3. THE MANDIBULAR IMPRESSION.

The excessively resorbed mandible, with its so many unfavourable features, calls even more insistently than the maxilla for an individual tray in which to secure an impression; as MacMillan finds, an impression technique must be developed different from that usually employed. The writer having tried, and been subjected to, many methods, has evolved the following routine.

A tray is chosen that extends as far back over the retro-molar pads and into the retro-molar fossae as observation leads one to think will be tolerated by the tissues, insuring clearance of the mylo-hyoid ridge, sub-lingual glands and muscles, and the masseter muscle, by cutting away the tray where necessary; the projecting handle is reduced to a stub as was the upper preliminary tray, the writer having found a general involuntary recoil of the lip from contact with the metal tray handle; Figs. 43 and 43A.

Fig. 43. Fig. 43A.

The minimum bulk of modelling compound is secured to the tray, flamed, tempered, and held
down under minimum pressure while the patient opens the mouth and protrudes the tongue; a limited amount only, of muscle trimming being undertaken. The heels of the chilled impression are softened one side at a time, tracing stick added if deemed necessary, the tray re-inserted and held down while the first-finger is run along the softened compound pressing it backward and upward into the retro-molar fossa; this is chilled, the tray removed and the same side again softened, and the tray held down while the patient protrudes the tongue and raises it toward the upper lip; after thorough chilling the tray is removed, and the process repeated on the other side. Should the tray show through the impression material, the latter must be cut away, the tray trimmed down, additional compound traced on, and the process of securing registration of the tissues repeated; by lifting the tray slightly and passing it backwards, there not being any anterior alveolar ridge to interfere, it is seldom necessary to break the retro-molar fossa projection on one side as demonstrated by Ewell Neil;

Fig. 44.

also, the writer finds that usually, in proportion
to the amount of alveolar resorption so is the restriction of the area into which an impression may be carried; Fig. 44, though very flat, allows a greater extension than usual into the retro-molar fossa on one side. The impression is trimmed back to where the material begins to turn over, thinned down in the labial region and poured in ordinary plaster.

Upon the resulting cast a special individual vulcanite tray is constructed, using one thickness of base plate wax well re-inforced all round, keeping clear of the periphery and ridge crest including the heels; finger-rests similar to those used on the upper tray are attached at right angles to the crest of the ridge at a point half way between parallel lines drawn across the retro-molar pads and the incisive ridge; a german silver wire about 16 B. & S. gauge is bent round, the ends dropped

Fig. 45.

into slots filed across the finger-rest tubing, and securely waxed in position; the wire serves as a conveying handle and eliminates springiness in the finished tray, Fig. 45. Vulcanised off the cast, the finished tray, Fig. 46, should need little
trimming before being tested in the mouth for gross peripheral interference, adjustments being made where necessary; the average width of the ridge may be tested with capipers, and the tray marked accordingly.

Fig. 46.

The tray is thoroughly dried and a piping of beeswax of sufficiently heavy gauge to compensate for any compressibility of soft tissue overlying the ridge-crest is sealed along the marked lines, extending lingually between the estimated distal borders of the second molars, or just short of any definite muscle insertion that may have been noticed, such as the superior constrictor of the pharynx; bucco-labially the wax piping is extended right round between the retro molar pads unless muscle interference
degrees otherwise; the retro-molar pads in their turn are covered by a section of beeswax equal in thickness, roughly, to the diameter of the piping, Fig. 47.

The bushed tray is immersed in water at 125° F. for a few minutes and gently pressed down in the mouth; on removal and chilling, any drift of beeswax to the ridge trough or periphery is trimmed away; areas showing want of contact are added to, preferably with a fine brush dipped in molten wax; the whole tray is again softened in the warm water and tried in.

With the fingers held lightly on the finger-rests, the patient is asked to make excursions with the tongue in all directions; any thrust against the tray from such movements may be readily detected; the periphery whence the thrust comes is reduced till both lingual, labial and buccal movements fail to dislodge the gently held tray. The beeswax piping having been thoroughly chilled, pressure vents similar to those in the upper tray are drilled from above with a fine, tapered, fissure-bur along the crest of the ridge, and parallel to it; the tray tested for clearance of tissue and thoroughly dried.

A moderately thick mix of plaster-wash is carefully loaded into the tray, some of the mix placed under the tongue in the bicuspids regions, and the tray gently rocked into position and held with the forefingers on the rests; the operator standing well above, and as nearly in front of the patient as possible; the lower lip is pressed upward and inward with the thumbs, care being taken not to
carry the tray itself backward at the same time, as may easily happen in the absence of a steadying anterior alveolar ridge; with the fingers still on the rests and the thumbs under the mandible, the patient is instructed to open the mouth as widely as possible, drawing the lips back at the same time; to protrude the tongue, raise it, and pass it from side to side, and draw it back into itself; a deftly wielded middle finger will insure all the pharyngeal muscular contractions one could wish, and which it is almost impossible to obtain from the patient voluntarily; but the right moment must be chosen; --- when the plaster wash has passed the flowing stage, and is not in danger of being friibbled away from the periphery; slight, but even pressure is maintained by the forefingers and thumbs till the plaster wash has thoroughly set.

If the impression be raised slightly and passed backward a little, withdrawal is easy and fractures rare; should there be any dislodged

Fig. 48.

fragments, they, with the impression, should be well washed under running water to free the plaster surfaces from all traces of saliva, a more difficult
task than with the upper impression.

Fig. 48 shows an impression taken by this method.

Any portion of the impression tray showing through the plaster should be reduced with sandpaper, the buccal, labial and lingual fraena relieved, also with sandpaper, and the impression relieved inside the external oblique line up to the muscle attachments.

A single thickness of gold casting wax is adjusted in the post-dam areas, (the retro-molar pads), and the impression proceeded with as usual; i.e., wax on fragments, rim, box, varnish, and pour in artificial stone or plaster as the case may require.

The writer does not claim that a denture made on the resulting cast will make absolute peripheral contact with the tissues in all muscular positions; but the fact must not be overlooked that the viscosity of the saliva lying on the floor of the mouth makes an effective seal, precluding the possibility of the ingress of air being responsible for the unseating of a lower denture stable to all other influences; also, as demonstrated by Fish the design of the polished denture surfaces is an all important factor in stabilising lower dentures, to which the writer adds, from experience, the size, shape and disposition of the mandibular teeth.

The writer does claim, however, that a denture made on a cast resulting from the foregoing technique will give:
1. Relief from over compression along the crest of the ridge.

2. Absence of distortion of any soft tissue that may surmount the ridge.


4. Utilisation of the meagre secondary stress-bearing areas afforded by the mandible.

5. Relief over the buccal plate.
4. OCCLUSION.

A. Maxillary bite and trial plates.

The special vulcanite tray, freed from plaster wash and beeswax, makes an ideal base for the bite plate; the finger rests are in the correct position over the ridge, and may be easily reduced if too tall; while the central lug has already been trimmed down to the correct lip line; all that is necessary is a dusting of the cast with talc powder and adaptation, with the tray, of a thin sheet of modelling compound carried to the intended denture outline and sealed to the tray with a hot spatula. The gaps between the central lug and finger rests are filled in with softened modelling compound and squared off occlusally on a flat surface.

NOTE: Any operator who so adapts a few trays individually, instead of handing them over to a mechanic, will emerge with a new respect for, and conception of, the requirements of modelling compound; realising as never before, the degree of softness necessary to register fine detail; also, and the more important, that this material must not only be placed where required, but held there till sufficiently hard to overcome any tendency to spring back to its original shape.

