

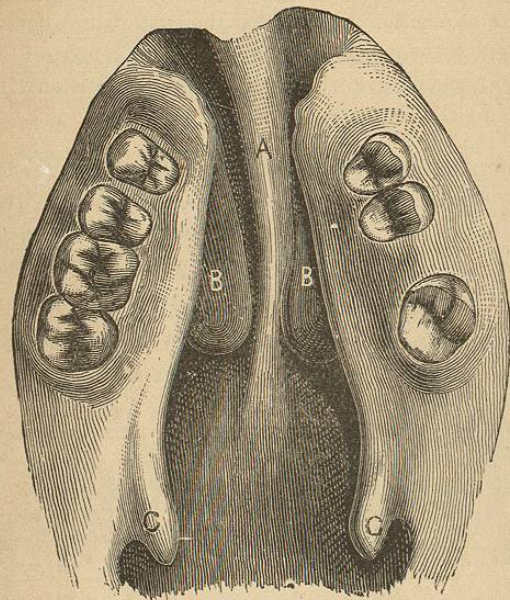
Obturator, here most justly called vela, designed to accomplish the second end, introduce the practitioner, in a study of them, to the complexities of prosthesis. Fortunately, the study leads in turn toward absolute simplicity.

In 1845, Mr. Stearn conceived the idea of a velum which should take the place of parts wanting in a soft palate, and be made movable by the parietes with which it was related. This appliance, as made by the gentleman, consisted of a gold plate fitted to the hard palate, having attached to it, by means of two spiral springs, an artificial velum of elastic rubber, composed of a body, wings, and grooved edges, to receive the margin of the cleft.

Succeeding Mr. Stearn is Dr. Norman Kingsley, of New York City, a practitioner who has been an enthusiastic worker in the direction for years. To follow and appreciate the steps taken in the work by this operator is to inform one's self very fully as to the principles of the practice.

Fig. 362 shows a case with which Dr. Kingsley commenced experimentation. The patient was a lady; the defect congenital. As is seen, the

FIG. 362.



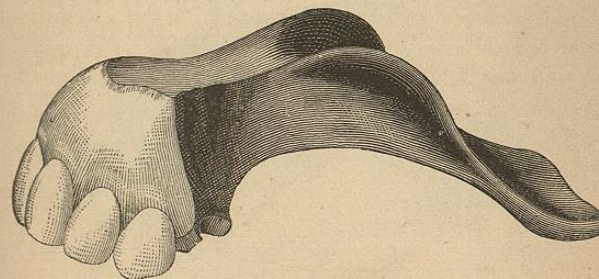
break passes completely through both hard and soft palates. Indications directed an obturator and velum combined.

In the cut is exposed the perverted anatomy of the parts: A is the disarticulated vomer; B, B are the turbinate bones; C, C show the separated halves of the uvula, and afford an accurate idea of extent of deficiency in the soft palate.

"In my desire," writes Dr. Kingsley, "to benefit this patient, I re-read all

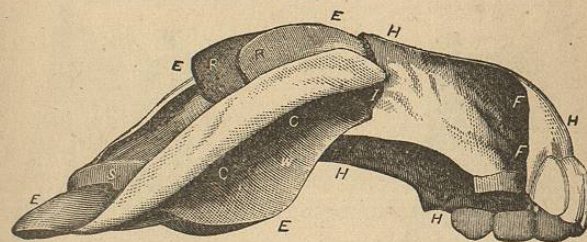
the literature I could find on the subject, with but little satisfaction, and ended in making a plate of vulcanite, of which Fig. 363 is an illustration. This obturator was worn for a few days with entire comfort, when my patient informed me that she had accidentally learned that there was a gentleman in the city engaged in manufacturing pursuits who had made a plate for himself which was a great success." Calling on the gentleman, Dr. Kingsley expresses his great surprise in finding him to be the veritable Mr. Stearn whose name, in connection with the invention of the artificial velum, is cited in previous paragraphs.*

FIG. 363.



Mr. Stearn and Dr. Kingsley entered conjointly on the manufacture of a second apparatus. Fig. 364 shows the result of the work.

FIG. 364.



