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A SCIENTIFIC TECHNIC IN THE CONSTRUCTION OF ARTIFICIAL DENTURES IN WHICH THE LATEST AND MOST APPROVED METHODS HAVE BEEN ORGANIZED IN A METHODICAL SEQUENCE.

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WITH the universal acceptance by the medical profession as a whole, of the dependence of health upon the teeth and the recognition of the effect of the blind abscess which lies at the root of much disease, as well as at the roots of the teeth, the importance of the artificial denture has grown and must continue to grow in the future; for full or partial extraction more and more will be indicated for prevention and cure of infectious conditions.

It is then essential that the artificial denture shall receive more attention and

scientific treatment, that it may as nearly as possible approximate the natural denture.

No dentist will deny the fact that the most successful dentures constructed at present fall far short of the natural in masticating efficiency, which, in the last analysis, is the most necessary function of teeth whether they be natural or artificial.

The satisfaction of the patient should by no means be the only concern of the profession, for the average persons wearing artificial dentures are satisfied with far less than the best, because they

are educated by the profession not to expect much as regards comfort, appearance or service. We ourselves in the profession are "influenced by fashion, convention and tradition," but when some epoch-making dentist succeeds in changing the fashion, we all wonder how we were ever satisfied with these conventionalized imitations. To realize that this is a fact, we need only to think of some of the epoch-making changes that have come about in our own day thru the efforts of such men as Bonwill, Snow, Walker, Green Bros., Haskel, Wilson, Gysi, Williams, Giffin, Hall and many others who have contributed to the evolution, and who prove to us that the artificial denture has not reached its present important position in prosthesis by any decided leap but by a progressive development of unconscious processes, which are generally elemental and momentous.

Whether the methods taught in the schools today are scientific enough to meet the needs of the average practitioner, is doubtless an open question but that the average practitioner is dissatisfied with the technic in vogue is no longer a question, but a fact. I have come to this conclusion in confidential talks with hundreds of dentists in numerous conventions, societies and study clubs, tho to be sure, these men are not the rank and file of the profession but the better, more ambitious men, as is evidenced by the very fact that they attend these meetings, to voice their dissatisfaction with present methods and their desire to improve them.

Our service demands more than the expression of esthetic feeling, its greater value is utilitarian. Artists of every period have accepted the aphorism that "the height of art is to conceal art" and this aim we should adopt in our work, for design and construction in artificial denture like design and construction in architecture, may be classed both as fine art and industrial art, in proportion as

the dentist succeeds in disguising artificiality and attaining maximum efficiency.

I believe that the average dentist is both willing and anxious to be successful in the best sense of that word, that he is anxious to be fair not only to himself but to the patient,—the trouble is he does not know how to accomplish this. I believe also, that the real reason why so many men fail to improve themselves and their work is because they give too much time and effort to production based on a pecuniary consideration and consequently they depend upon unvaried routine in all cases, failing to take advantage of new methods and discoveries which the leaders of the profession are constantly bringing to light.

If all of us were geniuses or took up our work for the love of it, there would be no necessity for definite technic, but in all walks of life the leaders are few and the followers many, hence, when so much depends upon results a clear setting forth of procedure in minute detail is absolutely essential to success.

It has been my ambition to systematize a technic in which every step shall be definite and teachable and logical. No clearer concept of the following of this process has been presented than that emanating from the pen of Dr. Orton, who says: "Technic may be likened to the road we might choose to reach a certain place; if we have a clear idea of where we are going, we shall be in a more enlightened position to choose the road. In going thru a new country, however, it is safer to stick to the road with many sign posts; after we learn the country we may safely try the short cuts."

The great mass of travelers must use the road, to the few is it vouchsafed to venture the short cuts and never until the main traveled road, is so well known as to present no questions but almost as second nature to be followed step by step.

So with our methods of procedure, the steps must be clearly set forth so that the average men may understand each process in turn, and the language used must be forcible enough to make the description a word picture in which all the details are brought out in so strong a light as to be stamped upon the learner's mind. Let this technic be so simply presented that it may be thoroly teachable, that it may be absolutely mastered in all its details and followed in the minutest particular; only by so following technic, until habit becomes second nature, may a practitioner become an expert, able to go forward alone and then perhaps, develop individual talent or even genius.

The mastering of a technic simply means then, habituating one's self to do a certain thing in a certain way; it means a clear and definite plan of what to do and how to do it and makes for the easier and surer formation of the habit. Such habits are the only ones to be depended upon in the emergency of our daily practice.

With this thought in view I present the following technic based upon the necessity for the greatest efficiency in artificial dentures. This necessity is illustrated by the "experiments of Dr. G. V. Black, begun in 1893, for the purpose of showing the pressure that it was possible to exert on the human teeth, and which brought out the fact in a tabulation of results that in one thousand persons, the average force exerted was 171 pounds on the molar teeth but much less on bicuspid and incisors. The variation was from 25 to 275 pounds," whereas the greatest force it was possible to exert on the same machine where artificial dentures were worn was from zero to 50 pounds. "Force required in the mastication of meats showed that the most tender meats required 3 to 5 pounds pressure, while tougher meats required from 15 to 90 pounds."

While these experiments were made

by Dr. Black for the purpose of determining the resistance form required in cavity preparation, they have an equal application in determining the masticating limitations we may expect in artificial dentures, and suggest the need of a deeper cusp arrangement. This in my opinion, unquestionably allows of a greater masticating efficiency, which after all, I repeat, is the most essential function of the teeth, whether natural or artificial.

To begin with, it is absolutely necessary to make a careful mouth examination, noting with care the tissue conditions, muscle attachments and move-

Figure 1.

Shows the first (1st) step, the Hall method of taking impressions. Showing the taking of an impression with S. S. White's tray compound, for the making of an ideal tray.

ments, as well as the amount of absorption and the loss of facial contour. This examination is indicated as essential because the peripheral border of the impression is the first step in the restoration of said lost facial contour, the restoration of which is the patient's chief idea of a successful result and the attainment of which is usually his chief concern, tho but one of the features to be considered by a really conscientious dentist.

HALL METHOD OF IMPRESSION TAKING.

The first step in the impression is the fitting of a metal tray which closely approximates the area to be covered, care being taken that the borders at no point are high enough to raise the soft tissues or muscle attachments. An im-

pression is now taken with S. S. White Tray Compound in the same way that any ordinary modelling compound impression would be taken.

This tray compound is then removed from the metal tray, and trimmed to approximate proper facial restoration, care being taken to lower the margins so there will be no impingement on the muscle attachments and no displacement of tissue around the peripheral border.

Referring in particular to the lower impression it is necessary to have the buccal margins of the compound tray trimmed, so there is no impingement of

Figure 2.

Shows the compound tray trimmed to the proper size and form.

the muscles in the masseter region, nor overlapping of the cheek tissues.

In the lingual region it is necessary to make a very careful examination with the finger, the patient's tongue being raised to the roof of the mouth, thus plainly allowing the points of attachment of tissue to the bone along the floor of the mouth, to be felt.

If in doubt as to one's ability to properly trim the lingual margin of the lower tray, so there will be no impingement of tissue and yet retain all the lingual flange applicable to the case in hand, a simple way to get a perfect margin in this region is to trim the S. S. White Compound Tray slightly shorter than the required length and trace on this margin with Kerr's modelling compound, a small area at a time, then slightly heat over a fine point flame, dip in warm but not hot water, place

the tray in the mouth and hold it down with the fore fingers, having the patient raise the tongue to the roof of mouth, moving it freely in all directions. When the entire lingual border has been traced in this manner and thoroly chilled, first trim away all undercuts, especially in the region of the mylo-hyoid ridge, then trim the edge with a knife to the thickness desired for the finished denture.