At this stage, before the cast is mounted on an articulator, it is a wise precaution to adapt the shellac trial base upon which the teeth are to be mounted; if the base be trimmed a little beyond the intended denture outline, the labial and
buccal edges rolled, and a wire strengthener secured across the heel, there will be a minimum of warpage; the greater strength reducing the danger of fracture during handling; while the periphery is smooth, and may be made to conform accurately to the denture outline as developed on the cast; Fig. 49. The writer finds an ordinary child's school eraser about three inches long with bevelled ends ideal for adapting shellac base-plates, especially in developing the lap over for the roll.

Fig. 49.

B. Mandibular bite and trial plates.

As with the upper, the lower special vulcanite tray, freed from plaster wash and beeswax, may be used as a bite plate by lining with modelling compound and filling in between the finger rests with modelling compound, making the upper quarter-inch with green tracing-stick; if a measurement from the impression periphery to the lip has been taken and recorded, an approximate height of rim is assured.

In this case also, the shellac trial base
should be adapted while the cast is more easily handled than when mounted on an articulator. A wire strengthenener secured along the ridge crest, with the edges rolled lingually, as well as buccolabially insures against warpage and fracture, Fig. 50.

Fig. 50.

A knife-edged piece of modelling compound, simulating a ridge, secured to the trial base from about the first bicuspids region backward will give added strength, and serve as a guard against distortion when carving and finishing up the wax in a tall narrow case, Fig. 51.

Fig. 51.

Having the upper and lower bite-plates with occlusal rims attached, the next step is, as in
all full denture construction, to register occlusion; under which generic term is included:

1. Determination of lip line and fullness.
2. Securing the occlusal plane.
3. Registering the vertical opening of the jaws.
4. Establishing (a) centric relation, (b) the occlusal curve, (c) position of casts on an articulator.

1. Determination of lip line has already been partly carried out in the impression technique, fullness is largely a matter of the operator's judgment.

2. The plane of occlusion is secured; high and low lip lines, also disto-cuspid borders are marked on the bite-rim, and the upper cast luted to the articulator, keeping the occlusal plane parallel with the base of the instrument. Landmarks are registered on the cast, the occlusal surface of the bite rim lubricated, and the bite plate returned to the mouth.

3. The vertical spacing of the jaws is obtained by softening the upper surface of the lower bite-rim, inserting the bite-plate, and asking the patient to 'close'; no effort being made to do more than register the height of bite, which the writer secures with a locally made Willis Bite Gauge, Fig. 52, modified according to the exigencies of the case in hand.

The bite rims, held together by the pressed-in overflow of green tracing-stick compound forming the upper part of the lower rim, are fitted to
their respective casts which are securely tied together; the lower cast then being tacked to the lower unit of the articulator.

Upper and lower rims are made to conform by trimming the surplus compound from the lower, which then has a broad, shallow notch cut from the occlusal surface extending from the bicuspids region to within four or five M.M. of the heel, Fig. 53; this notch is filled in with soft carding wax and squared off against the upper occlusal rim, the whole lower occlusal surface then being covered with No. 60 tin foil sealed in place with a hot flat spatula, and well lubricated, Fig. 54.
The upper occlusal rim, freed from lubricant has securely sealed to it a thickness of three or

Fig. 54.

four M.M. of soft carding wax also well lubricated; the bite plates are then in readiness for the next step.

(4) Securing centric relation and registering the patient's individual occlusal curve are combined in the one operation. The bite plates are inserted in the mouth, nothing being said about closure; while the carding wax is softening in the warmth of the mouth the operator may play for time by re-checking landmarks, or may leave the patient alone till fatigue, or the necessity of swallowing the accumulating saliva causes a natural closure of the jaws; when observation lines are scored down both bite rims in the cuspid region, the central line being extended down the lower rim. The patient is then asked to 'masticate' the wax, chopping up and down with the mandible in all positions; if the patient can be induced to make sliding lateral and protrusive movements, so much the better; when there is only a thin line of black wax left between the compound of the upper rim and tin foil of the
lower, with the lips held apart, the movements are continued till observation of the vertical lines indicates that centric relation has been obtained. A thin strip of very soft carding wax is then laid along each side of the lower occlusal rim in the second bicuspid-first molar area, and the patient allowed to gently close. The rims are stapled together, both bite plates removed from the mouth, chilled, and secured to their respective casts; the lower, having been detached from the articulator, is re-attached in its new position in relation to the upper.

The staples are withdrawn, and the expressed carding wax trimmed back to the upper compound rim with a razor sharp knife.

The upper arm of the articulator is thrown back, and about a quarter inch of the lower occlusal surface compound pared off, strips of wax or plasticene being run round to form a trough into which the upper bite rim will pass; the trough is filled with a mix of artificial stone sufficiently soft to receive the upper occlusal surface without pressure.

Fig. 55.

When sufficiently set, the stone is squared
back to the edge of the upper rim, Fig. 55, in which the occlusal curve may be clearly seen; incidentally, the curve differs markedly on the two sides of this case. Another view of the curve on one side is shown in Fig. 56 in which a match has been laid across the curve.

When the stone has thoroughly set, the lower bite plate is removed from the cast, and using curved calipers, one beak is run along the ridge trough, the other being made to scratch the position of the ridge crest on the stone occlusal surface, which is then trimmed away from both sides to the width of the posterior teeth to be used on

the upper denture; the scratched line is then heavily
pencil marked, Fig. 57, and the bite plate is returned to its cast, there to yield an artificial stone template to which an anatomical articulator may be adjusted for left, right and protrusive excursions; and to which, with any type of articulator, the upper teeth may be set in the assurance that the compensating curve is the one most likely to give the patient maximum comfort and efficiency, other things being equal, as the curve is a record of the individual jaw movements; not an arbitrary arrangement of a segment of a sphere whose most dependent point can, at best, be only a matter of guess-work.

When it is found quite impossible to induce an elderly, self-conscious patient to make the necessary jaw movements and excursions, one is forced to resort to the arbitrary segment of a sphere template; proceeding thence by strategy; the writer having had considerable success with the following method.

After securing vertical relation, the lower cast is tucked to the lower unit of the articulator; the occlusal surface of the upper bite rim, by the addition of tracing stick compound, is made to conform to the surface of an arbitrary segment of a-sphere-template; this is well lubricated, and the occlusal surface of the lower bite rim, by removing sufficient compound and substituting pink wax, is made to conform to the upper, seeing that the most dependent point of the curve is in the second bicuspid region.

The lower rim, freed from lubricant, is
thoroughly dried, and four small balls of very soft carding wax smeared with a little tartaric acid are securely sealed in the cuspid and first molar regions; the bite plates are inserted in the mouth, the patient being instructed, firmly, not to close the mouth, but to hold the tongue between the bite rims. As soon as the tartaric crystals begin to dissolve the struggle between involuntarily swallowing the excess saliva stimulated by the acid, and disinclination to ingesting the acid, invariably results in a retraction of the mandible to the desired position, when the rims are stapled together; the plates are removed from the mouth, chilled and placed on their respective casts.

That this method is quite unscientific the writer freely admits; but where the human element is concerned we must sometimes substitute art, or artifice, for science; the objective, the patient's ultimate comfort and well-being justifying the means.

In this procedure also the lower cast, having been detached from the articulator, is now re-attached, the subsequent procedure being the same as already detailed.

NOTE: A carding wax that will become quite malleable at mouth temperature may be made by melting ordinary black carding wax over a water-bath, adding a small quantity of lard, stirring briskly, and pouring onto a flat dish floating on water in the workroom sink; this last insures an even thickness of cake.
5. TOOTH ARRANGEMENT.

