

Journal

AMERICAN COLLEGE OF DENTISTS

IN THIS ISSUE:

Learning and Scholarship
and People *By the Editor*

Post-war Leadership in Dentistry . *H. L. Banzhaf*

Simplifying the Construction of the
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The Journal Forum *Harlan H. Horner*

American College of Dentists:
Reports of Committees
Minutes of the Meeting of the Board of Regents

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THE AMERICAN COLLEGE OF DENTISTS

Journal

AMERICAN COLLEGE OF DENTISTS

Presents the proceedings of the American College of Dentists and such additional papers and comment from responsible sources as may be useful for the promotion of oral health-service and the advancement of the dental profession. The Journal disclaims responsibility, however, for opinions expressed by authors.

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AMERICAN COLLEGE OF DENTISTS

Objects: The American College of Dentists "was established to promote the ideals of the dental profession; to advance the standards and efficiency of dentistry; to stimulate graduate study and effort by dentists; to confer Fellowship in recognition of meritorious achievement, especially in dental science, art, education and literature; and to improve public understanding and appreciation of oral health-service." — *Constitution, Article I.*

Announcements

Next Meeting, Board of Regents: Miami, Oct. 12-13.

Next Convocation: To be announced.

Fellowships and awards in dental research. The American College of Dentists, at its annual meeting in 1937 [*J. Am. Col. Den.*, 4, 100; Sep. and 256, Dec., 1937] inaugurated plans to promote research in dentistry. These plans include grants of funds (The William John Gies Fellowships) to applicants, in support of projected investigations; and also the formal recognition, through annual awards (The William John Gies Awards), of distinguished achievement in dental research. A standing committee of the International Association for Dental Research will actively cooperate with the College in the furtherance of these plans. Applications for grants in aid of projected researches, and requests for information, may be sent to the Chairman of the Committee on Dental Research of the American College of Dentists, Dr. Albert L. Midgley, 1108 Union Trust Bldg., Providence, R. I. [See "The Gies Dental Research Fellowships and Awards for Achievement in Research," *J. Am. Col. Den.*, 5, 115; 1938, Sep.]

Journal

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AMERICAN COLLEGE OF DENTISTS

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American College of Dentists

J. FOSTER FLAGG says:

With this I am permitted to see the end of a work which was commenced a quarter of a century ago. Its possibilities were then discussed, its probabilities foretold, but the view of its realization—then, to a few, an ideal of the far-off future—has been granted to me alone.

Although it is with grateful satisfaction that I now contemplate the gradual development of that which has been the medium for so much alleviation to suffering, so much bestowal of long-enduring comfort, and such incontestably beneficial results, it is yet with mingling of regret and pleasure that I cast it forth to do battle in the struggle for professional place and precedence.

I shall regret to see it frowned upon; I shall regret to see it misrepresented, and yet I can but know that it must meet with the common reception of those numerous predecessors which have waged war against "accepted doctrines"; but it is to me a pleasure indeed that I am, even yet, afforded ample opportunity for the practical demonstration of the truths of its teachings, and that strength is yet given me to raise my voice in its defense.

I ask for it a serious, thoughtful consideration, and sincerely hope that much good may come of it.

The author of the paragraph above is well known in the history of dentistry as the champion of plastic filling materials, particularly amalgam. (Ed.) Herewith follows his

*New Departure Creed*¹

- I. In proportion as teeth *need* saving, gold is the *worst* material to use.
- II. Neither "contouring filling" nor "separating teeth" has much to do with the arrest of decay.
- III. Failure in operations is mainly due to incompatibility of filling material with toothbone.
- IV. A tooth that can be so treated as to be satisfactorily filled with *anything* is worth filling.

V. Skillful and scrupulous dentists fill with tin covered with gold, *thereby* preventing decay, pulpitis, death of the pulp, and abscess, and *thereby saving the tooth.*²

VI. A filling may be the *best known* for the tooth and yet *leak badly*.

VII. Gutta-percha *properly used* is the *most permanent* filling material we possess.

VIII. A *poor* gutta-percha filling in its proper place is better than a *good* gold one.

IX. Amalgam *per se* is an *excellent* filling material

X. The use of "plastic" filling materials tends to lower that dentistry which has for its standard of excellence "ability to make gold fillings," but very much extends the sphere of usefulness of that dentistry which has for its standard of excellence "ability to save teeth."

¹*Dental Cosmos*, 20, 174-5; 1878 (March).

²This article was introduced in the creed because it was *textual authority*, at that time, that "unskillful and unscrupulous dentists fill with tin covered with gold, *thereby* causing galvanic action, pulpitis, death of the pulp, abscess, and *loss of the tooth.*"



LEARNING AND SCHOLARSHIP AND PEOPLE
BY THE EDITOR

Many definitions of the scholar and scholarship have been proposed by different men and no doubt at different times by the same man. However, that may be and whatever others may have been stated, Emerson has suggested, "in the right state the scholar is *man thinking*." That has to be the fact in any branch of learning and especially is it true within the professions. Dentistry then has its responsibility in providing opportunity for, and in developing scholars.

But in this connection Marjorie Hope Nicolson¹ has pointed out that in remembering this obligation to scholarship we must also be cognizant of our duty to the people. She says further that we must be "constantly aware that scholarship is not a 'couch whereupon to rest a searching and restless spirit; . . . or a tower of state, for a proud mind to raise itself upon; or a fort, for strife and contention.' Learning and scholarship should and must be 'a rich storehouse, for the glory of the Creator, and *the relief of a man's estate*.'"

Mill's dictum that each generation receives the culture of the preceding, raises it to a higher level and passes it on to a succeeding generation, has within our own time and to our own satisfaction been proved true. If members of the dental profession today will simply take the time to look back over the past 35 or 40 years and contemplate the changes and advances that have been made, they will realize that we are a group, no longer limited to the term of "tooth tinkers," but that on the other hand we have come to that time in our learning and in our experience, in which we are mentally qualified to take our places with all other fields of learning, and that it is ours to do it.

