of the orginal wound.

A deep furrow has formed along the inferior third of the ridge of the nose in the line of the cicatrix, and terminates at its tip in an unsightly notch. The removal of this conspicuous disfigurement was the object of the

Fifth and Final Operation on the 27th October.

Two parallel incisions, one on either side, were made, to penetrate in converging planes so as to include the sides of the furrow and notch, and remove them. The opposite surfaces were accurately brought together and secured by two twisted sutures and three fine interrupted thread sutures. Within six days the sutures were all removed and the adhesion perfect. A great improvement in appearance was thus accomplished.

Remarks.—Present condition, June, 1864: Burgan enjoys good health, and has for several months been able to discharge efficiently the duties of an assistant nurse in a large ward of the New York hospital. The hypertrophied condition of the nasal patch still persists, and may be regarded as a permanent condition; quite the reverse of what we should have anticipated; it has the advantage of maintaining the side of the nose in a plump form. When the patch is pricked, the sensation is no longer referred to the forehead as at first, but to the part irritated. The cicatricial bands, on the inside of the mouth, have been kept from contracting by the perserving efforts of the patient, who has faithfully executed the directions given him on the subject, which were to introduce one or two fingures into the mouth and stretch the band to their utmost endurance, and repeat the process several times daily.

The only dental fixture still worn by the patient is the principal piece which covers the roof of the mouth and supplies the lost teeth of the right upper maxilla. It is worn constantly

with entire comfort, and is removed and replaced at pleasure. When the mouth is open to its fullest extent, the forefinger can be introduced edgewise between the front teeth. Mastication of all descriptions of food is performed with facility. The speech, which without the dental fixture is hardly intelligible, scarcely betrays any defect when it is worn.

Through the kindness of Mr. T. J. Davis, the skillful optist, No. 483 Broadway, an artificial eye has been adapted to the right orbitar socket, and is worn by the patient a part of the time.

[Figs. 4, 5, 6, 7.]

Fig. I. *A view of the Face before the first Operation*

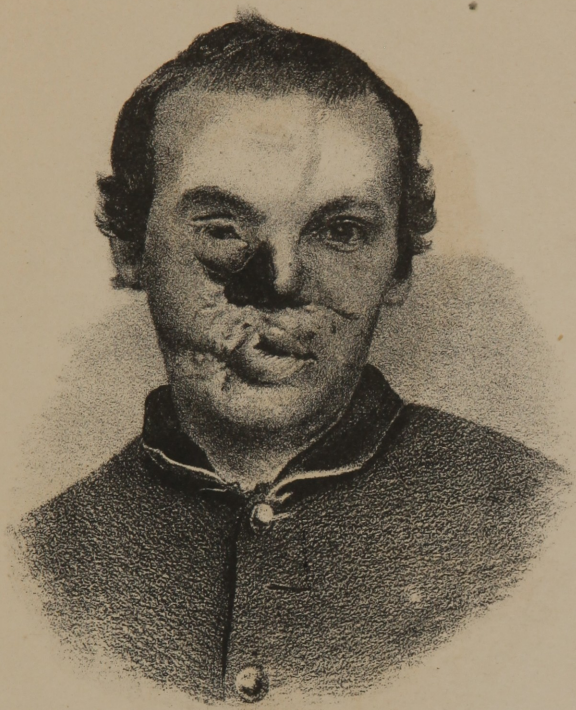

Fig II. *Shows the result of the first Operation: the reconstruction of the mouth.*

Fig III. *Shews the improvement of the right angle of the mouth after the second Operation.*

Fig. IV. *A front view shewing the final result of all the Operations.*

Fig V. *A view of the right side of the Face in its present condition.*

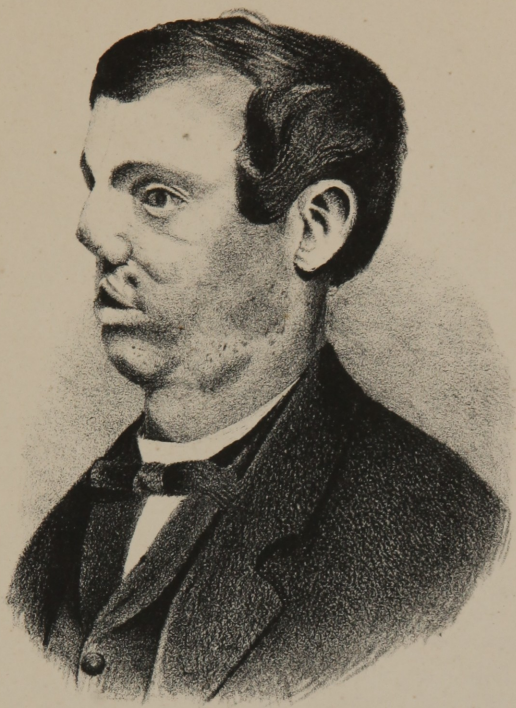

Fig VI. *A view of the left side of the Face in its present condition.*

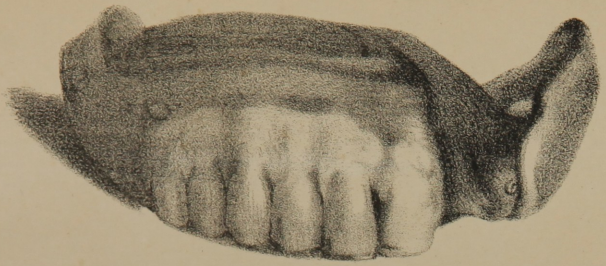

Fig. 1 Artificial Roof of Mouth and Teeth.

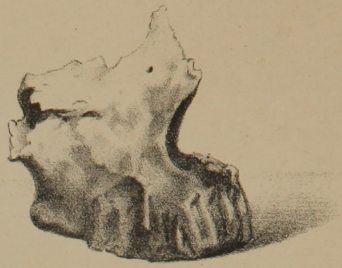

Fig 4. Right superior Maxilla from specimen in the Army Medical Museum at Washington.

Fig. 2. Nose piece.

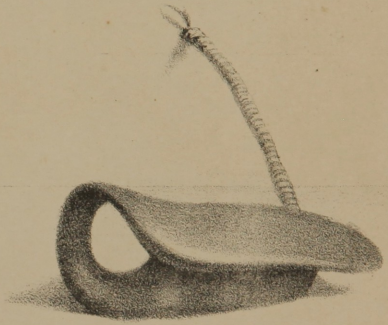

Fig. 3. Cap covering the lower molar teeth of right side holding up piece No. 1 by means of the spiral spring attached to it