In the buccal and labial region, the compound tray should be trimmed to about the thickness of a brattania metal tray. This affords a free and unrestrained outlet for the flow of plaster, allowing no bulky masses to accumulate so that in the proper massaging of the cheeks and lip, it is possible to obtain the desired contour of these regions. In all cases after trimming, the tray should be placed in the mouth and a test made for impingement of muscle attachments and soft tissues.

For successful results, certain qualities are essential in the plaster to be used in these impressions. Owing to the small amount of plaster which it is possible to use, in these impressions, it must have peculiar qualities of hardness, smoothness, a uniform working property and a not too rapid setting. I have been able to find but one plaster which satisfactorily fills all these requirements and that is Kerr's Snow White Model Plaster.

The time required for the setting is governed by two things: the temperature of the water and some chemical agent, the amount of which must be determined by the operator. Salt is the agent commonly used but personally, I much prefer potassium sulphate as it does not, in any way, deteriorate the quality of the plaster when set.

To mix it: use tepid water with a small amount of potassium sulphate well dissolved, then sift the plaster, allowing it to become saturated as it settles in the solution. After a sufficient amount has been sifted, pour off the ex-

cessive water and stir thoroly. You will now have plaster of a thin creamy consistency, from which, by waiting for it to slightly set, you may get any consistency you desire for the special case in hand, as the tissue condition of each mouth requires a special treatment in order to obtain the desired result, tho the plaster must never be sufficiently stiff to be resistable in moulding the peripheral borders. I speak of moulding in this connection, because I employ a method of drawing the attachments involved to their low point of attachment and then massaging the face along the peripheral borders of the impression to mould them to proper form.

Note particularly at this point the fact that the upper and lower plaster impressions are taken in totally different manners.

Let us first consider the upper impression. The upper compound tray being properly trimmed for facial restoration and lowered for muscle and tissue attachments, the undercuts sufficiently trimmed to permit the plaster to flow freely past, we now place a sufficient amount of plaster mixed to proper creamy consistency in the tray, (the patient having been previously instructed to completely relax the facial muscles) place the tray in the mouth and move to place with gentle wavelike oscillating guidance, until seated by the test of gentle touch. When the plaster is of the proper consistency, mould the borders by holding the tray in place with the fore finger of each hand and with the thumbs, draw the lip in region of the phrenum and the facial muscles in the region of muscle attachments, freely downward. Then, with the thumbs, massage the facial tissues gently along the peripheral borders of the impression to properly muscle trim and perfect the facial contour as well as to properly place the soft marginal tissues. After the plaster is sufficiently set, remove and examine it to make sure that you have an ideal

impression of the case. In case of failure. Either remove all the plaster from the compound tray and retake the impression or trim the plaster properly, (trimming out well in the muscle and phrenum regions) then soak it thoroly in water, placing in it a small amount of creamy plaster and replace in the mouth, using the same technic for placing tissues as before. This description covers the general technic used for this work with the exception of post-damming, tho, of course, it is impossible to consider here the many variations with which we have to deal in different cases.

POST-DAMMING: UPPER IMPRESSION.

In order to post-dam the upper impression, thoroly dry the plaster along

Figure 3.

Shows plaster impressions taken in compound trays.

the posterior border with cold compressed air, then, with a stick of Kerr's Modeling Compound, trace a small area across the posterior border up to the point of the hard palate, heat over a fine point flame, dip quickly in warm water, place in the mouth and, with firm and steady pressure, gently seat the impression in place. Remove and trim to the width and shape desired for the case in hand and if not satisfactory, re-heat and proceed as before until the desired result is obtained.

LOWER IMPRESSION:

Having your compound tray fitted, trimmed and tested, making sure it does not impinge on any of the movable tissues, and with undercuts sufficiently re-

moved to allow the plaster to flow freely by, proceed with the mixing of the plaster as for the upper impression. Having the patient with facial tissues entirely relaxed, place the compound tray with plaster of the proper consistency in the mouth and have the patient place his tongue in a high and forward position. Then gently move the tray to a seated position as before. Have the patient keep his tongue in the position noted

Figure 4.

Shows first stage of boxing impressions.

above, hold the tray in place with the fore finger of each hand about the region of the first molar, then with the thumb and second finger of each hand, draw the facial tissues upward and inward over the outside borders, to properly muscle trim and perfect facial contour as well as to place the soft marginal tissues. When the plaster is sufficiently hard, remove and examine it carefully. In event of failure, before removing the plaster from the tray, correct any defects in the compound tray which may have caused impingement or displacement of tissue. Always remove all the plaster in the lower tray in case of failure, before taking another impression.

TRIMMING INNER BORDER OF LOWER IMPRESSION.

After the ideal impression is attained by this method, you will have a perfectly trimmed outer border with the excess plaster drawn up over the top of the tray, but the excess of plaster around the inner border will be spread in thick rolls between the tongue and the tray, leaving the margins much thicker than desired in the finished plate. It is, therefore, necessary to trim away this excess until it represents the thickness you desire to reproduce in the finished denture, remembering that this border would be represented by a groove in the

Figure 5.

Shows impressions boxed in ready for pouring of cast.

cast for reproduction of this margin of the finished plate.

BOXING IN IMPRESSIONS.

We now have our impressions properly taken, with muscle trimmed and tissue sealed borders. It is, therefore, necessary to prepare and box these impressions in the proper form in order to reproduce in our finished plate from the cast, all the minute detail of the muscle trimmed and tissue sealed borders obtained in the impression. (Illustrated with slides.)

1. Impression shallaced and placed on a block of soft plaster to form a base.

2. Plaster trimmed to size of block desired for base and built up with plastaline leaving 1-16th of an inch of the entire peripheral margin of impression exposed, the plastaline forming a right

angle with the peripheral margin $\frac{1}{8}$ th of an inch wide.

3. Blocked in impression surrounded

Figure 6.

Shows cross section of boxed in impression and cast.

with wax to form a box and trimmed to the depth desired for the thickness of the finished cast.

Figure 7.

Shows casts taken from boxed in impressions, showing the preservation of borders for duplicating peripheral margins of impressions.

The advantages of boxing in impressions are three-fold, viz: to maintain and preserve the details of the peripheral

Figure 8.

Shows metal bite plates on casts.

border, to give proper size and thickness to the cast and to confine the material which adds pressure and gives greater density to the cast.

In order to obtain the best results, it

is necessary to use hard material for making the casts, such as Weinstein's Artificial Stone or Spence's Plaster.

MAKING BITE PLATES.

I myself use bite plates made of Ash's No. 7 Soft Tray Metal as used by Greene Bros. for swedging what they

Figure 9.

Shows metal bite plates removed from casts.

call Ideal Trays. I find a metal bite plate to be advantageous over shellac and gutta-percha preparations, because I am able to obtain a more perfect adaptation to the cast and they give a more positive result in obtaining uniform thickness of plates, not being affected by

Figure 10.

Shows putty swedger for swedging bite plates and all metal plates.

heat when pooling the wax and setting up the teeth. These bite plates may be burnished to the cast or, in difficult cases, swedged. Wax ridges are placed on them to complete the base plate, before taking the bite and are made to conform to an arch-shaped gauge which

insures their proper relation to each other when taking the bite.

TAKING BITES.

The upper base plate is placed in the

Figure 11.

Shows wax bites made on metal base plates; also bite gauge and hot plate.

mouth and the lip length determined, then the plate removed and trimmed to conform to the lip length and occlusal plane.

Figure 12.

Shows wax bite plates on casts.

The lower base plate is then placed in the mouth, the lip length determined and marked on the wax. It is then trimmed in the anterior portion to the line marked for length, left higher in the posterior region than in the anterior so that when the bite plates are placed in

the mouth together, the strike is first in the posterior region, thus keeping the planes apart about 3-16 of an inch in the anterior region. The lower bite plate

Figure 13.