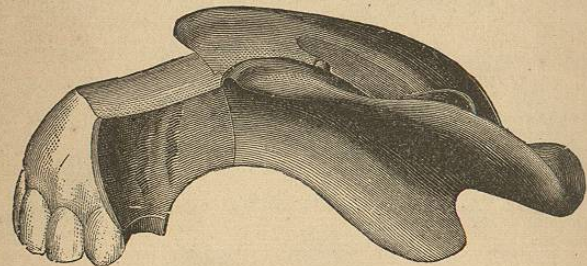
This velum proving unsatisfactory to Dr. Kingsley, believing, as he expresses himself, that one produced more after the manner in which a dentist would manipulate must do better, a second impression was secured (this being taken in plaster), and from it a model made. Upon this model a pattern was formed in gutta-percha, which, in turn, was copied in vulcanite. "This vulcanite model was carefully finished, and steps taken to make a mould in which to vulcanize duplicates of soft or elastic rubber." In this manipulation Dr. Kingsley claims to have been the first to use type metal, the mould used by Mr. Stearn being of wood. The instrument made is shown in Fig. 365.

* Desirabode, Snell, and Seracombe, as will be recognized, are not lacking in claim to a share in the conception of the possibilities of artificial vela.

Alluding to the two pieces, Dr. Kingsley suggests that the only advantage in the one constructed by himself lay in a nicer adaptability.

Improving on his original plate, Dr. Kingsley exhibits his second case, made in 1863. Figs. 366 and 367 show the oral and nasal surfaces. "A, A, A represent the groove which correspond to the border of the fissure. E, E show processes which lapped on to the floor of the nares and assisted in its support. C is the central flap, as used in the Stearn palate, and G, G are the two bows, or springs of rubber, which sustained it. In swallowing, the sides,

FIG. 365.



B, B, approached each other, sliding under the flap, C. This instrument was made of soft rubber in a type-metal mould, the mould itself being an intricate

FIG. 366.

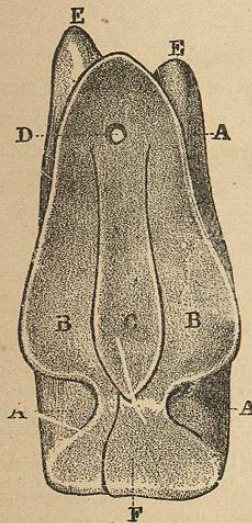
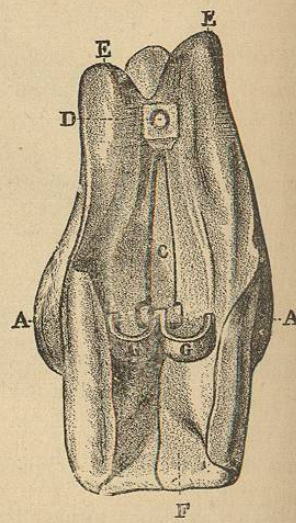


FIG. 367.



affair; but the instrument was simple in its application, and was of as much benefit in articulation as anything which has been produced since."

Objection to this apparatus, felt by Dr. Kingsley himself not less than by others, lay in its complexity, the instrument being both costly and liable to

get out of order. Here was an incentive to renewed effort. In 1864 a model was made of an instrument strictly original. The change consisted in abandonment of the triple form of construction, doing away with the central slip, the flaps, and all gold and other springs. These arrangements, it will be recognized, were in the former appliance to provide for the movements of the divided uvula and adjacent remnant of palate. The complexity is not hard to appreciate. Figs. 368 and 369 show the new instrument.

FIG. 368.

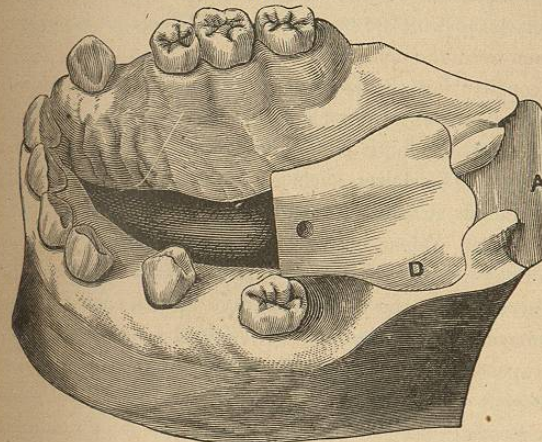
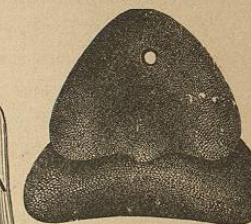


FIG. 369.



