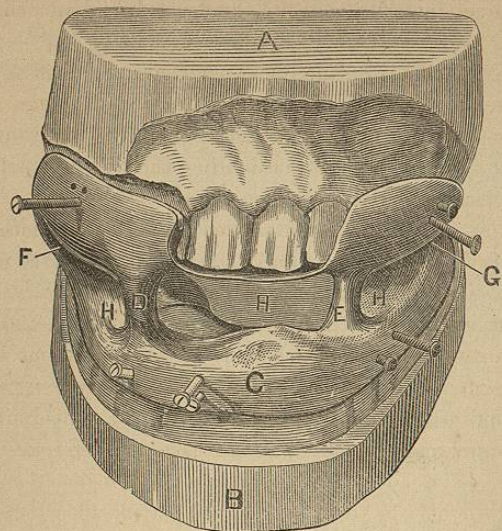


application. The screws passing between the teeth—shown in the cut—are not longer found necessary. A bandage, tightly enough applied, prevents

FIG. 521.—THE INTER-DENTAL SPLINT.



all motion. It will be understood that the plate line seen below the superior incisor teeth is, in the cut, with a view of showing its relation with the palatal faces of these organs; when the plate is in place the line is, of course, resting upon the gum adjoining the necks of the teeth.

FIG. 522.—DENTAL SPLINT.

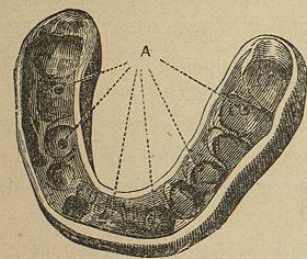
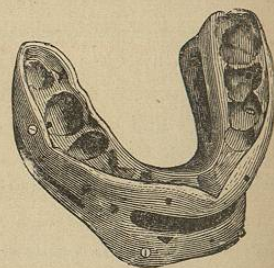


FIG. 523.—INTER-DENTAL SPLINT.



Inter-dental splints are now, in America at least, more frequently made of gutta-percha than of metal; this, presumably because of the easier working of that material. Metal, however, is, in the estimation of the author, most decidedly to have preference; gold to be used, if the patient be rich enough to bear the expense. Silver, when fire gilded, is an admirable substitute.

Fig. 522 exhibits a splint of gutta-percha which is made most simply by

warming and moulding the material over a cast secured from a wax impression obtained as described. Being hardened by the use of cold water, and trimmed, such a splint is prepared and applied in a little time. A represents alveoli accommodating the teeth. Fig. 523, after model by Dr. Gunning, shows an inter-dental splint, made of this same material, fitting both jaws.

An inter-dental splint of satisfactory character and entirely general in application is to be prepared and applied as follows: Make a curved tin channel corresponding to any inferior jaw that may be selected. Upon the base of this first set and attach second channels made to loosely correspond to the molar regions of the superior jaw. Putting the three in place, attach them by means of wax, the jaws being separated to the width of a finger. Remove carefully from the mouth and solder. Make several to correspond reasonably with the varying curvatures of different arches. To apply, fill the channel with softened white beeswax, set the fracture, and, placing the apparatus in correspondence with the arches, let the patient bite into the wax until the plates are reached. Instantly bandage to prevent movement, and, this accomplished, harden the wax by cold water held in the mouth. This apparatus proves as satisfactory as it is seen to be simple.

CHAPTER LV.

EXSECTIONS OF THE MAXILLARY BONES.

THE history of experimental surgery on the bones of the face constitutes one of the most interesting of the chapters in surgery. The formation about and within these bones of such tumors as seemed to make desirable their removal, necessarily directed, from a comparatively early period, the attention of surgeons to the feasibility, propriety, and promises of such operations.