Shows pooling of wax of the lower bite plate for taking bite.

is then removed and, with a heavy hot spatula, the wax is pooled to a watery consistency by imbedding the hot spat-

Figure 14.

Shows bite plates closed together after pooling of wax.

ula deep in the wax and passing it back and forth, from about the location of the lower lateral incisor to the posterior end of the bite plate. This is done on both sides of the lower bite plate, never

allowing the hot spatula at any point to melt the outer surfaces of the wax, leaving them standing as soft shells, forming a trough to retain the melted wax. The lower bite plate is now placed in the mouth and the patient instructed to bring the lips together, thus causing the bite plates to come together in their proper relation, the hard wax left in the region of the lower incisors automatically stopping the jaws at the proper rest point. It is safe to assert that the jaws will never be too close together if this method is used; it does not confuse

Figure 15.

Shows the right and wrong way to make marks for testing bites.

the patient, eliminates the liability of excessive pressure on either side of the mouth, thus removing one of the most common faults in our procedure of construction.

It is now necessary to examine the patient's profile, general contour of the face, and in particular, the appearance of the lips at rest. Proper facial contour should be established at this point and if advisable to close the jaws, to get the proper appearance of the lips, all that is necessary to accomplish this, is to remove the lower bite plate from the mouth and cut a notch out of the wax from lateral incisor to lateral incisor inclusive and to a depth from 1-32d to 1-16th of an

inch or whatever is deemed sufficient by the operator, to give a proper length of bite, or the working bite.

Re-pool the wax and proceed as be-

Figure 16.

Hall articulator with Jig for properly mounting Casts.

fore, then mark the median line and carefully test the bite.

This procedure first described by Dr.

Figure 17.

Case on Jig in Articulator ready for mounting.

Greene in his method of taking bites, (altho he used modelling compound instead of wax) gives the operator absolute and scientific control as to lip rest line and proper facial length.

In my experience this method, used in

connection with the jig designed by Dr. Hall for mounting cases in his articulator according to the Bonwill measurements of the equilateral triangle) obviates the use of the face bow.

MOUNTING OF CASTS.

These casts are mounted in the Hall articulator according to Dr. Hall's method by setting the center pin of the jig at the median line and occlusal plane and the posterior pins in line with the occlusal plane.

Figure 18.

Case mounted on Articulator.

SETTING UP OF TEETH.

Volumes have been written upon the proper alignment of teeth, altho I use a simplified technic for this work, the time allotted to this paper will not allow of its presentation. Under the circumstances, I can do no better than to refer you to *Prosthetic Articulation*, published by Dr. George Wood Clapp for instruction as to proper alignment for the setting up of the teeth.

WAXING UP TEETH.

This is a feature of the work which must be accurately and carefully carried out for with the facial contour properly re-established with bite plates, we are

enabled to place the teeth so as to obtain the best effect,—that of naturalness.

The thickness of the upper plate is obtained by the use of the 20 gauge

Figure 19.

Properly waxed case ready to tin-foil and invest.

metal used in the bite plate with an additional thickness of Kerr's Cast Gold Wax, 28 gauge; a second thickness of

Figure 20.

Shows method of tin-foiling palatal surface of plate when properly waxed for investing.

the same wax is used where metal relief is indicated for hard tissues. A No. 60 tinfoil perfectly conforming to this surface of the plate is then burnished over the palatal portion, leaving the edges higher than the occlusal surfaces of the teeth to engage in the plaster when invested.

The case is then invested and when packed, a relief of the hard areas on the cast is made with No. 60 tin foil and the entire surface of the cast covered with a very thin tinfoil made for this purpose. The tin covered cast is then

Figure 21.

Shows relieving hard mouth surfaces with metal and tin-foiling cast before vulcanization.

soaped, the flask closed and the case vulcanized.

By this method the greatest density and strength and the utmost elasticity of rubber is obtained, as it is vulcanized between metals and uniform palatal

Figure 22.

Shows comparison of vulcanization between metal and plaster.

thickness made thruout, thus eliminating the danger of warping in polishing, as both palatal surfaces of the plate come from the vulcanizer practically finished. Of inestimable advantage to the patient, is the fact that in this treatment of the

rubber, nature is so closely simulated that the least irregularity of surface is reproduced and the patient relieved from

Figure 23.

Shows spring press for proper pressing of rubber before closing flask.

the discomfort of the ordinary thick, smooth palate.

Figure 24.

Lower Plate with wax on ready to take test bite before regrinding.

TAKING TEST BITE FOR RE-GRINDING AND BALANCING OF DENTURES.

Taking the final test bite with finished dentures in the mouth, re-mounting on anatomical articulator and grinding to all the movements of the mouth with carbo-

rundum paste, make it possible to obtain a degree of accuracy and efficiency in occlusion and articulation never hitherto accomplished. This method, in connection with the incisal guide pin and cup as advocated by Dr. Hall, has made

Figure 25.

Shows plates after taking test bites preparatory to grinding teeth for proper balance and articulation after vulcanization.

possible the advanced and unheard-of efficiency of the deep cusp teeth.

We may readily see how slow we have been to receive and perfect the good things offered us by early geniuses in our profession by referring to the treat-

Figure 26.

Use of jig in mounting for regrinding.

ment of this subject by Dr. Greene, whose book was published in 1910. This was years after the invention of his novel scheme for re-cutting the occlusal surfaces of the teeth by mounting the finished dentures in the articulator and working them together, with carborundum powder placed between the teeth,

for the purpose of cutting out the bumps and inaccuracies.

TEMPORARY PLATES AND DUPLICATION.

In closing let me call attention to a most satisfactory technic employed for reproduction, where cases present for full dentures before the extraction of the teeth has been accomplished. A plaster impression is taken of the mouth prior to extraction, a record made of the patient's name, address, telephone num-

Figure 27.

Shows plates mounted on articulator for grinding.

ber and the shade of the natural teeth; both impression and record are filed. After extraction, the teeth are boiled and cleaned, placed in the plaster impression and a plaster cast made which retains the teeth in their original position. These casts are also filed and kept for the purpose of duplicating the tooth form, arch form, fillings, crowns and irregularities and are helpful aids in the reproduction of grooves and pitted surfaces, as well as for staining and shading the porcelain teeth for the denture to be made. They thus serve as guides for the building of both temporary and permanent dentures.

A surgical procedure is employed in the preparation of the mouth after extraction as originated by Dr. Carl D. Lucas, of Indianapolis, and presented by him in a paper before the First District Dental Society of Michigan and later published in the Michigan Dental Journal in 1916.

This procedure makes it possible for people to wear temporary plates with great comfort and satisfaction, after six

and ground to duplication of form. The upper central is then sawed out of the cast and the cast carved, so as to

Figure 29.

Shows position for grinding to proper balance in protrusive bite.

Figure 28.

Shows position for first grinding to balance in rest position.

or eight days from the time of extraction and their mouths are then as smooth and free from prominent points and undercuts, as they would be without this surgical preparation in four or five months.

In cases of people in public life who would be greatly inconvenienced by being without teeth for even this length of time, the following procedure is used: all of the teeth posterior to the cuspids are removed and the mouth surgically treated and allowed to heal for a week or ten days. Impressions and bites are then taken as for partial plates, the cases articulated and the teeth selected

permit the artificial tooth to be set in the same alignment and position as the natural tooth. Working from the center in

Figure 30.

Shows comparison of occlusion taken from a mouth with perfect natural teeth and artificial dentures made by method given in this paper.

each direction, all the teeth are treated in the same manner both above and below, making complete artificial dentures. After these dentures are vulcanized and finished, the patient is called, the re-

maining natural teeth extracted and the mouth surgically treated. The dentures are then fitted to place and the patient leaves with dentures comfortable to wear while the healing is being effected.

In all upper cases of this kind we use a large size Eureka Suction as no anterior gum is put in these cases at this time.