Out of his experience Dr. Kingsley remarks of this last construction: "For fifteen years I have used this form, and applied it in hundreds of cases of congenital fissure, and have made no improvement beyond simplifying the method of production. I know of no other form, or attempt at making an elastic velum, which fulfils the functions that this one does; nor do I believe it possible to make a flexible, yielding instrument which shall be of so universal application in any other form or by any other method."

In the cut (Fig. 368) D expresses the wings and A the posterior part of the velum; Fig. 369 shows an unattached instrument. Viewed *in situ* and distinct, the arrangement is easily appreciated. The hole in the front face of either velum is a means for attaching the piece to any arrangement required anterior to it.

Passing from the Kingsley experiments, reference is to be made to the velum and to the labors of William Suersen, Doctor of Surgery, a dentist practising his profession in Berlin. By this gentleman we have had advanced a new principle in the mechanism of speech. To pronounce distinctly it is necessary, he says, that the cavity of the mouth be separated from that of the nose by muscular interruption. That interruption is, under normal conditions, effected, on the one hand, by the velum palati, on the other by a muscle which has not, in such connection, received the attention merited,—namely,

the constrictor pharyngeus superioris. This latter muscle contracts itself during the utterance of every letter pronounced without the nasal sound, just as the levator palati does. The constrictive muscle contracts the pharyngeal cave, the wall bulging. On the action of this muscle is based the system of the new velum.

The palate, constructed in all its parts of caoutchouc, consists of a plate suitably attached to existing teeth, this being made as an obturator if indications exist in that direction. Where a fissure is related alone with the velum, this palate expands at the part into a process, or apophysis broad enough to compensate for the loss of the missing part. This process, or enlargement, is at the same time of such thickness as to keep up contact between the high edges constituting the sides of the apophysis and the two halves of the velum, even when the levator palati is active. To insure this contact in motion of the parts, the high edges do not rise straight, but obliquely, toward the outside. The lower surface of the apophysis, turned toward the mouth, lies on about an equal level with the velum, if the latter be raised by the lifting muscle. When, however, the levator is not in action, the velum loosely depending, the back part of the artificial palate lies over it. This back part fills up, accordingly, the pharyngeal cave, and in such manner as not to impede the entrance of air into the cavity of the nose when the pharyngeus constrictor superioris is inactive. Thus the patient can, without impediment, breathe through the nose. But, as soon as the constrictor contracts the cavum pharyngo-palatinum, this happening with the pronunciation of every letter, *m* and *n* excepted, the muscle reclines against the vertical back surface of the instrument. By this operation the air-current is prevented from entering the cavity of the nose and is compelled to take its way through the mouth, utterance being thus freed of nasal sound. To the existence of the vertical surfaces, and consequently to the thickness of that part of the apparatus which fills up the fissure in the soft palate and the cavum pharyngo-palatinum, special importance is to be attached. But for the thickness, the levator palati, when it rises upward, would not remain in contact with the side-edges of the instrument, nor would the pharyngeal constrictor be able to effect a sufficient termination if the portion of the obturator nearest it consisted only of a thin plate.

The author has to remark his great satisfaction with the Suersen design. Nothing yet made surpasses it for service, and for adaptability to requirements. It is his own plan, however, to make the portion covering the hard palate out of metal and to attach to this a velum, or box portion, constructed from celluloid.

Reference in connection with this form of obturator is deservedly to be made to what may prove an addition designed by Dr. Booth, of Iowa, in the shape of a box, or velum, portion related by means of a stop-hinge, and controlled in its upward movement by a delicate spring. The writer has not yet constructed such an apparatus, but its promise has much impressed him. The

instrument certainly has all required latitude of ascent and fall, and there is nothing to get out of order. To appreciate the construction of this obturator, it is only necessary to imagine a common plate fitted to the hard portion of the palate, to which a box, shaped something like the last phalanx of an index finger, is attached by a hinge of a character that prevents the part descending below the curvature of the arch, yet moving freely upward, except as such freedom of movement is controlled by a spring riveted at its fixed extremity to the nasal aspect of the common plate, and reaching back to the box.

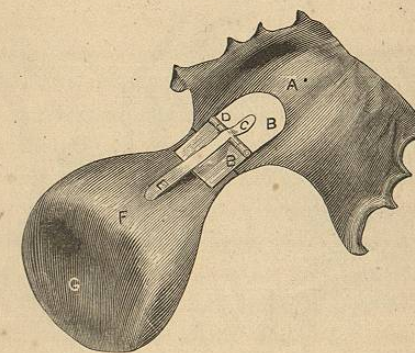
In a specimen of this design exhibited to the writer by its inventor, the roof-plate on one side was fixed by means of a groove slipped about the palatal process; a means of fixation not so desirable, it would seem, as the employment of the ordinary denture arch.