It is not at all unreasonable to infer that surgery gained its first lesson in this direction by observing, in the results of accidents, how extensive could be an injury done to the parts without fatal, or, indeed, even threatening consequences. As early as 1693, Acoluthus, a surgeon of Breslau, attempted the removal of a portion of the upper jaw for a tumor, in which operation he succeeded very satisfactorily. Jourdan, according to his translator, removed, at various times during his century, portions of the jaw. To Dr. Jameson, an American surgeon, belongs the credit, however, of having made the first complete exsection, or removal of the upper jaw,—this having been done in 1820, although to Lizars, of Edinburgh, belongs the higher credit of having first suggested the possibility and advantage of the operation. In 1824, four years later, Dr. David Rodgers, of New York, exsected both superior maxillæ. Afterward this was attempted by Lizars, and in the same year by Gensoul, of France. After this the operation may be considered as having become commonly recognized, surgeons of ability performing the various sections throughout England and France, and especially in the United States.

While the operation of exsection has been frequently performed, it cannot but surprise the surgeon of to-day to notice how slowly its lessons were learned. At present it is practised with little preliminary caution, being esteemed a matter that is to be attempted with trifling danger to the patient, and even without much damage to the appearance. Formerly, and, indeed, not very far back, it was considered necessary to ligate, as a preliminary step, the primitive carotid artery; and when, as experience advanced, this was seen not to be a necessity, the actual cauterants were always held in readiness, a means of controlling the hemorrhage which, much to the detriment of a happy cure, obtains in some regions even to the present day.

Exsections of the maxillary bones are practised for various diseases, the principal of which are the malignant tumors. That such exsections are so often reported as resulting unfavorably, has not explanation in shock, or in local injury done, but in the fact that the disease for which operations have been performed is in itself fatal.

In looking, after an interval of months, and, in cases, of years, at individuals on whose jaws the author has personally performed exsections, he has been astonished at the correction, on the part of nature, of deformity. The little German boy, alluded to in the chapter on Necrosis as having lost the left half of the inferior maxilla, without at the time any reproduction, looks to-day as though no such loss had occurred; his face is exactly as it was before the operation, and, so far as may be judged, the ability to masticate, allowing for the loss of the teeth on that side, is about as good as ever. This, however, is an uncommon case, the result without doubt of the youth of the patient. A young lady allowed herself to be exhibited by the author to a few gentlemen during a meeting of the dental profession of New England, held at Providence (1883), from whose person he had removed, a year before, the right superior maxilla in its entirety. A denture made for the case by her dentist, Dr. Buckland, of Woonsocket, which differed little from an ordinary tooth-plate, corrected the loss so absolutely as appearance was concerned, that every external evidence of an operation was absent. The bone had been removed from the inside.

Ollier, by his experiments upon the osteogenetic properties of the periosteum, has done good service to oral surgery. It is now a common practice in exsections to spare and save all this tissue possible. In the chapter on Necrosis the author has alluded to his own success in this direction, having replaced entirely (now several times), with the exception of the alveolar process and teeth, the whole of the lower jaw; the process adopted being that of enucleation.

It is not to be forgotten, however, that the seeds of a disease, so to speak, may be left in a part by an attempted preservation of periosteal tissue. This fact is always, in all classes of exsection, to be borne prominently in mind: periosteal tissue is not to be saved unless healthy.

To make a complete exsection of either maxilla implies, ordinarily, a preliminary uncovering of the affected bone. The incisions to such ends are necessarily various, being influenced by the condition of the parts beneath. Exposure is not, however, always necessary. Professor Horner, as exhibited in Plate VIII., has removed the upper jaw of the left side without preliminary incision; and in several favorable cases the writer has himself succeeded, even without difficulty, in doing the same thing.

In the case of tumors of magnitude these sub-integumental operations are not, however, to be commended. A wound, or incision, made to expose such tumors, may be united by the first intention, leaving little or no scar, while certainly the exposure obtained through such incisions compensates by the liberty and rapidity of movement allowed in the subsequent steps of an operation.