In proceeding to set up the teeth, the upper bite-block is replaced by the prepared shellac trial base, and the selected anterior teeth arranged to conform to bite-block registrations and guide marks on the cast; if the first bicuspids are placed "slightly in the shadow of the cuspids" as lectured by Dr. Septimus Hinder in the writer's student days, the narrowing of the lower denture in this region, so forcibly stressed by Fish, will be automatically secured; at the same time, the lingual position must not be so exaggerated as to prevent the first bicuspids being caught and held up by the modiolus as that stabilising force comes into play with the bunching of the buccinator muscles. The second bicuspids and the molars are then placed

Fig. 58.

with their centres falling on the pencilled line on the lower stone template. Fig. 58.

The lower bite block is now replaced by the already prepared shellac trial plate, and the lower molars placed in position; their narrowed oclusal surfaces articulating lingual to the buccal
edges of the uppers and their long central axial lines passing through the ridge crest; if care has been taken in mapping out the bite block template and accurately adjusting the upper teeth, the positions of the lower molars is assured; always keeping mesial to the retro molar pads.

The second bicuspid are then placed, followed by the six anterior teeth, which are kept over the crest of the ridge, or only slightly in advance of it, their incisal edges being so inclined labially that there shall be an unbroken line to the denture periphery lingually; the under jet, and under lap to the upper anterior teeth must be such that contact during mastication and speech is impossible.

If there be still room for the first bicuspid, they are arranged with the buccal cusp occluding lingual to the centre of the upper first bicuspid, it being important that the denture be kept narrow in this region to allow of its being caught and held down at the same time as the upper is caught up by the coming into play of the group of muscles entering into the modiolus; also, the danger of the tissues at the corners of the mouth being bitten as the orbicularis oris is drawn inward and backward is obviated. Fish recommends the complete removal of the lingual cusps from the first bicuspid to compensate for their lingual placement. The writer frequently substitutes a lower cusp where the tongue is thick and broad, the greater length of porcelain lingually, and the reduced bucco-lingual width offering advantages not to
be overlooked.

Where the pre maxilla has been carried forward by the absence of posterior balance, or in the case of a naturally retruded mandible, the disparity between the arches presents a problem that may be overcome by omitting the first bicuspids altogether, if they may not be placed mesial to the upper first bicuspids without undue narrowing of the lower incisors, or risking their being carried too far forward of the ridge and into the lip; in which case the lower cuspids, even if slightly wider teeth be used, may be so placed that their distal slopes and flattened points occlude mesially with the upper first bicuspids; the placing of the full number of teeth supplied in 'sets' is of much less importance than the position on the ridge of a lesser number of units giving freedom of tongue movement, and allowing balanced contact of the upper and lower occlusal surfaces; also, it is of the utmost importance that the full masticating stress be kept distal to the first bicuspid.

If, prior to mounting, all posterior teeth be warmed and securely attached to wax cones, the placement and manipulation of each individual tooth without fear of disturbing those adjacent, will be found to greatly facilitate the work of 'setting up'; also, there is less annoyance from shrinkage of the wax than when a continuous roll is sealed to the trial base-plate. (Fig. 58)

The incisal post, which, having no counterpart in the human mouth, has only been used to maintain the vertical spacing of the casts, is now
withdrawn; the trial bases are securely waxed to their respective casts and a rubber band passed over the anterior portion of the articulator; a few minutes spent making lateral and protrusive excursions with the articulator will disclose any serious interference with the free running of the oclusal surfaces over each other by one of two things happening; either one, or both plates will be dislodged from the cast, or a tooth, or teeth will be loosened from the wax; the source of the 'trip' may be readily located and removed by grinding or altering the angle of contact of the teeth.

Although we may not rely upon even 'anatomical' articulators to accurately simulate mandibular movements, the lateral excursion with narrow lower molar oclusal surfaces is for all practical purposes horizontal; and provided the oclusal plane has been accurately recorded, and the casts placed squarely on the instrument, this test is quite useful in helping to dispose of gross interference.

The final waxing up of the case for trying in the mouth should exactly represent the intended finished dentures that both patient and operator may have a quite definite idea of what to expect; addition or removal of wax and modification of anterior tooth arrangement are best carried out with the patient present; keeping in mind, the while, W.Fish's excellent directions for the shaping of the denture "polished surfaces"; i.e., that all buccal surfaces of the upper denture should look downward and outward, the labial flange being kept
sufficiently suppressed to avoid pushing the lip out under the nose. The lower buccal surfaces should look upward and outward, and while avoiding undue weight, the thickness of material in the buccal pouch region should be sufficient to preclude lodgment of food within the pouch whence it is almost impossible to remove it with the tongue; the labial region between the bicuspids should be kept as thin as possible, and the lingual surfaces of both dentures so shaped as not only to preclude possibility of dislodgment by the tongue, but that the stabilising action of that organ in counter to the buccal muscles during mastication and phonation be developed to the utmost.

Conditions in the excessively resorbed case require that every possible aid to stability and restoration of function be not overlooked; as the ideal case requires that nothing be neglected that may preserve the ridges and keep them in the ideal class.

From this point procedure is the same as in all full denture construction; testing for evenness of contact on both sides, testing for correctness of the compensating curve, also for lateral and protrusive balance; always recognising the economy of not hesitating to spend the time necessary to remove the lower cast from the articulator, remount with carding wax check-bite taken under minimum pressure, rearrange the teeth, and have the patient return for final check in the mouth before proceeding to finish the dentures.

It is at the 'try in' stage that provision
is made for any extra relief required over such areas as the mental foramen or a particularly prominent muscle such as the superior constrictor of the pharynx may be. A piece of thick blotting paper is cut to the required size, lightly pressed over the spot in the mouth, the trial denture inserted, pressed down, and removed; invariably bringing the mark away in position; if this marking paper be brushed over with wet jewellers' rouge and the trial denture pressed down on the cast, the area requiring relief may be outlined and covered with heavy tinfoil, of which the edges have been chamfered off; securing in position with a cellulose cement will insure the relief remaining in position during processing.

Remounting the finished dentures on the articulator is also time well spent; slight tooth movement during processing may be detected more readily than in the patient's mouth, thus eliminating a possible source of trauma. A final milling in with carborundum and liquid paraffin paste in the patient's mouth is another item to add to the already long list of detail; but, as McEuen (97) says, "it is the little things that count". The sum of the 'little things' is what makes for success as far as skill, judgment and interest in our work will permit.

CONCLUSIONS.

Excessive alveolar atrophy may be diagnosed by visual, digital, and Roentgenographic examination of the oral cavity revealing the absence of residual alveolar ridge, which may be accompanied by resorbed, pendulous, or hypertrophied ridge mucosa.

The absence of residual ridge and abnormal position of the muscles classed as 'border tissues' renders the making of stable artificial dentures a complicated matter.

The wearing of unstable dentures leads to more or less serious digestive troubles from inability to properly masticate solid food; while the effort to keep such dentures in position interferes with speech, and engenders a self-consciousness that reacts to a greater or lesser extent on the nervous system, enhancing adverse systemic conditions.

Predisposing causes may be mitigated by:

1. Maintaining the natural dentitions, deciduous and permanent, as far as lies in our power and present knowledge by ante-natal care, diet, oral prophylaxis, and preventive dentistry.

2. Obtaining and maintaining functional occlusal balance by conservative treatment, orthodontia, extractions, partial denture service, or whatever means may best suit the individual case.

Exciting causes may be countered by:

1. Attention to any systemic disorder lowering to the bodily resistance generally, or interfering
with mineral metabolism.

2. Conservative surgery, in which is recognised the value of preserving the maximum of alveolar bone with absence of scar tissue, as favourable to the support of the dentures to be subsequently worn.

3. Meticulous attention to the details of full denture construction, that such dentures may be in harmony with the biological tolerance of the tissues on which they rest; that they yield the maximum service in mastication by having the occlusal contacting surfaces of the posterior teeth shaped and arranged to reproduce the individual occlusal curve of each case, and conform to the mechanical laws governing all mechanical structures.