Referring for a moment to the title of this discussion, it will not be difficult for each of us to understand the implications involved in the term scholar or scholarship. Likewise it will be easy for us to

¹*The American Scholar*, 15, 12; 1946.

understand that such position is attained only by learning. But as we refer now not only to the statement of Miss Nicolson but to the further calculations of our own mental processes, we know that we must be realistic, that is to say, whatever knowledge one has in mind and whatever command one may have by virtue of his scholarship, it is useless unless it be of benefit to the people. To have the mind filled with the beauty and joy that come from knowledge and understanding but to fail to minister in some way to others who may need it, will make of that one not a scholar but a "dead sea."

Archibald MacLeish² in a thesis on Humanism suggests that in governing the world we must know how "to educate men and women to live in it (otherwise) we are quite literally lost. Lost not in rhetoric: lost in truth." He further states³ that "a philosophy of the education and life of man which has nothing to say to mankind about its life and education at the most critical moment in its recorded history is not a philosophy of man at all but a dilettantism with a pretentious name."

As has been said so many times, dentistry is a peculiar profession. It may be either one of two extremes. It offers to man an opportunity in scholarship equal to that of any other field but it also offers to man an opportunity in technical training, especially with the fingers, which may be considered as learning, and its ultimate service to the people manifest by little relation to scholarship. Hence the suggestion of this particular topic under which this is written: dentists should manifest more scholarliness. They should continue their learning but always remembering that the thing they have taken into their lives, either in their minds or in their fingers, must be of benefit to suffering humanity, and at the same time provide for the dentist that thing which he needs to give him an appreciation of the fullness of his own life. Isn't it in this that the philosophy of dentistry lies?

²*Religion and Our Divided Denominations*, published by Harvard University Press, 1945, p. 96.

³*Ibid.*, p. 98.

The History of Surgical Anesthesia by Keys is a good illustration of what is attempted to be expressed here: he has written under the heading, *The Development of Anesthesia* with an introductory essay by Leake. These two give the facts concerning anesthetics and anesthesia, and persons involved in their development. The next section consists of *A Chronology of Events Relating to Anesthesiology and Allied Subjects*. Here we have the plan behind the facts and events related to the subject. Then with references by subject and by author, Gillespie writes the last chapter on the *Future of Anesthesia*. This book gives you not only the historical facts in chronological order, not only personal relationships and physiological effects, but the writers also lead us to see its usefulness to man. Thus may easily be established the philosophy of anesthesia along with the science of the same. If one may parallel without plagiarizing, a History of Dentistry could be similarly developed, as a result of which might come the scholar and scholarship with increased knowledge (philosophy) and a concomitant greater usefulness to the people.

THE PIERIAN SPRING

In connection with learning, even in the field of dentistry, it may be well to turn back the pages of time or of history or of literature and learn again about the Pierian Spring. In looking back one will be sure to find this couplet:

"A little learning is a dangerous thing:
Drink deep, or taste not the Pierian spring."

The particular object in referring to the above is not that one may be recommended to undertake a deeper study, valuable as it might be, but rather to give greater usefulness to present day conditions as some might see them. Again originality is not claimed, but rather the suggestion comes from a little four-page sheet published by the University of California Press marked, "Issued at Intervals," under the title, *The Pierian Spring*. The last issue, Vol. 4, No. 4, September, 1946, contains the following thought which may be appropriate:

"We found—some support for a theory we've had in the back of our heads for quite some time—that there is a direct relation between the decline of romantic poetry and the rise of rich, beautiful advertising copy. The pale young men who once wrote of their unattainable loves and the mystery of life now sit behind desks and turn out advertising copy in praise of aphrodisiac perfumes, Scotch whisky, ice blue brassieres, automobiles, and other symbols of luxury. Possibly the change is a measure of our age."

Perchance here is a lesson for dentists and even their patients.

MEETINGS

For several years now it has been impossible to hold dental meetings. The reasons do not need to be indicated here. With the war over, we resume these again and so in America and in different parts of the world we find men getting together to increase their learning, to develop their scholarship and to increase their usefulness to man.

Among others, we take pleasure in calling the attention of our readers to the meeting of the Dental Association of Paris, November 21st to 24th. We publish this for some of our members might be interested in an effort to attend.

POST-WAR LEADERSHIP IN DENTISTRY

HENRY L. BANZHAF, D.D.S., *Milwaukee*¹

The aftermath of a war in modern times is usually quite as disastrous for the victorious as well as for the vanquished. Economic upheaval, staggering debt, unemployment, and social unrest follows inevitably for the victors, and all these plus actual privation for the losers.

For such scientific professions as dentistry, however, the results, while economically disturbing were in the past, professionally beneficial. The reasons for this were obvious. During a war, all of the facilities and services of the professions are extended to the utmost. Attention is called to deficiencies and therefore, efforts to improve are accelerated. During and after World War I and the period immediately following, dentistry experienced a remarkable period of improvement in professional attainment. Dental schools made noteworthy attempts to improve with respect to facilities, entrance requirements and teaching methods, and facilities for research began to be developed in a wider scale. The Carnegie Foundation, utilizing the genius of Dr. William G. Gies, published Bulletin 19. Dentistry acquired new importance. Moreover, the improved recognition, accorded the profession by the public in general and by the Medical profession in particular, was one of the striking benefits enjoyed by dentists in the nineteen twenties.

Now that the experiences of World War II have again called attention to dentistry and have given it new importance, will the dental profession seize the opportunity as it did twenty-five years ago, to secure wider recognition as an autonomous profession equal to medicine and co-operating with it? The present day problems to be met are admittedly of far greater difficulty than those following World War I. On the other hand, dentistry was never so well prepared to meet these difficulties as it is today.

¹Dean Emeritus, Marquette University Dental School.

Two groups of problems confront dentistry today. One is economic and has to do with its relationship to the public; the other is professional and has to do with scientific and educational advances. The two groups are closely interrelated.

The profession must and will co-operate gladly in well thought out, economically sound plans to give efficient, modern dental service and dental education to more people at the lowest cost possible. Such a plan is incorporated in bills S190 and S1099 introduced in the Congress last year, and which are to be combined and considered for passage in the near future. The profession must and will repel any plans such as are incorporated in bill S1606 now introduced in Congress which would provide only for treatments of an emergency character, but which would regiment and socialize the profession and eventually bring it under the control of politicians. The best interests of the dental and medical professions, fortunately, coincide with the best interests of the public. To bring this fact forcefully before the public will cost much effort and fortitude on the part of each individual member of the American Dental Association, which never was stronger or more able than it is today, to wage the fight, together with the American Medical Association, to save health service from the bureaucrats. The tactful and skillful presentation of dentistry's point of view on bill S1606 before the Senate Committee on Education and Labor, as reported on pages 743-754 of the June 1946 issue of the *JOURNAL* of the A.D.A. illustrates the fact that dentistry today is fortunate in the possession of socially minded, clear thinking leaders.