The patient is instructed to return in six or eight days for the removal of the sutures, at which time, with the denture held firmly in place, an impression is taken of the anterior portion of the mouth where the gum was omitted. The impression and denture are then removed, the Eureka rubber taken off and a cast is poured into the denture. A front is waxed in, flaked, packed, vulcanized and finished. The stud for the Eureka is then cut off and the temporary plate is complete.

The same technic is employed in the lower case with the omission of the Eureka.

I have found this method very successful and highly satisfactory to the class of business and professional people referred to above.

DISCUSSION.

W. M. Randall, Louisville, Ky.

The time for discussion has been cut short, and I will not go into the discussion which had been anticipated.

There are a few things or thoughts in the matter of digesting the subject which was presented to us yesterday afternoon, which occur to me more as a matter of history in prosthesis than as strictly technical work.

It seems that this department of our profession at this time has a responsibility before it that it never had before, and which certainly no other department in our practice at the present time, involving the foci of infection propaganda, and the restoration work in the mouth, has ever had before, and that we

should certainly arrive at a more definite viewpoint and a more widespread standardized technic, as a whole profession on this subject of denture or plate construction.

It is true, each man is going to put his individuality into the work and he is going to vary somewhat on little technical points, but the main points, namely impression taking, articulation of teeth, bite measurement and a point which was not brought out in the discussion yesterday, but one which in my own mind is equally as important as any of those three fundamental and important steps in denture construction is the vulcanizing technic, and the finishing process.

Let us consider in a reminiscent way, if you please, what has been done in the last twenty years in the way of standardizing the technic in plate construction. Take Dr. Bonwill as the beginning of anatomical articulation. The profession at that time recognized Dr. Bonwill as a heroic technician, a man who was promulgating ideas and bringing about a standard that no average dental practitioner would ever perform.

We later had the Snow method, and all of its technic of anatomical articulation, the Walker technic, the Christensen technic of taking bites, and bite measurements for mounting on the articulators. We have the several different types of articulators, and Gysi technic, and now the Hall.

What does it mean? All of these different standards of technic which have been advocated by these men during the last twenty years, are to the present time being practiced, some more than others, and some longer than others. All have something good in them. Some have more good things about them than others. Some of the very best points, as I see it, in some of these methods of technic are being entirely overlooked in the average practice and the entire method is being discarded as absolutely no good, because most of it did not happen to be good.

It seems at present that it is high time

that while all of these things may not altogether be good, yet most of them have some good features. It is a question of getting together. It is a problem of giving and taking, and being willing to sacrifice a little, something here and there in order to get at what might be recognized as the standard type of technic, that the average practitioner in dentistry over this country may perform to his own satisfaction and to that of his patients, that we might do the greatest amount of service to the profession, and more important than that, to humanity at large. That is our duty. We are not going to do the greatest good to the greatest number until we have arrived at a more universally recognized standard form of technic that the average practitioner of dentistry can perform. That, as I see it, is our most important duty at this time.

The manufacturer and the laboratories have had their part in the development of prosthetic dentistry. They have played no little part in it. But we all realize at the present time that we have a responsibility in this regard that we never had before. Let us get busy on our individual and community, study all over this country and not leave it to one or two or four or five men who are more especially interested in this work, but every fellow get to work, and the multiple community will result in a good that we have never had before in this line of work.

I know there are a number of men in this country who are interested in prosthetic dentistry and who have never given it any special line of thought or effort, who can have some good results and good clinics and hold out very much good in the matter of assembling some of the good points of these different types of technic rather than taking up a special line that may not altogether be good, and it would be a great deal better if it had some things out of it in an extreme

way, and some other things injected into it from other methods.

I have especially given some study to the Gysi method of practice and the Hall method. I think both methods have some mighty good things in them, and for all cases in my own experience, either method is not absolutely perfect. That is to say, that you can not take every patient and every mouth that comes along and get universally the same results, at least I have not been able to do so, altho it has been claimed by some of our men that with the Hall method, in the matter of efficiency in masticating food, it is universally satisfactory.

I believe the face bow indicates a more or less irregular position of the condyles where the condyle is lower on one side than the other, and there is an extremely abnormal position of the condyloid processes, as related to each other, in the horizontal positions; I believe that the face bow does some good, in mounting our cases on the articulator, and that we do get a more accurate antagonization in the mouth.

The longer the triangle from the condyle to the median line in proportion to the base of that triangle, in my own experience, the more necessary it is that we should modify in the Hall method, the depth of the over-bite and cusp. In other words, our older patients—it is true they get used to it in time, but when the dentures are first placed in the mouth, it is more difficult for them to become accustomed to them—especially if they have ever worn dentures of a different type, than it is if the face bow measurements are taken and the depth of the cusps made in proportion to the difference between the length of the triangle and the breadth of its base. In other words, the younger our patients, in the majority of cases, the shorter the equilateral triangle and the greater depth of cusp they will stand, and the longer the triangle, as the patients get older, the more shallow cusp, not a flat nor even a mediocre one, but somewhat

modified from the extreme condition, as we saw it in the cases yesterday—in my own experience has proven to be easier for the patient to become accustomed to wearing it than if the extreme cusp is made.

My time is limited, but I would like to bring up a point in the technical construction regarding the bases. I want to say at this point that we believe conscientiously that the greatest salvation is going to come thru metal bases. Our old pioneers, back in the twenties, thirties and forties, received fees for their efforts that we have not been able to get since rubber came into use. It will serve the same purpose in resurrecing the old methods along that line more than it did before that time, and it will get us back into something which will pay us for our efforts. If we are going to make the very best dentures in vulcanite, there is a type of technic that I personally believe is important to us. We all recognize the strength of plaster, and plaster is more or less affected by the egress of moisture, and still the majority of us insist that we should boil our plaster to remove the wax, and boil it and heat it and press up our vulcanite; and what are we doing? We put it in the vulcanizer and vulcanize it, and immerse it in water, all the while saturating that plaster, and weakening it the more it becomes saturated.

For several years it has been recognized that plaster becomes stronger and stands more pressure as it becomes dried out; and I have used what is called the dry heat technic, a method of dry heat, using Wilmot's sterilizer. There are different methods of doing it—where you can shut off the steam from the water and have a chamber of dry heat. Put the flask in it and leave it at a certain temperature, which is registered by the thermometer; and when it reaches a certain point, the wax can be removed en masse and the flask is separated, and only the minimum quantity of boiling

water—with tin foil next to the plaster—will remove all the wax from the pins. I then use dry heat in warming the plaster previous to packing, and get the plaster thoroly dry. And when you pack the vulcanite against the warm moulds of plaster, it will lie just where it is put, and will remain there. You can more accurately pack. There is less excess of vulcanite. The plaster is getting harder all the while.

I prefer a vulcanizer which will keep the flask out of the water, free from contact with anything other than superheated steam above the surface of the water. In getting anything like an accurate registration by the thermometer, all the air should be expelled from the vulcanizer, and in vulcanizing the rubber should be out of the water, and with dry plaster in the flask, pressing it down and closing the flask completely, not at 212 but at 248, which is recognized as the fusing point or the most liquid state of vulcanite.

With this technic, with that maximum of the plaster in the flask, we have the minimum resistance offered by the vulcanite; we have the most perfect adaptation that can be obtained in the closing of the flasks.

The result is a less risk in change of the position of the teeth, the articulation of which is carried out so accurately, as was shown yesterday; and we do not want to run any risk.

I would suggest that you try this type of technic in carrying out the rubber cases. I am sure it will be most satisfactory to you in most cases used in conjunction with the tin foil on both sides of the vulcanite. There is a great deal in the strength of vulcanite, in its texture and in its elasticity, in the process of vulcanizing, which I could not attempt to describe at this time.

I want to commend everything which was given in Dr. House's paper. He is a most excellent operator and his type of technic will stand the test of time. I

do not say that it will do so in all cases, but it is worthy of your trial.