Similar in design and idea is an obturator made by Henry A. Baker, D.D.S.; like the last described, a modification of the Suersen instrument. Cuts here introduced afford an idea alike of the Booth and Baker apparatus.

Fig. 370, A, shows a gold or rubber plate fitted to the hard portion of the palate, its support being in clasps about the necks of certain teeth, as shown in the festoons. F is the velum proper; it is of chestnut shape and extends backward and downward, filling up completely the space between the separated parts, and being so embraced by the muscles and so restorative of the absent curvature that the movements of the palatal remnants reacquire, as nearly as may be, the meaning of original function.

Dr. Baker describes his velum as consisting of polished hard rubber, gold, or platinum. B, B exhibits hinge attachment to allow of part lifting

FIG. 370.

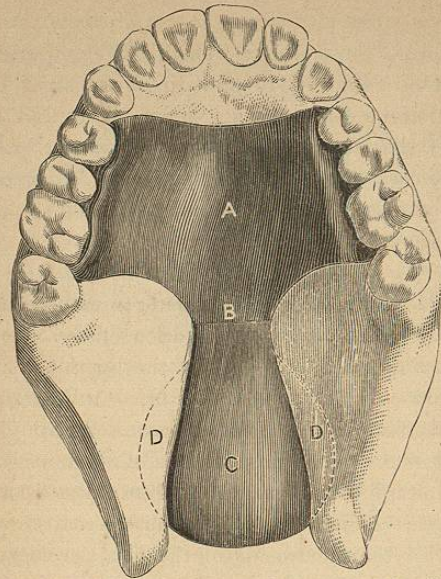


and falling in concert with constricting muscles. C is a delicate platinized gold spring, which, bridging the joint and resting on the velum at E with a slight downward pressure, serves to keep the latter in contact with the levator muscles when in action, thus giving them control of the appliance.

Turning here a glance at Fig. 371, the apparatus is seen in position.

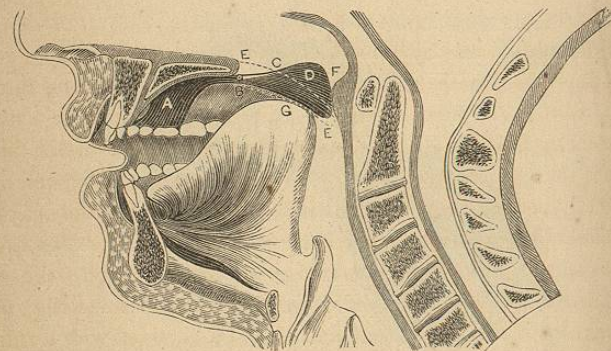
Attention is next directed to Fig. 372, which shows transverse section of obturator and of the natural parts to which it holds relation.

FIG. 371.



A, the plate; B, the stop, preventing downward motion when the muscles are in a relaxed condition; C, the artificial velum; D, D, muscles lying under it; the dotted lines show the appliance rests upon the muscles.

FIG. 372.

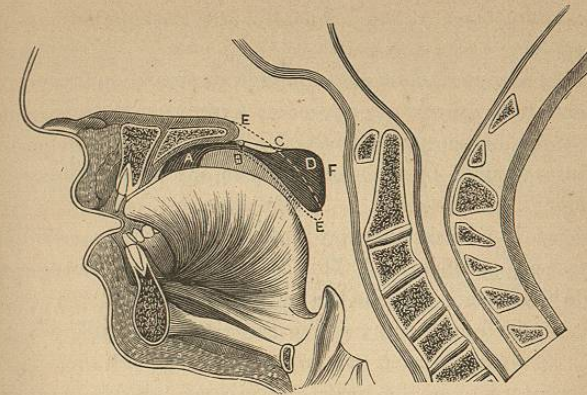


E, E, the artificial velum thrown up by the muscles as in all sounds requiring closure of the nasal passages; F, the superior constrictor muscle advanced to meet it; G, the tongue, raised, pressing hard against the appliance, as in pronouncing the letter *k* or *g*; A, the plate; B, the hinge-joint and stop; C, the spring resting on the velum.