The approach to full denture construction herein detailed will yield dentures that will:

1. Eliminate the effects on the nervous system and appearance of the sufferer from excessively resorbed ridges and abnormal muscle attachments that usually follow the wearing of dentures made from a procedure applicable only to edentulous cases of the ideal class.

2. Accommodate a pendulous mucosal ridge, or any soft tissue surmounting the resorbed ridge, without distortion or over-compression.

3. Rest a little more heavily upon the secondary stress-bearing areas than upon the diminished ridge representing the primary stress-bearing area of the ideal case.

4. Clear hard areas, and other regions requiring
relief, sufficiently to prevent rocking of a denture or interference with blood and nerve supplies without creating vacuum areas.

5. Allow freedom of border muscle action during mastication, phonation, deglutition, and the physiological exercises.

6. Will, by the individual occlusal curve being recorded for each case, insure the maximum of efficiency and comfort to be obtained from artificial dentures. Provided that --

(a) the bucco-lingual width of the posterior lower teeth does not exceed the combined width of the primary and secondary stress-bearing areas:

(b) the posterior mandibular teeth are placed along the crest of the ridge:

(c) the occlusal surfaces of the posterior teeth, upper and lower, are so shaped that the laws of mechanics are not outraged when, with the upper and lower occlusal surfaces in contact, and under pressure, the mandible makes lateral and protrusive excursions:

(d) the lower anterior teeth are arranged over, or only very slightly anterior to the ridge, the under-lap and under-jet to the upper anterior teeth being such that thrust from behind forward, of the lower teeth against the upper teeth is impossible during mastication and phonation:

(e) the force of mastication falls distal to
the first - bicuspid, and mesial to the retro-
molar pads or tuberosities; units of sets
of teeth being discarded or added to insure
this distribution of force:

(f) the polished surfaces of the finished
dentures are so shaped that full advantage
may be taken of the tongue and bucco-
labial muscles as aids to denture stability.
CASE HISTORIES
Case 1. The writer tenders her own case history in justification of her interest in the excessively resorbed ridge case.

With teeth that were never strong, by fillings, crowns, bridges, and a partial denture replacing several teeth lost in an accident in young girlhood, most of the teeth, or roots, were retained in good working condition till the coming of the focal infection boom, and when muscle trimmed, all compound impressions and anatomic posterior teeth were at the zenith of their popularity.

With the insertion of a full upper denture conditions were tolerably comfortable; but with the loss of the lower teeth and insertion of a full lower denture the writer's troubles began, and multiplied.

Ridges that were reasonably well defined began to recede, necessitating frequent relining or replacement of the dentures, the lower being the worse offender; a certain amount of stability could be secured in the upper denture with gum tragacanth, and the hard palate saved the buccal tissues from trauma to a certain extent. With the lower denture however, as the ridge decreased in height the buccal and lingual flanges buried themselves in the soft tissues making mastication of even soft foods a positive torture, both from actual pressure and from trying to reseat a wandering denture entangled with food. Speech became difficult, laughing, or the various physiological exercises had to be carried out with the mouth closed lest the dentures escape. Constant whittling away of the lower denture flanges
gave temporary relief from trauma, but did not restore stability.

With each relining or new set of dentures the maxillary ridge mucosa became more troublesome, and gum tragacanth lost its power as a stabilising aid.

The 'muscle and tongue grip' stage of the excessively resorbed ridge case wearing unstable dentures, with attendant disabilities and effects on the nervous system, was well established when a chance remark quoted elsewhere led the writer to try reduction of the bucco-lingual width, and height of cusps of posterior teeth as a measure of relief, in what was something more than an edentulous state, a veritable malady in her own case and in an increasing number of denture wearers presenting for treatment. That a specialised method of securing impressions was an indispensable item in denture restorations became evident, and the technique herein proffered was gradually evolved, recognising these cases as the result of cause and effect, and deploring the fact that having once become established, the antrophied ridge cannot be restored; but -- its incidence may, up to a certain point, be prevented.

The illustrations appended demonstrate the degree to which atrophy has progressed.

Fig. 59, Roentgenographs of half the mouth; the maxillary residual alveolar ridge is so little in evidence that the floor of the antrum has practically only the oral mucosa as a protection against pressure; while the mandible is of the type
in which it is difficult to tell the upper border

**Fig. 59.**

of the bone from the lower.

**Fig. 60** shows the diminished maxillary mucosal ridge and a state of almost taurus palatinus of the maxillary suture.

**Fig. 60.**

In **Fig. 61** the lower cast had to be tipped, throwing the bulk of it out of focus to show the pencil marked superior constrictor of the pharynx running forward as a stout band beyond the region of the second molar, and joined, near its insertion very close to the crest of the ridge, by two well defined slips from the tongue. The pain from having these fibrous bands pinched between the bone
and the denture can be intense, subsequent ulceration
and actual sore throat being often followed by a

Fig. 61.

rise in the body temperature.

The extreme flatness of the mandible and
the degree of resorption of the maxillary ridge,
including the tuberosities may be gathered from the
casts on an articulator, Fig. 62.

Fig. 62.

Figs. 63 and 64 illustrate the general
arrangement of the teeth and shaping of the polished surfaces.

**Fig. 63.**

**Fig. 64.**

The depth of overjet and the fact that flattened posterior cusps may be used without sacrificing the aesthetics are shown in **Fig. 65.**

**Fig. 65.**

This case of extreme resorption may have had a predisposing cause in an allergic tendency manifested by hives in childhood and urticaria in adult life; that the main cause, the immediate exciting cause, was trauma, from anatomic teeth with interdigitating cusps there is no shadow of doubt in the writer's mind.

The dentures featured (Figs. 63, 64, and 65), were constructed on duplicates of casts developed
from impressions taken over three years before, the fit demonstrating that atrophy had not progressed in that time; whereas formerly, six months was the longest life of any denture, sometimes much less.

That the technique as described, and followed out in detail will yield stable comfortable dentures is daily experienced by the writer; the dentures in question, worn continuously for nine months, permit the wearer to laugh, cough, yawn, engage in conversation, or perform any of those movements with lips, cheeks, and tongue in which the dentures are in any way concerned, as well as masticate any but very tough food without conscious, or even subconscious thought that the dentures might become unseated.
Case 2. Miss M. 60, presented, on her medical adviser's instructions, complaining of numbness of the lips and chin, tingling sensation spreading from the nose to the cheeks, drooling saliva, and inability to control food in her mouth; loss of weight, constant dyspepsia and general feeling of malaise.

The lips were puckered, felt leathery, and looked anaemic.

The inelastic state of the tissues combined with extreme tenderness of the lip mucosa prevented a detailed survey of the edentulous oral cavity; insertion of a loaded impression tray was out of the question.

Having already been prescribed diet and medication for the systemic condition, the local treatment advised was to foment the affected parts with hot packs, followed by massage with warm olive oil, twice daily; the use of an Epsom salts mouth wash several times daily, gradually extending the time taken in washing the mouth and exercising the lips and cheeks; to refrain from wearing the dentures.

At the end of three weeks the tissues were sufficiently relaxed to make a detailed survey. The maxillary ridge, edentulous for twenty-six years, showed excessive atrophy of both alveolar ridge and mucosa; the pre-maxilla had been carried forward and upward under the nose, the incisive papilla, markedly acentric, merged into the labial flexure, Fig. 66.

The palatal vault was very flat, one tuberosity had entirely disappeared, the other showed some remaining
form due to the presence of a residual root or

Fig. 66.

supernumerary tooth, Fig. 1, P.10, the patient refusing to have the area explored; there was no pterygoid notch on either side.

The mucosa was thin, pale and inelastic, with some sessile ridge tissue in the incisal region, which, with the labial mucosa was much less inflamed than before treatment began.