Norman S. Essig, Philadelphia, Pa.

After having listened with much interest to Dr. House's paper I conclude that as far as I am concerned, I can put my seal of approbation on the great bulk of its contents, and the points upon which I could differ are not sufficiently important to take the time away from the vital features of his essay.

It is not my purpose to dwell on the dental traditions and history which have been touched upon in the beginning of the paper, nor will it be necessary for me to go again into the subject of impression taking, except to say that for many years it has been my custom to make an especially swaged cup for each case that presents itself to me.

The method described today presents many advantages, except in some partial cases, especially in the lower mouth, and here the specially swaged cup, made either of air chamber metal brass or some material that is adequate for the purpose, can be used to better advantage. The principle, however, may be looked upon as identical, and the method described by the essayist as an evolution, being far in advance of any other in use for entire upper and lower cases.

The combination of an impression tray comp. and plaster of Paris is ideal, and the range of possibilities offered is unlimited. So that I can strongly advocate this method after having adopted it in my practice.

Impressions taken after the manner advocated by Dr. House places in the hands of the prosthesis, a plaster model which is absolutely accurate, and furnishes the foundation for a plan which should be marked upon the plaster model, and strictly adhered to thruout the consequent stages of the procedure.

Too much stress cannot be laid upon this plan, which should be drawn upon the model in blue pencil, after giving the case careful study, especially in par-

tial cases where clasps are to be used to give all or a part of the stability required. We are still far from a point where we can afford to dispense with this means of attachment, or allow it to become a matter of dental ancient history. In fact, partial dentures should at this stage of dentistry be assuming their proper place and importance in our efforts to serve our patients, and here let me say that I am firmly of the opinion that the clasp, and the partial dentures went out of use, in a broad sense, because they were too difficult to make, requiring too much time and skill to produce in metal, a swaged denture of a high standard of precision and excellence.

In view of the fact that as root work is not only an expensive procedure, but the number of roots which can be filled ideally are limited, we must have recourse to some satisfactory method of replacing lost organs of mastication, that those who are not in a position to spend large sums on removable bridges may also be served satisfactorily.

This can be done by means of the partial plate of metal or rubber, together with an oscillating clasp which adjusts itself automatically, and brings no stress upon the teeth which serve for the purpose of stability.

I have devised quite an assortment of varied forms of clasps, having a reciprocating or compensating form of movement, and these I find are a wonderful source of comfort to the patient, who is rarely conscious of this form of attachment, even when worn for the first time.

Let us stop at this time to consider just what is demanded of us. What is Prosthesis, and what is the nature of its component parts—and wherein have we fallen down in the past—and why? Let us begin at the first and fundamental step.

How many men systematize impression taking, or have anything but a

vague idea in their heads when beginning a denture of any kind? This is unlike any other department of manufacture, especially when the product is to perform an unusual service, composed of many intricate steps, each of which depends upon accuracy of the preceding one for its success, the finished product evolving itself into a work of art embodying facial restoration as well. This, gentlemen, is a very important service, involving all the artistic skill and talent we possess, and it should have its plan and specifications just as any other product in art and science.

We should not permit ourselves or others, whose finger skill is employed upon such work, to deviate from this plan. The success or failure, however, depends upon the accuracy of the impression. Therefore, the impression and the plane are the fundamental steps in the production of a denture of any kind.

This may require additional time, but the results will warrant it. Therefore, do not let me hear any one say that they can't charge enough to compensate them; for each man will get just what his work is worth, if he takes that stand in the beginning.

It gratifies me to know that many of the principles of Prosthetic Dentistry, that I have always regarded as vital to that branch, have been advocated in this paper.

Details in the construction of an artificial denture, which seemed destined to be spoken of but lightly in our textbooks, have been given the prominence that is justly their own. I believe, I have also had a hand in keeping some of these alive, and rejoice in the fact that others have been working along similar lines.

Broadly speaking, the essayist has outlined to us today a systematic, standardized method of impression taking, the different steps of which are in logical sequence. It is the inevitable evolution which generally appears when interest, etc., are at a low ebb.

The swaged trial plate and the record model, the finished temporary denture, made before the extraction of the teeth, I have used and have advocated all my professional life, and I am keenly alive to their importance, both to the operator and the patient. I believe I am one of the few men who has a collection of record models of an entire practice.

Facial restorations are so dependent upon these record models that their importance cannot be measured. The advocacy of this procedure was the subject of the first paper I ever read before a dental society.

I have been in the habit of making my temporary denture before the teeth are extracted, and have frequently had my patients come directly to my office from the extractor, to have the denture adjusted, if, indeed, adjustment was necessary.

After the shrinkage has taken place to the extent that the temporary piece becomes loose, I have but to use the plate as an impression cup, and run a bite over the teeth to insure their accurate replacement, and remake the plate. This is simple, easy, and very quickly done.

We must also remember that we are dealing with something that together with all that is found in juxtaposition to it, is a law within itself. The oral cavity, and each case that falls to us differs tremendously in its detail from the preceding one. This fact precludes the conventional, and forces us to treat the subject in a special way.

In the discussion of this paper, I feel that I shall not digress beyond the pertinent, if I treat the correctable method of impression taking as an eminently satisfactory one, filling a tremendous want, and bringing about a degree of accuracy hitherto unknown, and continue from this point along the lines which seem to me not only pertinent, but also requisite and necessary, lending itself and dove-tailing into the method described to produce the greatest results.

After taking the impression, and evolving the plan for the type or form of denture, our next step is the selection of the teeth to be used to replace those which have been lost, and restore the harmony in the mouth of the patient.

My purpose is, therefore, obviously to connect at the point to which Mr. House has brought us certain other steps, because I feel that by so doing I can contribute to a sequence of events, productive of wonderful results, and because this phase of the subject can no more be neglected than can the taking of the impression.

One word regarding the so-called anatomical articulator, and where its real place is in prosthetic dentistry. I am strongly of the opinion that we have been trying to mystify ourselves in the past, and have been looking thru the wrong end of the telescope in our effort to get at the facts.

As has been said, the bony structure, the articulating and functioning process of the maxilla and mandible, differ so widely in each individual case that it would be unscientific, to say the least, to try to place every one upon the same basis, inasmuch, as each patient brings with him his own truly anatomical articulator; why not make use of it to our own end? The only thing we demand of an articulator is that it maintains during the absence of the patient that which we have attained directly from the mouth of the individual.

I believe Dr. Hall's articulator will reproduce every movement the patient is capable of making, and some that cannot be made by a particular mandible. Furthermore, it is to me the pleasantest instrument upon which to work out the problem of articulation, on account of its great simplicity. The mystifying face bow, and the search for a condyle path, is beginning at the wrong end of the procedure, and completely ignores the importance of the occlusal planes

which are peculiar to the individual patient.

Let me lay stress upon the fact that to reproduce nature, and supply to our patients artificial substitutes which will at once be satisfactory and artistic, is not an easy or simple task.

The processes of nature in the same sequence must be maintained together, with and following an accurate method of taking an impression, which in turn must have subjoined to it a plan and set of specifications, so that the original ideas conserved by the prosthetist may be preserved and carried on to a satisfactory conclusion without deviation, especially when much of the actual technic may be in the hands of those who never see the patient.

In other words, the plan is to place the selection of artificial teeth, and their manipulation, both before and after their adjustment in the human mouth, as nearly as possible on the same basis as the natural teeth, and their evolution and development of form and arrangement in the human skull. Therefore, the formula for the method employed to bring about results of the greatest value and highest order should follow along and compare with the true scientific and physiological laws in order to produce by artificial means, results commensurate with those obtained by the processes of nature. Thereby a synthetic form and outline is obtained, bearing a direct relation to the combination of basal types, but retaining its greatest relation or resemblance to one of these which we call the base.