Subfig. 1, Plate VIII., exhibits the mouth of a patient of the late Dr. Horner, immediately after the removal of the superior maxillary bone without external incision. Fig. 2 is a side view of the bone removed, and Fig. 3

is the likeness of the patient taken three years after the exsection. The operation, as practised by Dr. Horner, is thus described by his son-in-law, Professor Henry Smith: Having determined to avoid cutting through the cheek, as commonly practised, the patient was seated in a chair, with his head well supported, and partially etherized. The assistant, supporting the patient's head, then raised the angle of the mouth on the left side,* and held it widely open, while the upper lip and cheek were dissected from the superior maxilla as far back as possible, in a line parallel with the superior margin of the buccinator muscle. The two incisor teeth on the left side being then drawn, the corresponding alveoli were cut through in the middle line by a narrow saw, which worked its way from the mouth into the left nostril; then a pair of strong hawk-bill scissors, such as are used by gardeners for lopping off twigs, took out the two vacated alveoli at a clip.

A thin, flat, well-tempered knife, with a strong, round handle, was now struck through the roof of the mouth into the nose, at the junction of the palatine processes of the palate and superior maxillary bones (posterior middle palate suture), so as to cut forward and separate the maxillary bones from each other in the middle, when the narrow saw was again used to cut through the root of the nasal process of the maxillary bone, and strong scissors, curved on the flat, made to cut through the orbital plate at its margin, the incision being carried back to the pterygoid process of the sphenoid, around and below the malar bone.

The base of the soft palate being then separated by a short triangular knife, curved on the flat, so as to leave the part associated with the palate bone, a few touches of the knife freed the remaining attachments.

The pterygoid process, malar bone, and the orbital plate of the maxilla were not disturbed. The tumor,—which was a scirrhomia,—besides its bony connection, was also attached to the posterior part of the cheek, and to the external pterygoid muscle. The gouge and scissors, however, sufficed to remove every part that could be detached.

The bleeding was profuse, especially from what was believed to be the posterior palatine artery, but the vessel was readily secured by means of a ligature and Physick's needle. A few other ligatures, together with the use of charpie, arrested the remainder of the hemorrhage.

The ordinary operation for the removal of the superior maxillary bone may now be described in detail.†

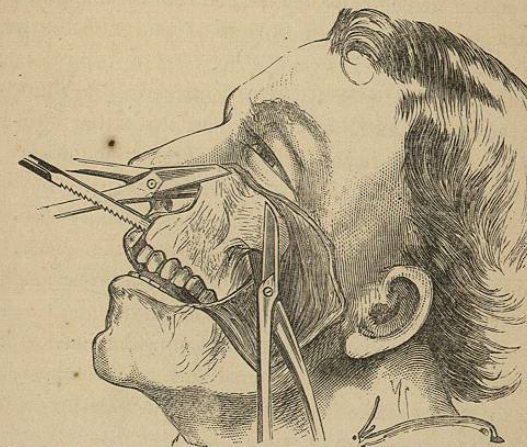
If the disease for which such an operation is to be performed is a tumor of moderate dimensions, say scirrhus, as in Professor Horner's case,—which

* The figure, by an error, is made to show the operation on the right side.

† An arrangement in the shape of a double tracheal canula has just been introduced into German surgery, and has received much encomium; this, of course, necessitates the preliminary operation of tracheotomy. The canula being put in place, the breathing of the patient is said to be in no way interfered with by the hemorrhage, thus permitting the exsection to be made without that haste generally found so necessary. A later design of tube enters the trachea from the mouth. The author uses neither.