Dentistry, while developing an ever closer bond of co-operation with the medical profession, must forever maintain its entity as an autonomous field of health service. One such effort to assimilate dentistry by an important institution has already recently resulted in failure; another currently attempted has been roundly condemned by medical and dental educators and by physicians and dentists almost unanimously. There is little doubt but that dentistry will always remain a separate division of health service in this country,

since to suggest a combination with medicine is obviously impractical and an affront to logical thought and common sense.

Dentistry must still further develop its own program of research in close relationship with medicine whenever that is desirable. The past fifteen years have witnessed a marked interest in dental research, and the findings are beginning to attract public attention. The next ten years should see more state, as well as philanthropic, funds allotted to research conducted by dentists trained especially for this type of work. This will come to pass much sooner than expected if the proposed legislation sponsored by dentistry should be acted on favorably. This is thought to be extremely probable.

Physicians must, in the future, be taught more about the importance of oral health in order that they may co-operate more effectively with dentists. The creation of dental internships and residencies in hospitals, particularly those established for the treatment of the indigent and the hospitals maintained by the Veterans Bureau, will do much to bring about a spirit of teamwork between the two professions since it is the policy of such institutions not to discharge patients whose teeth are in an infected or impaired condition. The members of the dental staff in such hospitals have an unparalleled opportunity to educate the physicians employed in those hospitals concerning the importance of clean mouths and good teeth.

While dental residencies and internships are not feasible in most private hospitals, each should have a dentist on its regular staff. A dentist thus honored assumes a responsibility that is of great importance to the future of the profession. He has an opportunity through his hospital contacts, particularly at staff meetings, to emphasize the importance of oral health and to make his colleagues aware of the advances in dental service. Physicians can be taught to notice the general oral health of their patients particularly in heart, kidney, arthritic, or rheumatic cases, and upon releasing a patient from the hospital to be certain to include instructions con-

cerning needed dental services. Many of the best internists include such advice as a routine.

Occasionally dental and medical organizations should meet together when some matter of interest to both groups is to be discussed. Such fraternization makes for greater understanding and better service to the public. Popular exhibits organized for the purpose of mass education of the public in which dentistry will co-operate with medicine, pharmacy, nursing, and hospital administration, also results in better teamwork between the divisions of health service.

Another effective method which is organized in at least one medical school² is to require each Junior to attend a clinic in oral diagnosis, conducted in the dental school by dentists, for a certain number of hours and to hear a number of lectures on oral diagnoses and preventive orthodontics. Medical students who have had this experience are well equipped to co-operate with the dentist and to appreciate the importance of efficient, modern, and scientific service for their future patients.

Most dental schools and many medical schools are integral parts of universities where the two groups of students meet professionally and socially. The facilities of both schools should be placed, as far as is possible, at the disposal of all of the students. The faculty and facilities of a department of physiology, for example, can be utilized for the benefit of all of the students in the university who are studying physiology. While medical, dental, and physical education students should not take identical courses in physiology or other basic sciences, the students, using the same facilities and taught by the same teachers, will inevitably develop a spirit of co-operation as well as respect and understanding for one another.

The concluding statement in this short paper, that having to do with dental education, must be very brief. The present Council on Dental Education of the American Dental Association can be relied upon to improve all phases of undergraduate, post-graduate, and

²The Marquette University School of Medicine.

graduate dental education as quickly as is practicably possible. It is adequately sustained financially and can employ the most efficient and competent executives and assistants. It already commands the respect of the entire dental profession as well as all educational groups. The remarkable advances of the past ten years under the new Council, under the most trying war-time conditions will undoubtedly be multiplied many times in the next decade.

Should any emergencies require a firm attitude, the leaders in the Council together with the officers of organized dentistry can be expected to carry the dental profession and with it the dental schools through any crisis that may threaten. Dentistry must and will under these progressive and socially minded leaders assume a place in the modern structure of civilization with as little interference to its professional and scientific progress as is possible in these hectic times.

SIMPLIFYING THE CONSTRUCTION OF THE PORCELAIN VENEER CROWN¹

J. RAYMOND GILL, D.D.S., *San Francisco*^{1a}

Ceramics as applied to dentistry, as in industry and the arts, has passed through many transitional stages. These stages have often tended towards improvement. It is this initiative of man, this striving for improvement, his creative instinct, and his ability to criticize and to accept criticism, that has been one of his greatest assets.

Galileo said that "observation and experience" are necessary so that man may be able to express himself. In addition, man must have the desire to correlate his observation and experience in order to advance his knowledge.

If we visualize in retrospect the changes that have taken place since the introduction of ceramics in the field of dentistry, it is surprising to see the immense improvement in so short a time. When Fauchard first introduced porcelain teeth, they were accepted as a great innovation. They were much better than anything used previously and they appeared as natural human teeth to the dentists of that period, although to our more experienced eyes, they lack proper color distribution and anatomy.

The utmost credit should be given to Dr. Fauchard for his invention. But in this paper I want to give credit to the creative instinct, which is not satisfied with a new invention, but constantly tries to improve upon it. It is to this creative instinct in the men following Fauchard, that we owe the beauty of the porcelain teeth of today. These teeth now meet the exacting requirements of esthetics and harmonize with the characteristics of each individual.

Many men deserve recognition for their untiring efforts in the

¹See *J. Am. Col. Den.* 13, 82; 1946 (June).

^{1a}Associate Professor of Crown and Bridge Prosthesis, University of California, College of Dentistry.

Read before the Section on Partial Denture Prosthesis at the Eighty-third Annual Meeting of the American Dental Association, October 29, 1941, revised and brought up to date.

scientific advancement of porcelain and its use. To mention a few, they are Fauchard, White, Land, Spauldin, LaGrue, Vehe, Argue, Bryan, Clark, Felcher, Avery, Brock, House, and Thompson.

Shortly after the introduction of porcelain, dentists began to realize that it could be used for other purposes in the mouth as well as for dentures. More progressive men discovered its use for individual crowns with metal backing. The possibility of making a porcelain crown became a reality through the use of a platinum matrix. This greatly stimulated the use of porcelain in dentistry.