Again, like any other creative process, there must be a basis of operation upon which the structure is to be built, and which in turn is to form the basis of subsequent calculations. This is also true of the development and eruption of the natural organs of mastication. It would, therefore, be most logical to ask ourselves the question: Upon what *does* nature base her system, and what physiological process maintains in the nor-

mal human being with regard to dentition?

We find that the capsule from which the human teeth are formed, develops, matures and pushes itself into place, governed and limited by the surrounding bony walls within which this development takes place, and that the size and shape of the fully developed tooth, and its final alignment, is dependent largely upon the space allotted to it, together with the influence exerted by cusp formation. This is especially true in the case of lateral incisors, which are more likely to bear little relation to the type represented by the centrals.

Even a superficial summary of a part of Nature's methods will more than account for the fact that the human teeth are a law unto themselves, tho this digression eventually becomes almost rhythmical in method and recurrence.

It has been established as the result of systematic research that the teeth of man owe their present form to the blending of three primal or basal types, which in their purity conform to the rectangular, pyramidal and rhomboid, and which may be found thruout the world, regardless of race or environment.

Having taken these points into consideration, let us see how we may apply these conditions to the results obtained by the correctable method of taking impressions, and to the formation of porcelain teeth, and how absolutely dependent it all is on our ability to obtain a perfect impression.

In the selection of porcelain teeth for an artificial denture, especially in the case of edentulous persons, much time must be spent in the contemplation and analysis of the face. No man can quickly scan the face of his patient, and conclude at a glance just what type and arrangement is indicated. Therefore, any method which holds out such ideas, is misleading to say the least.

Any one who has been deprived of the natural organs of mastication for any length of time has generally worn arti-

ficial substitutes, and it is, therefore, always advisable that a consultation appointment should be given with the idea of studying the face, and noting the requirements of the case in order that a readjustment or a harmony be reestablished which will blend the arrangement of the artificial teeth with the lines of the face so that attention shall not be attracted to the fact that there has been a dental service.

It is undoubtedly true that often it is desirable, or that a face demands the use of a blending of the basal types to produce the required harmony. It is also true, alas, that this fact in many instances is either not recognized, or it is disregarded altogether in the selection and adaptation of porcelain teeth.

We may conclude that if we ourselves are to produce appropriate blendings as a result of the study of any given face, we can do so to a much better advantage by starting the procedure with a strong and pure type of tooth, and specializing a modification to suit the case. This is only what has taken place in the original condition, and many times what we regard as a harmonious condition is but a countenance whose identity has become established by reason of the natural arrangement of the teeth, and effect they have on the face and its expression. Therefore, while we must not neglect the individual tooth and its anatomic variations, we must regard the six anterior teeth as a unit. This is how nature has been able to use any of the three types whenever she pleases and still produce or maintain harmony.

Experience has taught us that nature at times disregards all rules, tho as time goes on there is a very apparent effort to readjust or harmonize the conditions by what may be termed an automatic readjustment, or an effort on the part of nature to harmonize. But when mere man assumes to supply these most important organs the task becomes more than complex, when all phases are con-

sidered, if it is to be done as well as possible.

If the study of bacteriology, or any other department of science, has been carried on with the same disregard of principle and detail as is noticeable in some of the departments of dentistry, we would, without a doubt, still be groping in the dark, and many of the wonderful results which have been attained and applied to the relief of mankind, would be still on the list of future discoveries.

A complete analysis of a face must be made to create a harmony of line, even tho this harmony be later distorted in the adjustment of the mouth, if we are confronted with deformity or physical limitations which may or may not be disfiguring, or again a condition which is often more difficult because there is no deformity at all.

These variations from the harmonious and symmetrical are what may be designated as "harmonious discords," and can only be recognized by the establishment of a bilateral symmetry accomplished by the comparison of the two halves of the face between certain established lines. Therefore, that portion of the face which is most characteristic, and at the same time nearest to the teeth themselves, should be selected, because this area is less affected by high lights, shadow, or style of wearing the hair, etc. The discordant element which enters into the question must be applied after harmony has been recognized.

For this reason the area I have established for my convenience, is from the eyebrows to the comsure of the mouth with the median line vertically thru the nose at right angles with the horizontal lines, which are parallel to each other.

It should be borne in mind that what we often select as an example of harmonious discord, or an individuality is but the result of a digression from the symmetrical and ideal, and the effect that such a condition must necessarily have on facial expression. Therefore, if possible, it is our function to restore this

unusual or characteristic individuality, and like all reproductions of Nature, it is an art of the highest type.

If it is not possible to restore the mouth to what it was originally, we may serve the patient and do ourselves credit, by restoring the organs of mastication in an alignment of the teeth, similar to that which is in the mouth of some one else, provided we do not distort or disfigure the lines of the face by so doing.

The patient will have to get accustomed to an unusual condition in any event, so that our efforts should be directed along artistic lines, and the old conventional regular alignment be discarded.

I should like at this point to revert to what I said regarding digressions from the harmonious. This particular phase of the subject sometimes becomes almost a local or sectional characteristic, and proclaims at times the part of the country from whence a person comes. This is amply exemplified in those coming from the north of Ireland, where a peculiar wedge-shaped arch and over-shot appearance is more than common. This peculiarity, however, may embody any of the types.

The two central teeth which may be said to establish the type indicated should be in conformity with the portion of the face confined within the lines described. And not only should the outlines suggested by this method be adhered to, but modifications of profile of the teeth should also be made to conform them to the general contour of the face.

A very logical explanation for the great variation in the lateral tooth, and the fact that in many instances that tooth does not maintain the type of the central teeth, is that in its developmental stage the room allotted to the capsule is often curtailed by reason of the robust character of the central incisors and cuspids. So that it might, therefore, be said of this tooth, that at least a part of its function is to fill the space between

its more vigorous neighbors, and also to blend or harmonize the lines of these dissimilar teeth whose form and function is widely different.

There is, of course, a typical lateral to be found in well developed dentures, which is an ideal companion to the truest type of central, where development has been ideal and uniform. Harmony, however, is not marred by the insertion of any type of lateral whose width is appropriate, and individuality is often obtained by modifying the lateral incisor to suit the case in hand.

The cuspid or canine tooth is a most important one, and great character or a lack of it, can be produced by the appropriate placement of these teeth, which no doubt have more than one function, to perform, apart from the fact that it has its use in the preparation of food, or, in the lower animals, as a weapon of offense or defense. It is also a great stabilizer, and by reason of its strong roots acts to reinforce the arch at a point where the roots of the adjoining teeth are widely different. Therefore, in maintaining the sequence of events, and the ideas around which these methods have been established, a typical and robust form should be adopted so that modifications at any point may be made, and the harmonious darning of the six anterior teeth maintained and completed.

Heretofore, we have been in the habit of filling a given space by selecting six anterior teeth with appropriate bicuspids and molars to suit the case. As a matter of fact, artistic effect is greatly increased by selecting the two central incisors separately, with a view to type, and the two cuspids which shall denote character, and after having aligned them on the arch, a modified lateral placed in position whose proportions are governed entirely by the space left, because by so doing we have only done what Nature does.

Inasmuch as artificial teeth of porcelain are the means by which we reproduce the natural organs of mastication

which are designed and arranged by an all-wise Creator, whose plan thru it all has been modified by man thru his failure to observe certain laws. We would do well to follow this sequence and plan in the system by which we select and arrange our porcelain substitutes, because we have to restore a condition, the responsibility for which must ever remain with that Supreme Designer, whose method will forever maintain, and whose wisdom we may not dispute.

Reverting to the discordant elements which must evolve in the process herein described, it might be well to dwell upon that phase of prosthesis a little more in detail.

We have said that harmony should first be established. This is true according to our formula, and is verified by the examination of crania which shows clearly the natural, physiological process.