The buccal muscles were irregularly distributed toward the ridge crest in the bicuspid area, and round the site of the tuberosities, as may be seen in Fig. 67; the labial muscles were continuous with

Fig. 67.

what remained of the ridge mucosa.

Roentgenograms are shown Fig. 1, P.10.

The mandible offered a well rounded ridge
of medium height and depth from which the almost entire set of natural teeth had been extracted a year before. The retro-molar pads were well marked, and the retro-molar fossae restricted especially on one side.

The mucosa was less inflamed than at the first examination; the labial mucosa into which the anterior teeth of the existing denture had been carried still showed their imprint, but was much less swollen and inflamed.

The buccal-labial muscles appeared to be normally placed; the lingual groups were not quite so favourably attached, the lingual frenum being prominent with a high attachment; the gloss-mandibular glands were high and obvious. The saliva was thin, watery, and inconveniently abundant.

Roentgenograms showed a well marked anterior alveolar ridge with a lesser amount posteriorly; there were no residual roots.

**Fig. 68.**

![Image of dental X-rays showing the alveolar ridge and surrounding structures.]

The dentures being worn had been constructed less than a year before, the upper anterior teeth,
placed over the distorted alveolar ridge, pushed the labial tissues still farther out under the nose, causing continuous strain which was farther aggravated by the effort to keep an unstable denture in place with the lips and cheeks.

The lower denture, in an effort to secure an edge to edge bite and accommodate all fourteen teeth had been constructed with the six anterior teeth so far forward of the ridge as to give rise to the symptoms mentioned.

Dentures were constructed, following the technique herein detailed; the arrangement of the upper anterior teeth to allow even their tips to reach the lip line creating a problem in balance, as may be judged from the casts on an articulator, Fig. 69.

Fig. 69.

In the lower denture, to keep the width of the anterior teeth reasonable and allow their placement over the ridge, the first bicuspid on both sides was omitted, the patient having had, even with normal maxillary alignment, slight retrusion of the mandible. Fig. 70 shows the extent of error
in the position of the incisor teeth, Fig. 71 shows the depth of overjet necessary to their placement for ridge position and clearance of the upper teeth during mandibular lateral and protrusive excursions.

The patient was examined weekly for six weeks following the insertion of the new dentures; the gradual return of mobility and colour to the lips was evident; increasing control of saliva and food was reported, with lessening of the tingling sensation and improving health; the patient also finding great relief from dentures with which she could masticate and that did not require a continuous and conscious effort to keep in place.

This case may be classed as an example of:
1. Excessive maxillary atrophy and deformity due to mal-occlusion of a full upper denture with an almost completely dentate mandible over a long period.

2. Ignoring the need for providing relief over the palatine foramina, interference with blood and nerve supplies having given rise to the symptoms mentioned.

3. The complications that may arise from a faulty technique in so placing the anterior teeth as to cause partial paralysis of the lips from constant pressure, and to produce the profile shown in Fig. 72, a continual source of self-consciousness to an individual whose photographs clearly showed her natural appearance to be more like that in Fig. 73.
Case 3. Miss A. 60, was edentulous.

The maxillary teeth had been extracted at the age of twenty-two "because the front ones stuck out and the back ones were getting holes in them"; a vulcanite denture had been continuously worn from six months after the loss of the teeth.

The ridge was wide, deep, and well rounded; the palate was wide, with medium vault and well marked tuberosities.

The mucosa throughout, including the rugae was firm, resilient and glistening.

Muscle attachments appeared to be normal.

The mandibular teeth had been gradually lost, evidently from pyorrhoea, some having become so loose "they just fell out", or were removed by the patient herself.

In contrast to the maxilla, there was no ridge, alveolar or mucosal; in the molar regions what should have been the crest of the ridge was actually below the level of the muscle attachments on either side. Retro-molar pads or fossae were not distinguishable.

The mucosa was firm, glistening and healthy.

The bucco-labial and lingual muscles were separated by a very narrow strip of attached mucosa, the temporal tendon being inserted so far forward on both sides that the buccinators crossed in front of the retro-molar pads, obliterating them entirely. Lingually, on the right side, with the tongue drawn
back, the superior constrictor of the pharynx could clearly be seen running forward to about the first molar region, Fig. 33; with the tongue relaxed, this could be caught and moved from side to side over the mylo-hyoid ridge.

The saliva was normal in quantity and sufficiently viscous to promise considerable aid in excluding air from entering beneath the denture.

Roentgenograms, Fig. 74, showed the type of mandible in which it is difficult to distinguish the upper border from the lower in the bicuspid-molar regions; anteriorly there was a mere remnant of alveolus in the region of the right cuspid which had been retained till about a year before.

Fig. 75 shows the Roentgenograms of part of the maxilla in contrast to the mandible.
The upper vulcanite denture, worn for twenty-three years, was in excellent condition, fitted fairly well, but had several chipped anterior teeth.

The writer was not permitted to see the lower denture made four years before and to which the right cuspid had been added, but was assured it had never been very comfortable and had been useless for mastication.

Complete vulcanite dentures were constructed by the method detailed herein, an extra padding of tinfoil being secured to the lower cast over the raised muscle cord.

The narrowest possible molars were used and the first bicuspid omitted altogether to keep the force of mastication mesial to the second molar area and so avoid trauma of aberrant fibres of the buccinators as they passed over the retro-molar pads.

The final report, fourteen months after insertion of the dentures was that the patient could "eat anything" but is sometimes troubled by small particles of food working under the lower denture.

This case of excessive resorption may be said to be due to destruction of the alveolar bone by pyorrhoea combined with disuse atrophy of those edentulous spaces that were created by irregular extractions and neglect of partial denture restorations.
Case 4. Miss C. 43, presented with an edentulous maxilla and a mandible from which two right and one left molars were missing, all the other teeth being in good condition and well cared for.

The maxilla had been edentulous for fifteen years, and was typical of the resorbed alveolar ridge with flabby gum; one tuberosity had quite disappeared, the other was still in evidence, but quite movable; there were no pterygoid notches.

The palate was narrow and flat, the mucoosa being anaemic and tightly stretched; the ridge mucoosa was corrugated and inflamed.

The buccal muscles were irregularly distributed toward the ridge crest as far forward as the first bicuspid region, the labial muscles merging into the ridge mucoosa. A strong fibrous band stretched from the right tuberosity downward and backward, Figs. 30 and 31, most noticeable with the mouth widely open.

Roentgenographic examination showed typical ragged edged alveolar bone easily penetrable to X-Rays, there were no residual roots.

The denture being worn had been constructed with a very deep overlap of the anterior teeth, the lower six incisors striking the denture on closure of the jaws; on protrusion, with the incisors meeting, there was a considerable space between the posterior teeth.

The patient showed characteristic pursing of the lips and deep furrows running from the alae
nasi to the corners of the mouth; could not laugh, cough, or sing without the denture becoming unseated, and spoke usually with the lips and cheeks gripping the denture and the teeth barely separated.

The missing lower molars were replaced by a partial denture, and a full upper denture was constructed, the bite being raised sufficiently to allow not more than bare contact between the upper and lower incisors on protrusion, the weight of mastication being placed distal to the first bicuspid, the second molars being omitted to keep masticating pressure mesial to the tuberosity site.

The patient's delight with her improved appearance was gratifying to the operator, as was also the report at the end of six months that the dentures were giving every satisfaction, the patient being able to masticate ordinary foods, could indulge in most physiological exercises without the denture becoming dislodged, and was able to enunciate clearly and easily, a most important item in the life of a children's governess.

In Fig. 76 the palatal side of the dentures

Fig. 76.

is compared, the so called relief chamber having made
such a deep imprint on the tissues it is repeated in the new denture.

In Fig. 77 the tongue side of the dentures is shown, the way in which the lower teeth have been striking the denture is evident.