Fig. 373 exhibits expression of velum and associate parts when out of office. Referring to the curvature, marked difference is seen as contrasted with Fig.

372. In the latter nasal respiration is shut off, in this it is uninterfered with. The letters refer alike in both diagrams to the same parts.

FIG. 373.



Showing muscles relaxed and the velum at rest, thus affording free passage for nasal sounds and respiration.

A valuable hint in connection with the velum or bulb portion of this obturator relates to making it hollow, so that weight shall not interfere with the necessary, or desired, movement. Manufacturers of rubber balls secure the result as follows: Take the vulcanite rubber in the soft state, and cut the sheets so that when joined the desired form is secured; then a little water (alcohol is added by Dr. Baker) is dropped into the cavity, the edges are sealed, and the piece vulcanized in the usual way. The steam produced by the water and alcohol inside creates sufficient pressure to keep the walls distended.

The well-founded claims for this obturator relate with assistance rendered the levator muscles of the palate, as the action of these contributes to freedom in speech. With all sounds requiring closure of the nasal passage the bulb is lifted (see Fig. 373, D) by the levator muscles, which muscles find their ability to act through the bridge-like relation with those of the velum (Fig. 372, D, C, D), nothing interfering with the action except the insignificant resistance offered by the slight spring (Fig. 370, C). The thickness of the velum, or bulb, relates its posterior surface in apposition with the superior constrictor muscle, F, thereby affording, in the pronunciation of the gutturals, firmer resistance to the tongue, C, than is to be obtained with a thin obturator. By reason of the presence of the hinge, B, the above movements are rendered so free and easy that there is no tendency to displacement of the plate. If a nasal sound immediately follow a guttural, the descent of the velum is rendered certain and timely by means of the spring.

Masks.—A mask is an obturator or cover designed to conceal facial de-

fects. Fig. 356 furnishes a good illustration of a defect suited for the mask; it being accepted that the case admits of no correction by operation.

The principle of the mask is that of the common false-face; difference lying in quality and adaptability of construction.

Masks are complete or partial. The full piece covers the whole face; limited pieces apply to a part or parts.

To make a mask that shall fit perfectly and restore as completely as possible the lost contour, the surgeon commences by restoring to the face in wax the lacking parts; this he does as perfectly as his artistic skill admits of. Harmony of features secured by such temporary means, a succeeding step is the taking of a mould, or impression. To take such cast, plaster being used, all hair of the region is to be shaved away; otherwise closely flattened to the face through the free use of bandoline. This accomplished, a succeeding step provides means of breathing. Next is the getting of the mould. To secure this plaster batter is mixed in quantity and consistency that shall cover the face, yet not flow. The patient being now supine, and the parts thoroughly oiled, the batter is moulded upon the region; care being taken to accomplish the intention perfectly.

When set, or hard, the mould is carefully to be lifted from the face and laid away for at least twenty-four hours. If, in the act of removal, difficulty be experienced in raising the plaster, the piece is to be broken and lifted in parts.

A succeeding step refers to the proper cast of the face; it being recognized that the impression just taken is but a form in which this other is made.

The mould proper being arranged and built about so as to lie in the bottom of a cup, it is first varnished, and, after this has dried, it is very completely oiled. A second batter of plaster being mixed,—this time in the form of a thick cream,—the cup is filled by a pouring which commences and retains place at the lower portion of the mould. The batter is to rise gradually over the face surface, that absence of air-bubbles and absolute continuity of surface be secured.

Allowing time to elapse sufficient for the setting of the cast, a few hammer-taps against the mould suffice for the separating of the parts. A model thus secured represents perfectly the countenance from which it has been taken.

To fit a mask to this model, the whole or part being considered, a procedure is as follows: Taking the face (Fig. 356) as the block, and accepting the cast to have provided it with nose and lip, the operator commences by moulding over the restored parts a layer of absorbent paper, which performance he accomplishes by a free use of water. With this layer of paper he represents nose and lip, taking great pains that the boundary edges shall rest against their neighboring parts with the nicest accuracy.

The paper dry and hard, he proceeds to mould upon it either gutta-percha, other paper, or a sufficient number of layers of cotton stuff saturated with paste to accomplish the purpose of the requirements. This done, the proper

contour of the free surface of the lip and the nasal openings having been considered, succeeding steps relate to varnishing the piece, and to the manner of fixing it in place. In the case of a female such fixation is no easy matter; spectacles and flesh-colored string offer the best solution of the problem. The brush of an artist is necessary to give the final covering and color.