Orthodontists claim that there is a method of calculation which will produce the normal arch and alignment in each case that presents itself. This would lead us to believe that nature established a harmony, and then departed therefrom. Let us, therefore, do the same. Let us select the teeth with a view to a certain distortion later which shall conform to the irregularities which confront us. We select the types we desire from any of the three basal forms, and consequently regard the face of our patient with the view to distort the form and alignment of the teeth selected, so as to produce a harmony of line and contour in keeping with the face, regardless of how irregular it may be.

We must determine whether we wish to produce an appropriate degree of age and wear by cutting the tooth at the incisal edge, by exposing the neck, or by a compromise of both.

It is only in rare instances that there is not considerable elongation in elderly persons, and unless there is a marked over-bite, occlusal wear is manifest to a greater or less degree. Approximal wear while not so apparent, is generally evi-

dent upon close examination of those fifty years of age or older.

The foregoing may be classed among the discordant elements in the process by which we will endeavor to keep pace with Nature.

The use of the articulator is of great service, provided our instrument reproduces and maintains the movements established by the mandible itself. It is capable of producing an occlusal wear by persistent attrition like that which occurs in the mouth, and which is limited and influenced by the habits and physical capabilities of the individual.

These movements are also controlled by the bicusps and molars, and the radius of action permitted them by their cusp formation and general alignment, which either allows or precludes clearance laterally.

It will be noticed, when we examine a mouth having a good articulation, that wherever a tooth has a marked projection in cusp formation a compensation for that prominence is made in its antagonist by an indentation, or a semi-approximal surface which is shared in good proportion by the two opposing teeth, forming little occlusal planes which are separated by the triangular ridges typical in bicusps.

It is just as much a part of our plan to follow nature at this point as in any other. Therefore, we must again reproduce natural conditions by making our masticating teeth also a reproduction of nature with all the proportions to the smallest detail of their formation.

Reproductions of this kind in porcelain produce the most wonderful results, and such teeth are free from the interlocking feature which is most objectionable to most patients. They also have a slight inter-occlusal space, due to cusp formation, within which food may be held in small quantities without keeping the jaws apart during mastication. This feature allows the patient to thoroly masticate, not merely mash or bruise the food.

Let me again lay great stress upon the fact that the one dependable and truly anatomical articulator is the combination of the upper and lower jaws of the patient. Inasmuch as great variation of form of the boney structure of the human head maintains in the human race, the individual, as he presents himself to us for a service, furnishes us with our only true guide to the correct relation of that particular mandible and maxilla.

The articulator must, therefore, be only an instrument to maintain movement and relation in the absence of the patient.

The jaws of an edentulous person have no path or track upon which to functionate or to guide them in mastication, as is the case with those who have not lost their teeth. Therefore, while it is possible for any one to get accustomed to an inferior form of denture, and in time get some degree of service therefrom, our plain duty is to come as close to the natural state as we can by following Nature. The results are just the difference between good results and results that are deficient. My experience has been that a greater degree of perfection is attained by following the methods employed by Nature in the creation and development of the organs of mastication, and the way they are placed in the mouth of mankind.

Dr. William A. Giffen, Detroit, Mich.

I understand that we are trespassing upon the time of the other division of this Section.

It is important for the welfare of the National Association that this Section be arranged properly each year, and that the program be given proper attention, and that proper officers be elected, to get the best results for the dental profession. The election of officers has to take place before the next division of this Section comes on.

So I want to assure you that I gave to the paper of the essayist due consideration; I studied it carefully, and what

in my humble opinion was the right thing to say, I have put down on paper. It will be published probably with the other discussions in *The Journal of the National Dental Association*. Those of you who are interested in this subject—and I see there are many; I never saw such a fine audience before. It looks as tho this phase of dentistry is going to receive a great deal of attention in the future—you will be able to see it in *The Journal* when it appears. I am not going to take up any of your time. We have received a great deal of information.

There is one thought I want you to take home with you, and that is this: there is not any short cut to the successful making of dentures. You must arrange a definite technic if you expect to receive the most accurate results possible, and the thing for you to do is to work it out for yourselves. You have Dr. House's technic, and there are many others which have been given here, and which have appeared in *The Journal* in the last few months, in the *National Journal* and others; so that when we come next year we will try to have a more systematized method of procedure. I thank you, gentlemen, for your attention.

(The discussion referred to by Dr. Giffen is as follows:)

I feel very much pleased, and in no small degree honored, by being called upon to participate in the discussion of such an important phase of dentistry.

After preventive dentistry, denture construction is next in importance—a fact which our profession is just beginning to realize. Many more teeth are being condemned than ever before, and the fallacy of long fixed bridges has been recognized. There is a growing demand for full and partial dentures, which a large majority of dentists are incompetent to supply, except in a very rudimentary and crude way.

One of the two principal reasons for

this state of affairs is that the general practitioner believes that the fees usually obtained for this work are inadequate.

Dr. House fully eliminates this reason in his statement, that the thing to do is to prove to your patients that you are doing a better class of work than you are getting paid for.

The other principal reason pointed out is, that the majority of dentists do not know how to get accurate results.

Dr. House is eliminating this reason by laying down a systematic method of technic for denture construction, which, if followed, will enable the dentist to get accurate results.

It pleased me very much to see Dr. House give the men who "blazed the trail," credit for what they have done towards converting the art of constructing artificial dentures from a difficult and uncertain branch of dentistry into an interesting, scientific specialty, and particularly such men as Green, Williams, and Gysi. I would also add to that list, the Detroit Dental Manufacturing Company and the Dentists Supply Company of New York, as they have filled a very important place in the progress of prosthetic dentistry. We who are constructing dentures, owe a great deal to those men, as it is being made easier each year for dentists to become proficient in this work.

The subject under discussion is a broad one. I believe I can do no better than to emphasize a few important steps which the Doctor did not dwell upon and which he probably left for others to discuss.

A systematized technic which will give definite results should be the aim of all who construct dentures. The writer is thoroly convinced that a standardized technic of denture construction would be a great help to the dental profession, and as an evidence of his enthusiasm in that direction has had constructed motion pictures, depicting the various steps (which, by the way, were the first motion pictures constructed demonstrating

operative technic)—a technic which was the result of years of clinical study and of testing of the methods of other prosthodontists using what in his judgment was the most simple, practical and accurate technic for each step. This technic was fully demonstrated at the last National Dental meeting at New York by the prosthodontia section of the Detroit Dental Clinic Club.

The first step in this method of procedure (and one which the Doctor did not dwell upon) is to make Study Models of each case, as an aid to making a proper diagnosis of the requirements. This furnishes us with the opportunity of becoming familiar with the idiosyncrasies of the patient. (They all have one or more.) We can better estimate the difficulties to be overcome. It also demonstrates to the patient that you are giving the case careful consideration, and helps to establish the confidence of the patient that you are capable of giving sound advice when you explain to them what you propose to do and why you are going to do it a certain way. This is particularly helpful in those abnormal cases, where it is necessary to resort to surgical interference in order to make suitable foundation for the denture. This may mean the removal of abnormally placed teeth, reduction of connective and mucus tissue which has been caused by the unequal resorption of the alveolar ridge, or the removal of the portions of the alveolar ridge itself.

The "Study Models" can also be utilized for the purpose of making individual trays, which will require the minimum amount of material to make a correct impression. The individual trays can be made as an approximate impression over the Study Models with S. S. White Compound. Dr. Leberthals non-metal tray material, Dentists Supply Co. base-plate material or Detroit modeling compound, and numerous other materials; but with whatever material is used, the following steps are necessary if the denture is to be efficient.

First, the denture must be properly seated, with the strain on the hard and soft tissues equalized as nearly as possible when the stress of mastication is placed on the denture. Second, it must be the proper length in order that it will not interfere with the pharyngeal muscles during the act of swallowing or coughing, nor must it be so short that it does not pass to the distal edge of the hard palate, thereby having adhesion broken when stress is placed on the anterior teeth. Third, the rim of the denture should be adopted as perfectly as possible to the labial and buccal aspect of the alveolar ridge and extend as far over the ridge as possible without interfering with or placing undue strain on the muscular attachments to macillae, in order to take full advantage of all the retention we can in a given case.