Fig. 77.

In Figs. 78 and 79 the depth of overbite is compared.

Fig. 78. Fig. 79.

The softening of the mouth lines may be noticed in the profile Fig. 80, in contrast to Fig. 81 in which the labial tissues are pushed out under the nose by too great a width of the labial
flange combined with shortening the vertical dimension.

**Fig. 80.**

**Fig. 81.**

It is not unreasonable to assert that this case, if not directly due to traumatic occlusion in the first place, has been exaggerated by the wearing of a denture demonstrating that such is taking place continuously; any predisposing cause must be sought in whatever factors led to such condition of the teeth that they had to be extracted.
Case 5. Mr. G., 45, presented complaining of an unstable upper denture and persistent hot, stinging pain in the anterior region.

The maxilla had been edentulous for six years, immediate insertion of a vulcanite denture having been made at the time of extraction of eight anterior teeth; a partial gold denture had been worn for some years.

The trouble complained of began shortly after the insertion of the full upper denture, gradually increasing in intensity; successive vulcanite dentures failed to relieve the condition which was eventually diagnosed as "rubber-sore-mouth" and a gold base denture was inserted, but the desired relief did not follow.

Examination showed a highly inflamed area extending between the second bicuspids regions, spreading back over the rugae; the alveolar ridge was diminished, the mucosa thick, spongy, and sessile; the molar-tuberosity regions were firm and well rounded, with normal mucosa only slightly inflamed.

The palate was broad, with a good vault, and slightly prominent maxillary suture.

The labial muscles were attached to the movable ridge mucosa, the buccal muscles being normally placed; deep pterygoid notches indicated normal muscle attachments in those regions.

Roentgenograms disclosed a ragged edged anterior alveolar remnant easily penetrable to X-Rays, the posterior areas, in contrast showing firm, clear
cut outlines.

The mandibular teeth were in excellent condition, two right molars and one left bicuspid having been lost and replaced by a well fitting and designed partial gold denture.

Originally this patient had had short teeth with marked overlap, which was faithfully reproduced in the several dentures tendered, the lower anterior teeth in all cases striking the upper denture behind the anterior teeth.

Using one of the vulcanite dentures, the material behind the six anterior teeth was cut out, the edges rounded off, and the patient instructed to wear this as little as possible, keeping it in place with gum tragacanth.

The frequent use of Epsom salts mouth wash, soft diet, and freedom from the thrust from the lower teeth reduced the inflammation sufficiently to allow an impression to be taken at the end of a fortnight.

In the construction of a new upper denture the procedure was that outlined for soft ridge cases; the vertical spacing of the jaws and the placing of the anterior teeth insuring against impact mesial to the first bicuspids. At the end of six months, the patient reported well satisfied, and quite free of pain or tenderness.

This is clearly an example of atrophy from traumatic occlusion, the inflammatory and painful condition of the mucosa being due to the wearing
of a denture made on a cast developed from an impression recording the pendulous ridge-mucosa in a distorted position; with the constant irritation from the impact of the lower teeth against the denture material.
Case 6. Mrs. L. C., 43, had suffered from caries from young womanhood, and at the age of thirty six had all her upper teeth extracted, a vulcanite denture being inserted three months later.

The lower posterior teeth were lost during the following few years, the anterior eight having been retained till eight months previously; a partial lower denture had been worn intermittently, then discarded altogether because of recurrent sore spots and inability to masticate any but the softest foods without discomfort.

Oral examination disclosed a state of extreme atrophy of both alveolar bone and mucosa; the tuberosities were merely indicated, a mirror-head search for a pterygoid notch encountering only dense unyielding tissue.

The palatal vault was flat, the pre-maxilla distorted upward and outward, the maxillary suture broad and flattened.

The mucosa was thin, pale, and inelastic, except for a small portion of sessile ridge mucosa in the incisal region which was spongy and inflamed; there was no sign of rugae.

The buccal muscles were irregularly splayed toward what remained of the ridge crest in the bicuspids region, the labial muscles merging into the pendulous ridge mucosa; on one side there was a fan shaped collection of fibrous strands running from the occlusal surface of the atrophied tuberosity site backward and outward.
The mandible was very flat from the second bicuspide region backward, some slight semblance of a ridge being apparent anteriorly.

The retro-molar pads were small but well defined and free from muscle encroachment.

The retro-molar fossa on one side though restricted, gave promise of tolerating some denture extension; on the other side with the tongue drawn into itself, a drum head tension of the mucoosa indicated the merging of the posterior fibres of the mylo-hyoid with the temporal tendon.

Posteriorly there was a narrow strip of static mucoosa when the cheeks were drawn outward and upward and the tongue drawn back; the anterior lingual, and labial muscles were not abnormally high, but the genial tubercles were unusually prominent.

The mucoosa was thin, tense, and anaemic except anteriorly, where it was soft and rather inflamed.

The saliva was thin, watery and not very abundant,

Roentgenograms of this case are shown in Fig. 2, page 10 and Fig. 6 page 13.

The dentures being worn were ill fitting and of the poorest type of workmanship, no effort having been made to secure proper occlusion.

The patient, unable to masticate solid food properly was anaemic, had lost weight, and was being treated as an outpatient at the Royal Prince Alfred
Hospital for gastric catarrh, a peptic ulcer having been feared at first.

There was the so characteristic indrawn lips and cheeks giving hard, ageing lines round the mouth, and the patient was in constant dread of attracting attention by the shifting dentures with the mouth even slightly open.

Vulcanite dentures were constructed on the lines laid down, the last report eighteen months later being most satisfactory; the patient had gained in weight, was bright and alert, and was again able to sing in the local Church Choir and Musical Society, interests she had been forced to abandon some time previously because of her unstable dentures.

Fig. 82.

Fig. 82 shows this patient singing a sustained note, the dentures remaining stable after fourteen months' wear; evidently atrophy had not progressed in that time.

The case may be classed as an example of both predisposing and exciting causes; the former being shown in the loss of the teeth from caries, the latter in mal-occlusion from too long retention
of the anterior lower teeth and inadequate partial denture restoration, the condition being accentuated by complete dentures not constructed on sound mechanical lines.
Case 7. Mr. F., 53, a clergyman, had been edentulous for six years. Complaining of vague abdominal pains, indigestion, and a general feeling of lassitude which ordinary treatment for dyspepsia failed to relieve, he was advised to have his teeth removed.

The nervous conditions resulting from the shock of having twenty six teeth extracted under general anaesthetic, and his feeling of helplessness with an edentulous mouth making him fear he would never be able to preach again, was probably responsible for the real cause of the trouble declaring itself, a chronic appendix!

Oral examination disclosed an extreme case of excessive atrophy of both ridges; the maxillary mucosal ridge was fairly deep, sessile, corrugated and inflamed, and without supporting alveolar bone; the tuberosities were merely indicated, the palatal vault was very shallow, the mucosa generally was thick, spongy, corrugated and inflamed.

That fibres from the buccal and labial muscles were inserted in the pendulous ridge mucosa was evident on drawing the lips and cheeks outward and downward.

Roentgenograms, Fig. 83 showed a very irregular alveolar outline, the floor of the antrum on the left side having only a trace of protecting alveolar bone between it and the oral mucosa.

The mandible was quite flat, the mucosa soft and inflamed, and the bucco-labial and lingual
muscles approached each other to within a very narrow strip of mucosa with periosteal attachment. The retromolar pads were large and irregular, that on the left having the masseter muscle in close proximity to the disto-buccal border.

The saliva was thick, ropy, and scant.

Roentgenograms failed to show any remnant of alveolar bone.