seldom attains to large size,—the uncovering of the part is effected by dividing the superior lip in the middle line, carrying the incision upward along the base of the ala of the diseased side to the inner canthus: the flap thus secured, which is triangular, is dissected off as far as the malo-maxillary articulation. Next remove the central teeth, and, with a scalpel, make an incision along the middle line of the hard palate as far back as the palato-maxillary articulation. At right angles with this incision make a second, extending to the tuberosity of the bone, the cut to be as nearly as possible on the line of the articulation named. Examining at this stage a skull,—which it is never amiss to have by,*—take up a Hey or a metacarpal saw, and, with delicacy and accuracy, cut across the nasal process, leaving, if possible, the orbital plate. Next, with the same saw, cut across the maxillo-malar articulation; this completes the two upper sections. The third, the intermaxillary, is quickly effected by introducing within the nostril one blade of the large cutting forceps, the other being placed on the line of the articulation within the mouth, as far back as the point of union with the palate bone; the incision is now made, and the separation, as cutting is concerned, is completed. Take now a pair of strong forceps, and, seizing the bone, twist

FIG. 524.



Excision of the upper maxilla. Instruments applied to parts requiring division.

it from its bed. Fig. 524 shows an uncovered superior maxilla, with forceps and saw in the act of making separations.

In place of the instruments here shown the author now employs a circular-saw, revolved by the surgical engine. This latter means, while accomplishing

* In a review of the first edition of this book, "Diseases and Surgery of the Mouth, Jaws, and Associate Parts," fault was found by a critic with this suggestion. To some, such reminders may not be necessary; the author, however, has always found them serviceable as immediate hints for delicate and accurate manipulations. With a patient etherized, there can be no objection to the presence of such models.

the object neither more effectually nor quickly, is yet attended by such diminution in shock, and of injury to associated parts, that no hesitation exists in according decided preference to it. (See Figs. 531 to 533.)

Succeeding immediately the removal of the bone is a required attention to the hemorrhage. It may be that twenty arteries will jet their blood into the face of the operator, or, on the contrary, only two or three may require artificial means for their control. One need not be over-hasty or timid about this bleeding. Neither is he to be over-easy or too confident. The circumstances pertaining to the arrestation of such hemorrhage are most influenced by the nature of a tumor occupying the bone; a sarcoma being of great vascular relation, a fibroma only very moderately so. The author, depending first, and most prominently, on ligation, resorts at once, on failure of this, to packing.

Packing has the double signification of stanching the bleeding and affording support to the overlying integument which is to rest upon it. Using first a square, this is to be fully saturated with phénol sodique and laid in the bottom of the wound. Next a strip of linen is soaked with oil, and the cavity is solidly filled; the end of the strip being so placed as to be easily found when removal is demanded.

The hemorrhage controlled and sub-integumental form considered, the flap is laid carefully into place, and closely, but not tightly, approximated by a sufficient number of stitches of the interrupted suture. It is generally the best plan to put a pin or stitch first in the lip, thus insuring correct relation at that most important point.

As a dressing, in this, as in all his operations, the author now uses phénol sodique, cloths kept wet with it overlying the part. Should high inflammation supervene, the following combination is a favorite:

R.—Plumbi acetatis, ℥ij;
Tincturæ opii, ℥ij;
Aquæ, Oj. M.

Concerning the pad and strip inside, it is found the best practice not to allow them to dry from the time of their first introduction. This is to be prevented by repeated syringing with phénol and water, half and half.

Stitches used in approximating the external wound are to be removed as soon as possible: three or four days generally allows of such removal. It is well to cut them cautiously, taking away intermediate ones.

The withdrawal of the packing is to be effected leisurely: indeed, the idea is to consider it as a tent, to be thrown out as the wound granulates and fills up below. The plan of the author is to withdraw a very little portion each day, cutting off the part extracted by means of sharp scissors.

Many cases occur where the external incision here suggested might not be the best one, and, indeed, where it might not be sufficient to uncover the disease. Certain surgeons prefer to expose the bone by an incision, commencing at the angle of the mouth, and passing obliquely in front of the Stenonian duct to the centre of the malar bone, throwing thus the flap upward and

inward from below. Another mode is to use both these incisions upon the same subject, a necessary proceeding, in many cases, where the tumor is large.