In this direction of practice an interesting example has been detailed to the author by Dr. Alfred Burne, of Australia; the patient being a medical gentleman and personal friend of the operator. The deformity in the case involved the superior maxillary region, bounded above by the transverse suture, below by the lower lip, extending from either oral angle backward and upward in curved lines to the temporo-maxillary articulations.

Having found, said Dr. Burne, that my own face corresponded in form and size with that of my patient, I had an impression taken of it. From this mould I made a cast, upon which, in turn, a mask was constructed. The completion of this mask showing it to be too large, I had a second impression moulded; this time also of my own face. Another mask was now made, this time being moulded into the mould, no cast being made. The fit secured is described as being so perfect and in every respect so satisfactory that whereas the gentleman never before its application ventured abroad without close concealment, he is now found mingling in society generally.

The steps of manufacture and fixation of the mask are given as follows: After the impression was hard it was thoroughly smeared with cosmoline; common paste flour and warm glue, eight parts of the former to one of the latter, were in turn laid over the cosmoline. Next, a piece of fine linen was taken, and by dint of much patience it was worked into the irregularities of the mould, the task being accomplished minus a single wrinkle. This being allowed time to dry, the glue-paste was in turn brushed over it, this receiving still in its turn a layer of blotting-paper. Again dry, again was repeated the layer of paste and paper.

Sufficient thickness obtained, the mask was removed from the mould and padded and trimmed to suit the face of the patient. The piece was completed by cutting out holes for the eyes and nostrils, adapting eyebrows and moustache to match hair and beard, and a final artistic painting of it.

Fixation to the face was after the following manner: When in place the mask extended from the line of the hair upon the forehead to contact with the inferior lip below, from the ear upon one side to that upon the other. Above and at the sides the hair was brushed over the edges, concealing these fairly well. Midway—that is, over the bridge of the nose—spectacles were fixed which passed around the ears with a spring. The artificial moustache mingled with a beard which concealed elastic flesh-colored strings passing among the hair around the head.

With the aid of the diagrams shown in the chapter, and with comprehension of the principles on which obturators and vela are constructed, the student or practitioner will surely be at no loss to continue experiments in the direc-

tion. The field is one inviting wide and generous competition. It is to be added, however, in conclusion, that the experience of the writer favors treatment of palatine defects by operation in all cases where such means applies. It is to be suggested, at the same time, that failures are, and will not unlikely continue to be, multitudinous. In a succeeding chapter the matter and manner of surgical operations upon the parts will be found fully considered.

CHAPTER XXXII.

THE GUMS AND THEIR DISEASES.

THE gums are simply an amount of fibro-cartilaginous tissue (the fibrous element predominating) placed as protecting cushions about the alveolar processes. The neck of each tooth is closely enveloped by a dental pit of this cushion; the mucous membrane, which covers the common surface, being reflected around the pit and rendered continuous with the periodontium of the organ.

The gums, in a healthy state, are remarkable for their insensibility, bearing, with very little or no response, the pressure and irritation to which, in the process of mastication, they are so continuously subjected. The mucous membrane, of which this tissue is largely made up, is very heavy and thick as compared with its continuity in other parts of the alimentary canal, and is underlaid by a network of vessels, which leads it to be esteemed of considerable vascularity as reference is had to operations involving it.

Inflammation is the disease of the gums; but such perverted vascular action, here, as everywhere else, has quite a variety of significations. These significations are—

1. Accumulations of tartar.
2. Periodontitis.
3. The mercurial impression.
4. Scurvy.
5. Syphilis.
6. Dead or loose teeth.
7. A crowded dental arch.
8. Use of improper dentifrices and brushes.
9. Improperly inserted artificial teeth.
10. Malignant impressions.
11. Anomalous conditions.—Neuralgia. (See *Neuralgia*.)

A comprehension of the diseases of the gums is found in the appreciation of these various conditions or influences.

1. **Accumulations of Tartar.**—Salivary calculus, a deposit from the saliva, combined with the various oral detritus, when attached about the necks of the teeth, becomes necessarily a source of offence, provoking inflammatory action, the grade of which is marked by the general condition of the individual. The most common type of inflammation thus induced is the chronic degenerative. The tartar, pressing upon the gums and insinuating itself about and around the necks of the teeth, soon interferes to such extent with