The patient complained that following the extraction of his teeth his mouth changed so rapidly that his dentures had to be frequently relined or replaced, and that he had reached the stage of finding it difficult to enunciate clearly when talking, and was in constant dread of a denture slipping out of his mouth while in the pulpit; mastication was so difficult from pain and movement of the dentures that he had been forced to take an almost liquid diet; his hearing was becoming impaired and there was a constant singing in his
ears with occasional attacks of 'earache.'

The patient, on holidays from the country, was advised to abstain from wearing his dentures for a few days, take a quite liquid diet, use an Epsom Salts mouth wash, and massage the oral mucosa as well as he could with his finger. Calcium and a cod-liver oil extract were also advised.

Dentures made according to the technique herein suggested for this type of case were inserted; the last report, a year later, was quite satisfactory; the opportunity was taken to adjust the occlusion from the greater settlement of the dentures posteriorly by grinding down the eight anterior lower teeth a little.

A rebased primary denture tendered as representing the size, shape, and colour of the lost natural anterior teeth showed, as may be gathered from Fig. 84, a maxillary ridge favourable to denture construction; Fig. 85 however, shows the second molars placed right over the tuberosities, a position not favourable to denture stability. Fig. 86 does not look as though it belonged to the same case, but
the writer was assured the dentures were made and

**Fig. 86.**

worn as a 'set'. The bucco-lingual width of the molars is quite half as much again as the stress-bearing area could have been at its most favourable stage, and the lingual inclination of large convex surfaces provided ample leverage for the tongue to act as a dislodging force; while the denture polished surfaces, in the molar-bicuspid regions particularly, offered considerable leverage to the buccal muscles in an unseating direction. Failure to carry the denture over the retro-molar pads had allowed it to sink into the mucosa mesial to those areas.

Considering all data, it is reasonable to class this case as one of extreme atrophy from traumatic occlusion; the size and shape of the posterior teeth and their disposition on the ridges being unsuitable to that particular case, the marked cusps and failure to secure balanced occlusion being additional factors causing instability of the dentures and irritation of underlying tissues.
Case 8. Mrs. C. H., 60, presented with the characteristic muscle and tongue grip of the floating denture wearer.

Detailed history was difficult to elicit, but one gathered that with constant care and efficient dental service the natural dentition had been preserved up to the age of forty-five by fillings, gold crowns and one small fixed bridge.

A sufferer from asthma from boyhood, increased severity of the attacks was ascribed to focal infection from the many devitalised teeth present.

In the hope of relief, the patient submitted to the extraction of about twenty-eight teeth under a general anaesthetic; the shock to a frail man necessitated some weeks' treatment in hospital, the asthma being worse than ever before.

The ensuing struggle with complete dentures and progressively resorbing ridges combined with increase in frequency and severity of the asthmatic attacks engendered a fierce resentment against the medical man who had insisted on the extractions and the dentist who had performed them. With his faulty natural teeth he had been able to masticate his food; with ever loosening dentures he had recurrent sore spots and dyspepsia from under masticated food added to his troubles, and had to remove the dentures altogether during attacks of asthma, as in his efforts to breathe, fear of the upper denture becoming lodged in his larynx amounted almost to panic.

The maxillary ridge had practically disappeared;
the tuberosities were fairly well marked, though cartilaginous and slightly movable, the pterygoid notches were deep and free from abnormal muscle attachment.

The palate was flat, very narrow, and deep antero-posteriorly.

The mucosa was moderately resilient over the palate, soft and corrugated over the ridge.

The buccal muscles were unevenly distributed toward the ridge crest, with well marked fraena in the bicuspide regions. The labial muscles approached the ridge crest.

Roentgenographic examination disclosed a characteristic serrated, irregular alveolar remnant, there were no residual roots.

The mandible was very narrow and flat, the retro-molar pads well defined, and the retro-molar fossae moderately deep.

The mucosa was rather thin but of even texture.

The buccal and labial muscles were not unduly prominent, quite an appreciable strip of attached mucosa lying between their attachments and the ridge crest.

The lingual muscular groups closely approached the ridge crest, the superior constrictor of the pharynx running forward to the second molar region on both sides, the left side being complicated by a well defined slip from the tongue.
The mylo-hyoid ridges were very sharp and prominent with decided upward curl; the genial tubercles were also very prominent.

The mucosa was thin, tightly stretched and palls.

The saliva was moderately thin and not over-abundant.

Roentgenographic examination failed to reveal any residual alveolar ridge.

The dentures being worn faithfully reproduced the large teeth with deep overbite of the natural dentition.

New dentures were constructed, all bicuspids teeth being used posteriorly instead of molars owing to the narrow arches and exceptionally large tongue. Some slight 'easing' of the lower denture was required during the first month, and twice during the first year the occlusion was adjusted, the lower incisors being shortened a trifle to compensate for a greater settlement of the dentures posteriorly; and now, after two years, the patient expresses complete satisfaction.

After a tactful approach during the construction of the dentures, this man was persuaded to submit himself to specialist treatment; tests revealed achlorhydria and sensitivity to, among other things, various pollens, feather dust, kapok dust, and animal fur. At the time of his very severe attacks of asthma and the condemnation of his teeth, he had been presented with an oppossum skin rug which he
either used on his bed, or thrown over the end.

Injection treatment followed, with banishment of the fur rug, kapok mattress, and feather pillows, horse-hair mattress and pillows being substituted.

It is reasonable to conclude that the treatment which reduced the asthma to a minimum, and under which the patient's general health improved markedly, was largely responsible for the arrest of the alveolar atrophy in the maxilla -- the mandible could not go any farther --, and that the allergic condition was primarily responsible for the rapid and progressive alveolar resorption, the condition being aggravated by dentures not complying with the biological requirements of the tissues, and not having been constructed on sound mechanical lines.
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Case 9. Mrs. L., 40, whose frail overcrowded teeth had had constant dental care from childhood, gradually lost her teeth, partial dentures having been inserted as required from the age of sixteen, till at the age of thirty four, the upper second molars, and cuspids all devitalised, and the lower six anterior teeth, all very much filled, were extracted, both jaws then being edentulous.

There was an allergic history; hives in childhood, urticaria and hay-fever in adult life, inability to eat many fruits, nuts, honey, or cheese.

The hair was scanty, the finger nails soft and easily bent.

In the edentulous six years the mouth had changed so rapidly that frequent rebasing of the dentures was necessary, the lower denture never having been very comfortable or serviceable.

The maxillary ridge had resorbed to a very narrow, shallow band, the tuberosities were merely indicated, the palatal vault was flat, and there were no pterygoid notches.

The ridge mucosa was thin and tightly stretched except for some soft tissue in the incisal region; the muscle insertions were not unduly close to the ridge crest, except in the labial region, where the incisive papilla appeared to be part of the labial fraenum.

The mandibular ridged was resorbed throughout, the retro-molar pads very small, but distinct,
and the retro-molar fossae extremely restricted.

The mucosa was soft and corrugated in the anterior region, with a tense, knife-edged ridge in the molar areas.

The buccal and labial fraena were well marked, extending toward the ridge crest, otherwise the muscle insertions left a definite, if narrow, strip for denture seating purposes. The mylo-hyoid ridges were sharp and prominent, several small bundles of muscle fibre could be detected tensing and flattening with the drawing back and relaxing of the tongue; the rest of the lingual muscles, though rather high in attachment did not appear to offer any difficulty.

Surgery was performed on the supraperior labial fraenum, a wedge shaped section being removed, one suture inserted, and a friar's balsam pad placed on the dried mucosa; the upper denture, dusted with gum tragacanth, keeping this in place for forty-eight hours. Healing was rapid and uneventful, the patient using Epsom salts mouth wash frequently after the removal of the suture for ten days, at the end of which impressions were taken on the lines laid down and the construction of new dentures proceeded.

An extra padding of heavy tinfoil was burnished and cemented to the cast over the knife edge portions of the mandibular ridge, and over the mylo-hyoid ridges before the trial and bite plates were adapted.