The increased use of porcelain in individual restorations increased a knowledge of anatomy, color, and color distribution. Here again "observation and experience" made men realize that porcelain teeth used in dental prosthesis, could be made, comparable to single restorations.

It may be apropos to mention a few of the improvements that make it possible for us to meet some of the exacting requirements of the esthetic qualities of porcelain work. These are the making of various fusing porcelains, improvements in their quality, the use of stains, and the introduction of translucent porcelain. With the exception of the translucent porcelain, these fusing porcelains come in a variety of hues and shades so that they may be combined to meet any individual requirement. Also we have a variety of stains which are opaque and can be used as modifiers for the porcelain and for the reproduction of any abnormality that may exist in the teeth. With the knowledge of handling these materials and the other fundamental principles required in the construction of the porcelain veneer crown, it is not the most difficult art to master.

OBSERVATION

To master the art of dental ceramics one must be extremely observing, must acquire experience and must be diligent in every detail. It is impossible to master this fine art without some failure and disappointments. These difficulties must be and will be overcome if the individual exerts sufficient perseverance. Again there is emphasized the importance of observation, experience, and per-

severance, which are the means to success. Let us consider these three fundamental principles individually and evaluate their importance as related to dental ceramics.

Too many look at teeth as a regular routine in practice. Too few take sufficient time to analyze each individual tooth so as to have a mental picture which could be discussed in detail after the patient has left the office. What educational value has observation? It trains one to observe the relations of typical forms of teeth and their harmony or lack of harmony to the individual. It may be found from studies that there is a slight variation in the typical form in the same mouth but still there is definite harmony. But if one alters this slight variation, he will change the character of expression and harmony will be lacking.

Observation of surface texture and what effect it has on light reflection, not only in one but in various positions, is of extreme importance. It must be noted that diffused reflection of light differs in tooth structure from that of porcelain. The dispersion of light from a natural tooth is determined by the position of the enamel rods to the source of light. This is not true with porcelain, because the small amount of crystalline structure is not located positionally as in enamel, therefore we must develop the surface texture of the porcelain to simulate as closely as possible that of the tooth.

The anatomical form of the tooth also has an effect on light dispersion. This should be obvious to the close observer; but those that have paid only slight attention to this subject will be surprised to know how important an effect anatomy has on the reflection of light on the tooth. Just visualize the difference of the reflection of an object that has more or less acute angles and that which has obtuse angles. This is then analogous to that of an extremely tapering tooth and that of an ovoid type. The reflection of light will differ in each, according to its relation to the source of light.

The effect of light reflection also affects the optical illusion of dimension. Again, if the angles of an object are more acute than that of another of equal width, the one with the more acute angles

appears wider. The anatomical form of the tooth also plays an important part in the color of the tooth. Color varies proportionally to the thickness of the tooth. The thicker the tooth labio-lingually, the more saturated is the hue; this is especially important at the incisal when constructing the porcelain restoration. Also the color distribution varies according to the typical form. We all know that the anatomical outline of the tooth is determined by the enamel. Therefore, in the more exaggerated type enamel predominates, and the enamel shade of this type has a greater predomination than that of the square or less exaggerated. It is obvious, therefore, that anatomy not only is an influencing factor in individual characteristics, but also has an extremely influential effect on light reflection. This apparently is true of the difference in texture of the surface of the tooth. When a tooth is irregular it appears more brilliant than one having a smooth surface. This is entirely due to the diffusion or the dispersion of the different lengths of light waves. When the surfaces are devoid of these irregularities they lack this brilliancy and appear dull. This is due entirely to the elimination of high lights which is caused by irregularity of the surface. Therefore, if these irregularities are not reproduced on the surface, the crown will appear a darker hue.

EXPERIENCE

It is not only important that one observe the conditions that exist in the mouth, but he must interpret his observations into the construction of the porcelain crown to reproduce the exact likeness. In this way he will have harmony existing when the porcelain crown is completed. The experience in reproducing what one observes enhances his desire to make a better reproduction. In this way he will scrutinize the various conditions that exist in different mouths. The wider the experience, the more perfect will be the reproductions. By correlating observation and experience, one will enhance his ability for practical application and make it possible to give better service to his patients.

COLOR SELECTION

This then brings us into the subject of color selection. From the above discussion it is obvious that in selecting the color of the teeth we must have a shade guide; one which is devoid of irregularities and one in which the surface is irregular, but both glazed at the same temperature. The thickness of the color guide should be approximately the thickness of the crown to be constructed.

Environment plays an extremely important part in color selection. Environmental factors that influence color selection are: the relation of the lip, in both smiling and rest position; the position of the teeth in the arch, whether some surfaces are exposed to the source of light more than others; the position of shadows case; consideration of the surface textures and the effect of stains and fillings, not to mention the most important, anatomy. One other factor may be considered, and that is the color of the gums and lip. This last is only an influential factor relative to the individual's selecting the color. If the individual selecting the color devotes too great a time, without intervals of rest, and the eyes become overworked, we have what is termed visual fatigue. The fact that the field which surrounds the teeth is in the red end of the spectrum, such as the lips and gums, green which is the complementary color of red will be seen in the tooth, if visual fatigue is not avoided. Therefore, the individual selecting the color should rest his eyes periodically to avoid fatigue.

There are two means by which color may be selected, one a color guide which is made by the operator from the porcelain that is to be used for the construction of the restoration; and the other is the use of the manufacturer's shade guide or tooth guide. It matters not which is used, providing an accurate interpretation can be made, and this involves experience.

Color distribution is of equal importance to that of color selection. If incorrect color distribution is interpreted, the restoration will not harmonize with the adjacent teeth. Distribution of color is determined to great extent by the typical form of the tooth. Further dis-

cussion in detail will be deleted for the author discussed this fully in a paper published in *J.A.D.A.* in December, 1940. It is obvious from the foregoing discussion that observation and experience is essential in accurately determining the color selection and its distribution.

CONDENSATION

There are various schools of thought as to the method of condensing porcelain for a restoration. These may be enumerated as the spatulating method, whipping method, gravitation method, and vibrating method with or without a confining matrix. Each method is claimed to obtain accurate results. There is no question that in the hands of an experienced individual satisfactory results can be accomplished by one of these methods. Some men use the combination of two or more of these methods and obtain satisfactory results. The writer personally favors the vibration in a confining matrix for various reasons. These can be found in previous paper published by the author and discussed by others.