Dr. J. W. Greene was the first to classify these principles of impression making, and to originate a technic which would obtain these principles, and which could be proved by testing the impressions in the mouth.

The writer has for nine years practiced this technic and is absolutely convinced that it is the most accurate, scientific method yet devised. Further, that it is the most agreeable method from the patient's standpoint. Various teachers are teaching modifications of this method as their own, which are all based upon the original Greene technic, and honor should be given where due.

There is no reason, however, why every dentist should not be able to develop a technic that will enable him to obtain accurate results. It does not make any difference whether in the case of two or more operators the technic is the same in every minor detail, so long as it is sufficiently definite to be certain that they will arrive at the same accurate results.

MODELS.

Regarding this technic for making models as laid down by Dr. House, I

have no criticism to offer, as it will undoubtedly produce accurate results, in that you will have a very strong and practically unchangeable model.

The model technic used by the Prosthodontia Section of the Detroit Dental Clinic Club is as follows: Select from the Greene ready-made, non-changeable, approximate metal model, an upper metal model that will approximately fit the upper impression, and a lower metal model that will approximately fit the lower impression. A sufficient amount of plaster to cover the inside of each impression and the ridge of each metal model is now mixed, and placed in position, the upper metal model is gently pressed to position in the upper impression and the lower metal model pressed into the lower impression, and the excess of plaster which has been squeezed out around the edges wiped off. When the plaster has set, the impressions should be stripped off and the models trimmed, being careful to leave the shelf portion which clearly defines the edge of the impression.

You now have models which are about 95 per cent metal, with a thin film of plaster over them. No model can be made that is less changeable, and they will not warp or break and will stand a great deal of abuse. There is no possibility of squeezing them out of shape by careless packing, flasking or vulcanizing; any kind of a metal base-plate can be swaged over them perfectly in a rubber block swager.

We use Kerr's Snow White Plaster for vulcanite work, and Weinstein's Stone for aluminum, gold and platinum work. The writer would also suggest at this point that the only safe way to make a cast metal base-plate is to make two models for each case, cast the base-plate on one model, and then swage it over the other model to correct any warping or change in shape which may have taken place during crystallization of the metal.

I believe the technic for making trial

or bite plates and taking the bite, as demonstrated in Dr. House's paper, to be the most accurate we know about. The writer has been using and demonstrating this identical technic of making trial plates for ten years.

The next point of difference is in transferring bite plates to antagonist. We still use the Snow face bow. The Gysi Adaptable is generally conceded to be the most scientific, but I believe the Gysi Simplex, improved Snow or Hall antagonizers are all right from a practical standpoint, provided you use the mouth itself for the final adjustment of the teeth, for the reason that even the Gysi Adaptable Antagonizer does not make allowance for the difference in the relation of the dentures between the position when stress of mastication is applied upon them, owing to the resiliency in the soft tissues upon which the denture rests.

The face bow is an accurate method of getting the correct relation of the bite plates or occluding rims to the condyles of the mandible and transferring same to the antagonist.

I would have been very much pleased to have heard a description of Dr. House's simplified technic for arranging teeth in the wax; I am sure it would have been very instructive.

When the occluding rims are properly contoured, the next step is to select the proper form and size of teeth to be used.

Regarding selection of teeth, I wish to quote a few lines from my discussion of Dr. Williams' work at the National Dental Association meeting four years ago; also a few of Dr. Williams' arguments, which I am firmly convinced are correct. I accept everything the Doctor has to offer in relation to his system of artificial teeth. It is a certain, definite and simple system, and truly revolutionary, as it eliminates guess work almost entirely, the teeth being the most perfect representations of natural teeth ever produced. The Doctor has referred to the mistakes of Nature, which may at least

be compromised in the selection of teeth of a different form from that of the natural teeth, in order to overcome the lack of harmony which previously existed. We should always bear this fact in mind, as frequently we may change the form of the dental arch and obtain a more harmonious result.

I have one criticism to make of the Trubyte teeth. It is my opinion that the Doctor, in his zeal to imitate Nature, has made the error that other designers of artificial teeth have made, viz., the bucco-lingual diameter of the lower molars is too great for the majority of cases. In a large percentage of cases the lower molars are lost long before the patient wears dentures. The tongue having nothing to confine it laterally becomes wider in this region, so that when molars as wide as bucco-lingually as the natural molars were are placed in a lower denture, there is not room for the tongue. This is a very serious fault in a lower denture. I know that we have always been taught that we should select broad molars so we may have more masticating surface. This I believe to be a fallacy, for the reason that a person has not as much power behind a denture as he would have with his natural teeth, and if the lower molars, say, a millimeter narrower than the natural molars, it would increase their efficiency. However, a little grinding and polishing will remedy this fault.

The temperamental or guess system was practiced because we had nothing better; so the best guesser turned out the best prosthetic restorations.

It is a mistake to believe that nature always produces teeth in harmony with face and features.

Those who believe in the temperamental theory always assume that when a man or woman of opposite temperaments marry, the children will be a blend of two temperaments. This may happen occasionally, but more frequently the children possess the most

characteristic features of both parents. In other words, one child may inherit the general facial peculiarities of the father and the complexion, color of eyes, hair and teeth of the mother. In another child these conditions may be reversed.

Again, to follow the illogical arguments of the advocates of the temperamental theory, people of nervous temperament should be distinguished by greater intellectual achievements and brain power generally. But the fact remains, that all forms of faces and physical characteristics are included among the ablest and most intellectual people of the world.

We now know that the three typical forms of teeth exist in all races—that it is Nature's secret design in human teeth. So it is possible to beat her in her own work; for Nature, working more or less blindly, makes many mistakes, while we, working intelligently, can avoid these mistakes.

Therefore, it would be very unwise to adopt a system of artificial teeth on the assumption that all natural teeth are in harmony with the organism, or to conclude that in edentulous cases no improvement of the natural teeth which the patient had is ever possible.

The aim in designing artificial teeth should always be to maintain character in the tooth by keeping its typical or class features dominant.

The most uninteresting and unattractive tooth is one in which the characteristics of all three primary types have become so blended that it has no distinction. The problem of restoring efficiency in mastication with artificial teeth is an engineering problem, which has been greatly simplified by that greatest of all dental engineers—Professor Gysi—when he worked out with such definite precision the antagonizing surfaces of the Trubyte teeth.

In conclusion, I would say there is no reason why we should not endeavor to set the standard of Prosthetic Dentistry

so far above the position it has hitherto occupied as to make it impossible in the future for any self-respecting dentist to continue working in old haphazard guess-method ways.

The truest economy and the surest way to success is to throw away any method which produces an inferior article, the instant a better method is discovered. The writer believes fully that no one man can convince the dental profession that any technic is the one best way to construct dentures, as you will find as many methods of doing this work as there are experts in this audience. As a matter of fact, the differences are not great and are chiefly imaginary; but they serve to befuddle the issue of the standard technic. So the only way to settle this question is to get the experts of the country to organize themselves into a

society to thrash it out and adopt as a standard technic that which the majority decides is the most simple, practical and accurate.

Dr. M. M. House (Closing the discussion): I am very sorry that the time of this Section is so limited, we hope to some time have it arranged so that we can have more time.

I have nothing to add more than to leave with you one thought, and that is that I feel this subject in dentistry the same as in literature, the broader vocabulary you have the better prepared you are for success. Give fair unbiased consideration and due trial in your own hands, to the various methods and improvements and your success will be in proportion to the knowledge you have of the work plus the earnest effort and care given each case.

I thank you for your attention.

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