Bicuspid teeth were substituted for molars in the lower denture, the impossibility of cuspal
interference being assured by grinding off the cusps and deepening the sulci.

After forty-eight hours the patient reported more than satisfied with her improved appearance, and confident of comfort and service when she could succeed in overcoming the habit of nibbling with her front teeth as being the position of least discomfort.

The patient, having been advised to undergo tests and treatment for the allergic condition, reported fifteen months later that injections, followed by glandular and calcium administration had improved her general health, widened her dietary list, and given her "a new lease of life"; while her mental condition, freed from the fear of her dentures becoming unseated during talking, laughing, singing, etc., and being able to masticate in a normal way, allowed her to take up interests she had been forced to abandon.

This case of excessive resorption of both maxillary and mandibular ridges may reasonably be classed as resulting from systemic disorder, probably inherited; the condition being complicated by non-observance of the mechanical laws required to be recognised in the construction of her dentures.
Case 10. Mrs. N. C., 47, had worn full dentures with comfort and satisfaction for some years, the condition of both maxillary and mandibular ridges placing her in the ideal class.

On the lower denture becoming troublesome, examination disclosed a jaw condition that was later diagnosed as an adamantinoma of the left mandibular molar region, with every symptom of rapid development.

The left side of the mandible from the symphysis, up to, and including the condyle was removed, an external operation without involvement whatsoever of the oral cavity.

After the first shock of the operation had passed, the patient was able to wear her upper denture; as time went on however, the denture became so loose it had to be discarded -- it had ceased to fit!

On leaving hospital after thirteen weeks, and wearing a Gunning splint, the patient presented for denture restoration which was achieved by the aid of side spiral springs.

The maxillary ridge had narrowed by quite one half, but was still fairly deep; the tuberosities had disappeared altogether.

The alveolar ridge of the remaining half of the mandible had vanished, but the mucosa throughout the mouth was firm, resilient and a good healthy colour.

This change in the maxilla from a wide,
deep ridge, and well marked tuberosities could only have been caused by the systemic disturbance following the acute mental and physical distress inseparable from such a major operation.

Calcium medication has been carried out intermittently, and though the results cannot be said to be spectacular, atrophy has not progressed, as may be demonstrated by the comfort and efficiency of the dentures after almost three years' wear.

Here the writer would like to pay a grateful tribute to Professor Arnott, then Superintendent of the Dental Hospital; on being asked for guidance in this case, the patient was handed over to Dr. Richard Flynn who performed the operation; Professor Arnott having designed a silver splint which was left in place while the tissues were healing; and which, being in two parts, was easily removed through a small opening of the wound at the angle of the jaw, the patient emerging with a minimum of disfigurement. Professor Arnott also designed the Gunning splint worn after the silver splint was removed.

The prepared pathological specimen of the resected mandible was exhibited by Dr. R. Flynn at a meeting of the Australian Dental Association, N.S.W. Branch, April 24th, 1937; the near approach to the mandibular oral periosteum of the lesion demonstrating the narrow margin by which the patient escaped having the oral cavity involved when conditions would have been much less favourable to the preservation of the facial appearance, or to serviceable denture restorations.
Roentgenographs of half the maxilla are shown in Fig. 87, the condition of the ridge before the operation was performed, Fig. 88 being those taken four months afterwards.
Case II. Mrs. S. M., 70. The writer was called to hospital where this patient had been for about five months suffering from nephritis, from which complaint she eventually died.

Full dentures worn for many years had become so loose they could not be kept in position.

Oral examination showed excessive resorption of both maxillary and mandibular ridges; the mucosa was puckered, coarsely granular, anaemic, and very flabby.

The writer had had two opportunities in the preceding ten years of examining this patient's mouth and noting the well preserved ridges and healthy mucosa under most satisfactory gold base dentures constructed by the late Dr. G. M. Slate; visits to the writer being for replacement of a fractured anterior tooth only.

As these dentures had functioned for over twenty years without apparent change taking place in the supporting tissues, there must have been complete satisfaction of the biological requirements of those tissues, with balanced occlusal contact; incidentally the posterior teeth were of the pre-anatomic era design.

The tissue change resulting in instability of the dentures having begun only after the development of the acute stage of the malady, it is reasonable to ascribe the altered condition to the systemic disturbance consequent on the disease, accentuated possibly by the patient's age.
Case 12. Mr. B., 42, presented with the typically indrawn lips and cheeks of the floating denture wearer, the tongue being kept pressed against the lower anterior teeth giving a peculiar lisping speech.

Oral examination disclosed a maxilla, edentulous for five years, with firm, well rounded ridges, broad, moderately deep vault, marked tuberosities, and normal muscle attachments; the mucosa was healthy and resilient, the rugae being well marked; an ideal denture case Fig. 89.

Fig. 89.

The mandible, from which thirteen teeth had been removed by an over-drastic surgical method less than a year before was quite flat.

The retro-molar pad on the right side was fairly well marked, on the left the site was included in a dense scar that ran the length of the ridge, being wider and more ragged in the incisal region; the retro-molar fossae were restricted and the mucosa throughout was inflamed. The buccal labial muscles were attached within a very short distance of the scar, the lingual aspect of both sides disclosing a very prominent cord from the
superior constrictor of the pharynx running forward to the molar region, as may be seen in Fig. 90.

*Fig. 90.*

which also demonstrates the scar tissue standing up almost like a modified ridge; the rest of the border muscles, though reflected from very close to the scar-tissue seam were normal for this type of case.

Roentgenograms showed an uneven outline, but

*Fig. 91.*

with little or no alveolus except at the apices of the first molar roots' site; the level to which bone removal had been carried may be gauged from
this, Fig. 91; which also shows the upper central and bicuspide-molar areas in contrast with the corresponding areas in the mandible.

The saliva was scant, ropy, and inclined to frothiness during speech.

From the immediate insertion of the primary lower denture the patient's experience was one of shifting denture, recurrent sore spots, inability to masticate ordinary foods, dyspepsia and loss of weight. Difficulty in speaking made him dread interviews with people important from a business point of view, his self-consciousness being increased by finding that junior members of the staff of which he is an executive were mimicking his lisping speech.

The lower denture being worn, Fig. 92, had been 'eased' till the original outline was quite lost; the posterior teeth were a broad anatomic mould with tall cusps and a buccal-lingual width twice that of the possible denture stress-bearing area at its best, the lingual inclination and convex surfaces of the molars allowing the denture to be unseated by every movement of the tongue.
New dentures were constructed on the writer's specialised system, using narrow cuspless molars and bicuspids.

After forty-eight hours' trial the patient reported a tired feeling of the jaws, which was only to be expected from having had the vertical opening increased somewhat; a little relief was required over the superior constrictor of the pharynx on the left side; although the site had been padded with a thickness of No. 60 tinfoil on the cast. At the end of three months the patient again reported, expressing complete satisfaction; he had gained in weight, could masticate most foods, and was able to engage in conversation without fear of dislodging the lower denture or of not being readily understood from faulty enunciation; he was also able to resume smoking his pipe.

Comparing the casts of this case as shown on an articulator, Fig. 93, the maxilla having been

Fig. 93.

edentulous for five years and the mandible for less than a year, it was be reasonably assumed that the ridgeless condition of the latter was due to a too radical alveolectomy in the surgical removal of the
teeth, complicated by the wearing of a denture not designed to meet the biological requirements of the tissues on which the denture rested, in that provision had not been made to accommodate the prominent and tender scar tissue without compression or distortion; the border muscles were traumatised by the denture flanges, the posterior teeth were much wider bucco-lingually than the denture stress-bearing area, and the occlusal surfaces of both upper and lower posterior teeth were not designed and arranged according to the laws of mechanics.
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