The other problem that may be mentioned again which has two schools of thought is on the one hand, that of condensing and application of both the gingival and incisal color previous to the first firing, and on the other, that of the condensing of the gingival or dentine color, carving it to contour and then firing it before the addition of the incisal or enamel color. The latter is preferable because the control of the color distribution is more accurate than in the former. Also, if staining is necessary a more definite and greater accuracy of positioning of the stain can be procured. Whether one wishes to use the same fusing porcelain in the entire restoration, or use the higher for the dentine body and a lower for the enamel body is entirely an individual problem.

Various methods employed in the condensation of porcelain have been discussed, but it is the author's desire to present still another and one which is now in the field of dental ceramics. It does fall within that classification of vibration within a confining matrix, yet differing from any other heretofore considered. It is not to be

implied that this is a new invention, but so far as known it is the first time the application of a mold for the vibration of porcelain in the construction of a dental restoration has been used.

THE MOLD

In industry, ceramic art and the construction of porcelain teeth, this method has been employed to some extent. The method of casting or vibrating a material into a mold is not a new one, but the application of this method to individual crowns has not been used before. The greater part of this procedure differs so extensively from any other method that not to discuss it in detail would be an evasion. In the technique of this method the use of the working model has been eliminated. The reason will be obvious in the description of the technique.

If it were possible for patient and dentist, previous to its construction, to visualize how the crown would appear, one could eliminate many of the difficulties that confront him. If this were possible, one could determine more accurately and with less difficulty the exact requirement of the individual restoration. In other words, he would be producing a model, setting it in its exact position and environment. Then, the changes necessary to meet the esthetic requirements essential for harmony could be made. This is the method by which the true scientist analyzes each problem. He segregates it into individual parts, determines the function of each, and then assembles them into a functioning unit, thus assuring thorough understanding of the reasons why the completed unit or problem will function. For example, in the construction of a bridge or a building, a rough draft is made first. After this rough draft is analyzed and tested, a complete set of blue prints is made with most exacting descriptions and specifications which must be followed in the construction. How much attention do dentists give to analyzing their problems and to planning treatment? Probably it is too little and one of the reasons is that they depend on the working model to give an idea of what shall be done, or they put all the responsibility on the dental technician. The making of a crown on a working

model is not similar in any respect to that of the environment in which that restoration is to be placed. How many times have completed restorations been found not to fit exactly in the same position in the mouth as that on the working model? What was wrong? In most cases the die was not seated accurately in the impression, the result being that the finished restoration was either too long, in the labial or lingual version. Then grinding was necessitated in some places and additions in others. In this way all efforts for esthetic perfection have been destroyed. Mistakes and repeated failures force the development of ways to avoid them; in other words, experience teaches good lessons.

This method permits one to visualize the appearance of the completed restoration. It gives him an opportunity to obtain an accurate anatomical restoration and one that will harmonize with the adjacent teeth in its environment. It also eliminates complaint by the patient that the restoration is not exactly like his tooth or teeth. This is definitely true when two or more restorations are necessary. It gives the dentist an opportunity to show the fallacy, in some cases, of having the alignment of teeth altered by restorations rather than orthodontic treatment.

After a critical analysis of the tooth and its environment and a definite plan of treatment, of course the first procedure should be roentgenograms and study models. Also a labial model of the anterior teeth in centric relation is an excellent guide for both relation of spacing teeth and surface anatomy. Photographs will help immensely in reproducing the highlights and surface anatomy. It is advisable in some cases to take duplicate study models, make a preparation on one, then construct the restoration or restorations in wax. This is especially true where two or more crowns are to be made, and it will provide a more definite idea as to how the preparation should be made.

The preparation itself will not be considered here, but being completed, an accurate impression is taken. The results of the case will depend on the preparation and the accuracy of the impression.

The die should be made of amalgam or by copper deposition. On this die a tin foil (.003) matrix is burnished. This gives rigidity to the model and prevents distortion in placing and removing the model onto and from the preparation. (See Fig. 1.)

The model is constructed of either compound or hard wax or a combination of the two. The use of compound and a wax with a yellowish grey texture is most satisfactory. A hard wax with the same texture does well. The reason for this is that the compounds are too dark in color and do not give the high light, so that the anatomical form cannot be determined as accurately as on wax. Also, the application of wax is much easier than that of compound. The wax that is used in the enamel tone technique is the best. If a slightly harder wax were made it would be still more satisfactory.

This compound, or wax, or combination of the two is molded over the tin foil matrix on the die. This is carved to approximate size and then placed on the preparation in the mouth. Wax is added to complete the anatomical contour of the model. Occlusion is obtained and any variation of surface texture is noted. It is not the intention of the model to give the surface texture of the tooth in the reproduction. This must be done by hand-carving in the condensed porcelain.

When the model is completed, reproducing in minute detail every anatomical characteristic of the tooth, it should possess a definite relation to the adjacent and opposing teeth, and should harmonize with its environment. After the wax crown has been completed, a slight addition on the incisal is made. This is to allow for increase in length to permit a slight amount of grinding after the restoration is cemented into place to simulate wear like that which exists on the adjacent teeth. The reason for this is that on glazing, all surfaces round slightly and grinding is necessary especially on the incisal. (See Fig. 2.)

The model is then removed from the preparation and placed on the die. Tin foil, .003, is burnished over the model to a line just below the shoulder of the preparation on the die. The reason for burnishing tin foil over the model is to increase the size of the mold

to compensate for contraction of the porcelain during firing. The reason for carrying it below the shoulder on the die is to permit space for seating the platinum matrix when the die is placed in position in the mold.

A slot or groove is made in the die for a seat for positioning in the mold. Into this mold porcelain is to be condensed. Select a piece of metal with its sides bent at a 45° angle for the forms of the mold. The metal forms that the diatoric teeth are attached to make an excellent form. Cut these to about four or six millimeters greater in length than the length of the die plus the model. Three of these will be required; one for the lingual section, and one each for the mesial and distal sections. This will form a three sectional mold. Separate these forms so that the material used for the mold will adhere to them. (See Fig. 3.)