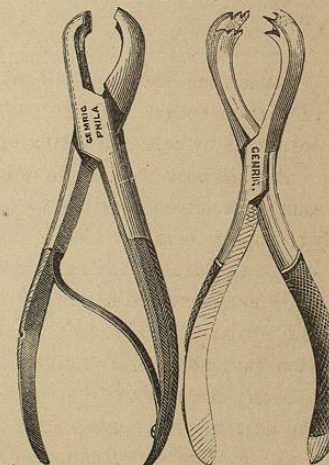
Sir William Fergusson, who during his years of practice was particularly successful in oral surgery, in remarks after an operation for the removal of disease affecting the alveolus and antrum, made some important and interesting observations, having reference generally to the exposure of such parts prior to the removal of the actual disease. He said that formerly, and even now, some surgeons divided the integument of the cheek, lip, etc., trying to get at the disease from various points: that one method he pursued with advantage (as in a case of removal of malignant disease of the upper jaw) was to divide the upper lip in the median line, and then by carrying the incision on one or both sides, as the circumstances of the case required it, into the nose, to dissect back the upper lip, ala nasi, and cheek, and thus expose the parts freely, avoid the deformity of scar on the cheek, or, to use his own words, "to leave as few marks of the surgeon's doings on the face as possible." In a case before him at the time the remarks were made,—a young woman,—he was able to remove the disease without interfering with the lip. It affected the alveolar ridge of the right side, extending from the second incisor to the second molar, and was continued into the antrum; but whether it first arose in the sinus or in the alveolus, he did not know. Mr. Fergusson attributed the success attending this method of removal, in a great measure, to the instrument he used, viz., a pair of clipping forceps. He first clipped away the alveolar ridge, and then attacked the portion of disease situated in the neighborhood; by this means freely laying open the antrum and nostril. He alluded to a case in which Mr. Bowman successfully removed a large tumor from the cavity extending into the mouth, without dividing the lips.

Such a mode of uncovering a tumor of limited size is admirable: the section will be found to make a large exposure, but the scar left is scarcely to be remarked.

Operation for Removal of both Superior Maxillæ.—It has never fallen to the lot of the author to exsect, or to see removed, both maxillary bones at one operation. Several such performances are, however, on record; and from among them may be selected that of Heyfelder, as being the one most practicable and easy of accomplishment.

The patient is to be seated in a chair, with his head supported by an assistant, or, better, he may lie down. An incision is made on each side of the face, from the external angle of the eye to the labial commissure; the included parts are now

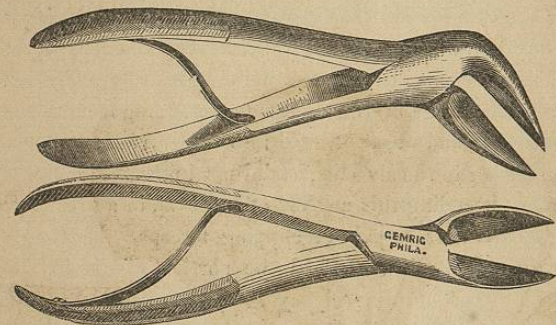
FIG. 525.



Lion forceps.

reflected upward toward the forehead until the infra-orbital ridges are exposed. This uncovers the whole of both bones. The chain saw is now passed through the spheno-maxillary fissures, the malar bones are divided, the maxillæ separated from the ossa nasi, and the vomer and thinner bones are cut with strong scissors. These steps complete the separation, when the bones are to be pried from the cavities with elevators or twisted away with the lion forceps of Liston. The result of an operation thus performed by the deviser himself is described as follows: Very little blood was lost, torsion and compression sufficing to arrest the hemorrhage. Two hours afterwards, the edges of the wound, from the angles of the eyes to the corners of the mouth, were united by twenty-six stitches of the interrupted suture; cold lotions were applied: there was no reaction or swelling, and the patient could swallow water and broth. Four days

FIG. 526.