Place some hydrocal or stone on the one to be used for the lingual section. The bulk of hydrocal should be about $\frac{1}{2}$ " to $\frac{3}{4}$ " from the base of the form. The model and the die are placed in the hydrocal to the depth of about three-quarters of the thickness of the die, and the lingual surface extending downward. After the hydrocal has begun to set, trim, so that it tapers off from the die and model to the metal form. At least one-half of the die should be exposed. Trim to sufficient depth on the mesial and distal of the model so as to preclude a concavity in the lingual section of the mold. The hydrocal should be trimmed lingually to approximately two millimeters from the lingual-marginal ridge. The reason for this is to facilitate the removal of the condensed porcelain from the lingual section of the mold. After the hydrocal has set, this section is smoothed and should be devoid of any under cut especially toward its lateral surface. Separating medium is applied permitting the removal of the other sections.

At this time a vent should be prepared in which to pour the porcelain and through which to remove the excess water. This is made by applying wax on the center of the incisal and middle part of the labial surface of the mold, then connecting these two with a

string of wax and extending on over the incisal onto the lingual section. The entire wax string or ridge should be about 2 mm. in width and thickness, and about 4 mm. in length. (See Fig. 4.)

Hydrocal is placed in one of the other forms and in proper position on either of the sides, being careful that the lateral and lingual metal forms contact each other. The hydrocal should extend over and on the labial surface of both the die and the model, slightly more than half of its width. After the hydrocal has begun to set, it is trimmed to the center of the die and model. This is then smoothed and a separating medium is applied. The other section of the mold is made the same way as the first lateral section. (See Figs. 5 and 6.)

When the hydrocal has thoroughly set, separate each section and remove the die and model. The model is removed from the die and the die is replaced in the lingual section of the mold, and the lateral sections are assembled. Through the vent one can see the exact amount of space between the die and the mold which shows the thickness of porcelain in the finished case. (See Fig. 7.)

BURNISHING THE MATRIX

Care must be exercised in burnishing the matrix because the seams must not allow any possibility of porcelain being vibrated into the crevices which would make it difficult to remove after the completion of the crown. This is always true in vibration in a confining matrix.

A piece of platinum of proper length that will circumscribe the die should be cut. Its width should be approximately 3 mm. greater than the distance from the incisal to the shoulder of the die. One mm. should be allowed to overlap at the incisal and 2 mm. beyond the shoulder. The platinum is placed around the die, permitting the two ends to join on either the mesial or the distal surface. The seam, therefore, will always be on one or the other of these two surfaces, and on these surfaces will be the greater bulk of porcelain. The two ends of the platinum are then pinched together with # 122 flat beak pliers. The platinum is then removed from the die and a small piece of pure gold 36 gauge is placed in the seam, and heated with a blow-

torch. The platinum is again placed on the die and the excess on the mesial or distal should be trimmed to about $\frac{1}{2}$ mm. from the joint. The excess is then folded toward the lingual and the platinum is burnished to place. Always start from the incisal and burnish toward the shoulder. This prevents tearing the platinum at the shoulder. A slit is made at the incisal opposite the seam. The lingual flap is burnished toward the labial and the labial flap toward the lingual. The platinum is then removed from the die and heated to a white heat. This permits the pure gold to flow throughout the entire seam, sealing it so that no porcelain can get in the crevices during condensation. The apron of the matrix should be of uniform width and should follow the peripheral outline of the shoulder. The matrix is then placed on the die and burnishing is completed. Shellac should be placed over the shoulder so that the porcelain is permitted to separate from the platinum during the firing. (See Fig. 8.)

POURING THE PORCELAIN

The mold may now be prepared for pouring the porcelain. That portion of the mold which will form the contour of the crown, or in which the porcelain is poured must be protected by some medium which prevents the absorption of water from the porcelain and to prevent the porcelain adhering to the surfaces of the mold. Several types of media have been tried but the one that has given the best results is tin foil. Therefore, tin foil of .0005 in. thickness cut in small pieces is burnished over the three sections of the mold. It is only necessary to burnish tin foil over that portion of the mold that will form the outline of the crown. (See Fig. 9.)

The die with the platinum in position is then put in the lingual section of the mold. Then the other sections are assembled in their proper place. The mold is then placed and locked in a vise on the vibration instrument. The vibrator is one that can be purchased at any drug store and the vise can be made so that it screws into the vibrator.

PREPARATION OF THE PORCELAIN

The colors to be used for the dentine color are thoroughly mixed together. Whether one should permit the mixed batch to soak in water previous to its use may be a debatable question at this time. But one thing is certain and that is the batch should be thoroughly saturated so that each particle of porcelain absorbs its maximum amount of water so that better plasticity is obtained. Increased plasticity improves not only the working qualities of the porcelain but also its firing. Porcelain should be ground in a small agate mortar in water previous to its use. This increases its plasticity and working qualities and also gives a more natural texture in the finished result. (See Fig. 10.)

For the dentine color the high fusing porcelain is preferable. The mix of the porcelain should be of a creamy consistency. This permits a uniform flow of porcelain into the mold. A small portion of the porcelain is placed in the vent and with a light vibration is carried to the floor of the mold. Then addition of small portions of porcelain is continued while vibrating until the mold has been filled. Before any moisture is removed vibration should be continued for at least fifteen minutes. The excess water is then removed by means of some absorbent material. Vibrate before and after each addition of porcelain. Then, add more porcelain and vibrate. This is continued until no more moisture comes to the surface. The time that should be allotted for this procedure is about half an hour. If the water is eliminated too rapidly, the porcelain at the base of the mold will not be thoroughly condensed and will have a flaky consistency. The reason for this is, that in vibrating the removal of moisture too rapidly makes the upper part of the porcelain so dense that it will not permit the water from the lower portion to find its way to the surface. (See Fig. 11.)

After the porcelain is thoroughly condensed the two latter sections of the mold are carefully removed. To remove the condensed porcelain and die from the lingual section, the ends of the tin foil are lifted away from the mold. The die, with the condensed porce-

lain and tin foil is removed from the mold intact. The tin foil is then removed from the condensed porcelain. If an attempt is made to remove the condensed porcelain and die from the mold invariably the lingual part of the condensed porcelain will break away. (See Fig. 12.)

The excess porcelain on the labial, formed by the vent, is trimmed away. We have then made the contour of the condensed porcelain exactly as that of the model that we made plus .003 in. to compensate for the contraction during firing. We now trim the condensed porcelain to the outline of the dentine color as is shown on our color chart. This is to obtain the proper color distribution.

The porcelain is then placed in the preheated muffle and fired to the temperature for vitrification. This temperature is about 100° F. below that of glazing. At this temperature, full shrinkage is complete and the surface has a semi-glazed appearance. After removing from the muffle, it will be found that the porcelain at the gingival has shrunk away from the platinum approximately $\frac{1}{2}$ mm. The fired porcelain is replaced on the die and the shoulder of the platinum reburnished.

If stains are to be used the mixing should take place at this time in preparation for their application. They should then be applied to their position on the previously moistened vitrified porcelain. The space between the matrix and porcelain should be filled, condensed, placed in the muffle, and fired to the same temperature.

After removal of the fired porcelain from the muffle it is placed back on the die. A piece of tin foil .0005 in. is burnished on the lingual section of the model, to take the place of that originally burnished on the lingual section of the mold which was removed at the time the condensed porcelain and die were separated.

The fired porcelain and die are placed in position in the lingual section and the other two sections of the mold are then assembled. This is placed in the vise with the vibrator.

For the contour of the crown, medium fusing porcelain is used. This technique differs from any other, in that the enamel color of

porcelain covers the entire labial, mesial and distal surfaces of the crown. If a study of the histology of a tooth be made, it will be found that the enamel forms the contour of the tooth and if the tooth is exposed to various sources of light the enamel color is evident. Therefore, by placing the enamel color of porcelain on the entire surface of the crown, it will more closely simulate that of the natural tooth. It is well to bear in mind, in view of the above explanation, that it is advisable when selecting the dentine color, to select one slightly darker, or to darken it slightly when mixing your combinations.

The porcelain is then mixed to a creamy consistency, and small portions are placed in the vent and vibrated. This is continued until the mold has been completely filled. This is then vibrated for about 15 to 20 minutes before the excess water is removed. After this water is removed, more porcelain is placed in the vent and vibrated for a few minutes before the remaining water is removed. Add porcelain as required to completely fill the mold. Vibration and the removal of water should continue slowly until no more moisture appears on the surface. The mold is then removed from the vibrator and the two lateral sections are dissembled very carefully. The ends of the tin foil on the lingual section are separated from the mold and the condensed porcelain, die and tin foil are removed with great care. The tin foil is then removed from the condensed porcelain. A thin portion of the porcelain on the lingual may be separated from the lingual surface and be removed with the tin foil. This is of no disadvantage because no porcelain was removed from the lingual surface after the initial condensation, so that this surface is now as originally formed in the mold. It may be necessary to add on the marginal ridge, only to make it uniform in its anatomical design. This is done after firing and when the crown is ready for the final glazing.

The excess porcelain due to the vent is now removed. The only carving necessary is that for fine detail and for the marking on the labial surface for diffused light reflection. The porcelain is placed

in the muffle and the temperature is brought just to the point of glazing under a definite time control. The reason for not giving the porcelain a complete glaze is that the final and finished glaze will be procured in the next firing. (See Fig. 13.)

After removal of the crown from the muffle the platinum is trimmed to $\frac{1}{2}$ mm. from the shoulder. The crown is ready for a try-in. It will be a trifle longer than necessary but final adjustment will be made after cementation. If these procedures of the technique are followed in detail, no alteration or additions will be necessary. At this time you can determine the exact type of glaze that will be required to simulate that of the adjacent teeth and the firing temperature that will be required to obtain the desired results.

The porcelain is removed from the mouth and placed on the die. With a small stone the porcelain and matrix are reduced so that an accurate fit is secured. Also reduce the contact slightly to prevent too tight contact after glazing. The crown is washed thoroughly, placed in the muffle and heated to about 1500° F. to burn off any organic material adhering after grinding. A thin mix of porcelain is placed over the surface and brushed with a #4 wash brush. The purpose of this is to fill in any pores or irregularities formed in the grinding process. The crown is then fired to the temperature determined to obtain the desired surface texture.

After the proper temperature has been reached the current is shut off and the muffle permitted to cool slowly to a temperature approximately 400° F. or below. The reason for this is for proper annealing of the porcelain. We know that porcelain properly annealed is stronger than one that is taken out at a high temperature and subjected to a rapid cooling process.

The matrix is then removed and the crown is placed on the tooth to check the margins. In placing crown in position it will be noticed that the contacts are snug just as they should be. If the contacts had not been reduced slightly before the final firing, they would be too tight at this time. The reason for this is that porcelain expands slightly with that temperature sufficient for the proper glaze. Also

due to the fact that all particles are at their maximum equilibrium, there is a slight settling of the mass. This change is not sufficient to alter the contour or in any way affect the chemical changes to take place.

The inner surface of the porcelain veneer crown should be etched with hydrofluoric acid to permit the cement to adhere and interlock into the unevenness of this surface of the porcelain. (See Fig. 14.)

The crown is then cemented to place. The excess cement is carefully removed just before setting is complete. No grinding of the margins is necessary if the technique is carefully followed. The gingival portion of a porcelain crown should never be touched with stone or disc after the final firing if healthy tissue is to be maintained.

It is obvious, therefore, that observation and experience are essential to success. And it is therefore true that only through experience can we appreciate the importance of observation. This pertains to the practical experience by which one reconstructs in detail that which he sees in the mouth. The wider the experience, the more critical will be the observation.

It is clear then, that one cannot be really successful without experience. Too many lose confidence if the first attempt at reproduction is not successful. They then follow the line of least resistance and delegate the work to the laboratory.

This work can be done by the great majority of men if the method of procedure is simplified sufficiently. In dentistry as in industry and the arts, certain phases of the problem should be so designed that the less skilled can perform them, and the more complicated part be delegated to the more highly skilled.

It is with this in mind, that this simplified technique in the construction of a porcelain veneer crown is submitted. First, a definite model of the reproduction can be made before constructing the crown, and the other part of the work can be done by a technician or office assistant. To be more precise, the assistant can construct the mold, condense and fire the porcelain. The time required in trimming the porcelain for color distribution is but a few minutes. The

time involved in making the model is compensated for by the results obtained. Also the wax can be molded to contour in the environment in which it is to be placed.