Cutting-bone scissors.

subsequently, the wound had nearly healed by the first intention, and in six weeks the patient was exhibited to the Medical Society of Erlachen. At this time there was no deformity of the features: a fissure, thirteen lines long and three wide, was seen along the median line of his mouth; the soft palate and uvula were in their natural place; deglutition was free; the nose had assumed its original form and direction. The face, which, before the operation, was like that of a monkey, again possessed a human expression; a firm and solid tissue replacing the extirpated parts.

For the removal of a class of tumors having origin back of the superior maxilla, the means known as the osteo-plastic resection of the jaw is employed. This operation consists in detaching the bone from its relations, except at one side, and then forcing it in the direction of the attached part,—that is, turning it out of place. The tumor is removed, and, after controlling the hemorrhage, the jaw is replaced.

Where, in this operation, may be the related part, is somewhat a matter for the preference of the operator; or otherwise is directed by the peculiarities of special cases. Langenbeck, the deviser of it, after exposing the bone, as in the ordinary performance, passes the saw through the maxillo-

Fig. 1.



Fig. 3.



Fig. 2.



Fig. 6.



Fig. 4.



Fig. 5.

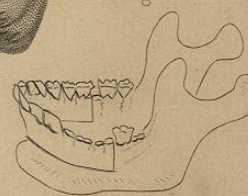


Fig. 7.



Fig. 8.



malar articulation, along the orbital angle, and then without further section turns, if possible, the bone toward the mesian aspect: if this may not be done, he then makes section of the palatine raphé. As a modification of this operation, Dr. Cheever, a Boston surgeon, separates the nasal and malar attachments, leaving in relation the palatine, thus throwing the bone downward.

In the removal of large and threatening nasal and naso-pharyngeal polypi, osteoplastic operations of the most severe character find commendation in the greater risk they are designed to avoid.

A mode of getting at such tumors, when they spring from the sphenoccipital base, and one which, on a single occasion, was practised with most satisfactory results by the author, consists in splitting the soft palate, and by a ligature passed through the apex of either flap drawing the veil aside.

Still another mode, one used by Ollier, applying more particularly where tumors are situated well back in the nares, consists in making a U-incision over the bridge and along the sides of the nose, having the apex looking toward the forehead; the flap, which is the nose, is now turned downward. Should space enough for the manipulations needed be not thus obtained, Ollier uncovers by a second incision the maxillæ, and saws away such portions of the bones as may be found necessary. (See *Polypi*.)

Exsection of Inferior Maxilla.—Figs. 6, 7, and 8, Plate VIII., exhibit various steps in section and removal of the inferior maxilla.

Complete section of the lower jaw is one of the most disfiguring and comfort-destroying operations that is practised on the living being, and is never to be performed without the existence of a well recognized or proven necessity. Section of the alveolar process is not a difficult matter, and is generally easily accomplished without external wound, the lips being held out of the way by such a mouth-stretcher as is used in the performance of dental operations.

Fig. 527 shows a form of mouth-stretcher commonly employed. A second form, one devised by Dr. Goodwillie, is shown in Fig. 528. This latter instrument takes up less room, and on that account is, in many cases, to have preference over the former. Quite as good as any is the common retractor found in every surgeon's operating-case. Still another, and a most excellent one, is known as Doyle's.

In instances where section of the lip may be thought desirable, as when the practitioner, from inexperience, is not able to accomplish ablation without such uncovering, various cuts are proposed. These are to be fully appreciated by the studies presented. Subfigure 8, Plate VIII., represents exposure of the mental portion of the bone. The flaps, 1, 2, are made by a single vertical incision through the median line of the lower lip, crossed by a second at right angles at the base of the jaw, extending on either side, laterally, as far as the bone is required to be removed.

Subfigure 7 represents an exposure of the whole left half of the jaw. To accomplish this, make a first incision in the median line to the under border