By this procedure of condensation of the porcelain, uniform density can be obtained each time. This means definitely that a uniformity in firing, shrinkage, and other procedures in the construction of the porcelain veneer crown is produced in other cases.

Therefore, by simplifying the construction of the porcelain veneer crown, we not only obtain more accurate results but by following each step accurately, the process becomes a more uniform and simple procedure.

BIBLIOGRAPHY

- Andrews: Ceramic Tests and Calculations. John Wiley and Sons, 1928.
- Argue: The Porcelain Jacket Technique. *J.A.D.A.* 26, 1472-1479; 1939.
- Bastion, Charles: The Individual Unit Porcelain Bridge. *J.A.D.A.* 29, 1369-1373; 1942.
- Binns: Potter's Craft. D. Van Nostrand, Inc., 1922.
- Byram: Principles and Practice of Filling Teeth with Porcelain. Consolidated Dental Manufacturing Co., 1908.
- Capon: Porcelain Dental Restorations. Lea and Feiger, 1920.
- Clark: Color Problems in Dentistry. *Dental Digest*, 37, 499; 1931.
- Doxtator: Procedures in Modern Crown and Bridge Work. *Dental Items of Interest*, 1931.
- Felcher: The Art of Porcelain in Dentistry. The C. V. Mosby Co., 1932.
- Gill: Methods and Results in Condensation of Dental Porcelain. *J.A.D.A.* 19, 1147-1154; 1932.
- Gill: Pyrochemical Reactions in Firing of Porcelain. *J.A.D.A.* 18, 280-290; 1931.
- Gill: Construction of the Porcelain Veneer Crown. *J.A.D.A.* 27, 1884-1896; 1940.
- Hardy: Handbook of Colorimetry. Technology Press, 1936.
- Hovestad: Practical Dental Porcelain. The C. V. Mosby Co., 1924.
- Le Gro: Ceramics in Dentistry. *Dental Items of Interest*, 51, 245; 1929.
- Luchiech: Color and Its Application. D. Van Nostrand Co., 1921.
- Luchiech: Light and Shade and Their Application. D. Van Nostrand Co., 1916.
- Philosophies of Education: 41st Yearbook, Part I. National Society for the Study of Education.
- Pilkington: Natural Effect in Porcelain. *J.A.D.A.* 17, 1270-1276; 1930.
- Robimau: Grand Feu Ceramics. Translated by Prof. Charles F. Binns. Keramics Studio Pub. Co., 1905.
- Searles: Clay Workers Hand Book, Charles Griffin & Co., Ltd., 1921.
- Sossman: The Properties of Silica. The Chemical Catalog Co., 1927.
- Squires: The Present Status of Porcelain Bridgework. *J.A.D.A.* & *Dental Cosmos*, 25, 570-577; 1938.

Tylman: Theory and Practice of Crown & Bridge Prosthesis. The C. V. Mosby Co., 1940.

Vehe: Some Basic Principles Underlying Porcelain Veneer. *J.A.D.A.* 17, 2167-2172; 1930.

Williams, Leon: The Esthetics and Anatomical Basis of Dental Prosthesis. *Dental Cosmos*, 53, 1; 1911.

Wilson: Ceramics. Clay Technology. McGraw-Hill Book Co., 1927.

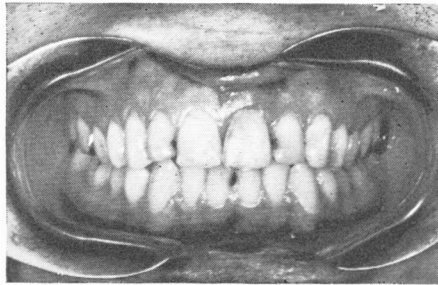
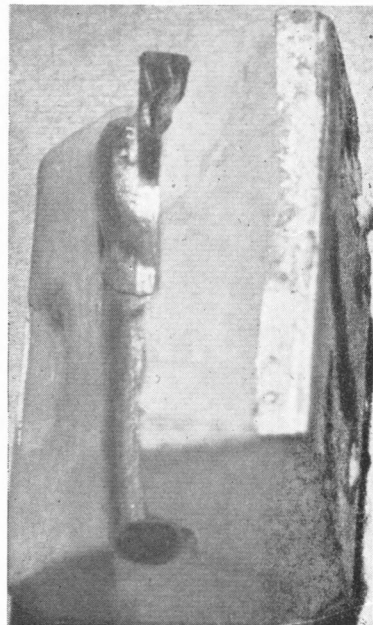


FIG. 1. WAX MODEL IN POSITION ON THE PREPARATION.



FIGS. 2 AND 3—(LEFT) .003 TIN FOIL BURNISHED OVER MODEL. MODEL WITH WAX VENT FORMER IN LINGUAL SECTION OF MOLD.

FIG. 4—(RIGHT) MAKING THE LATERAL SECTIONS OF THE MOLD.

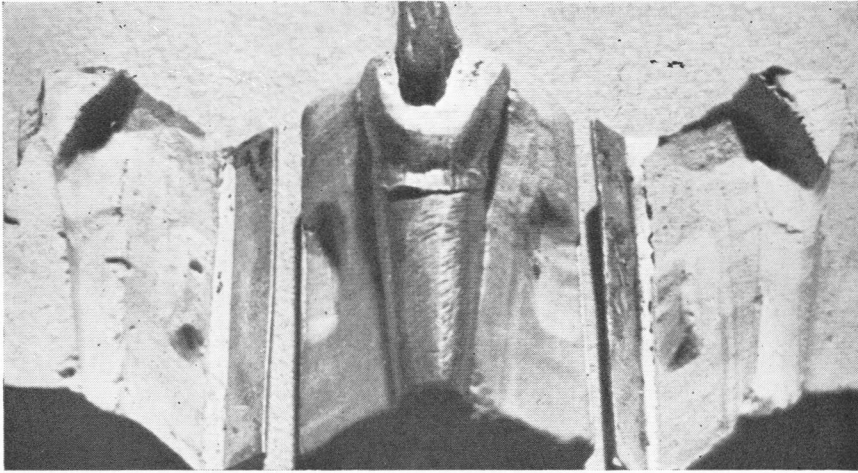


FIG. 5. SECTIONS OF MOLD SEPARATED WITH MODEL IN LINGUAL SECTION.

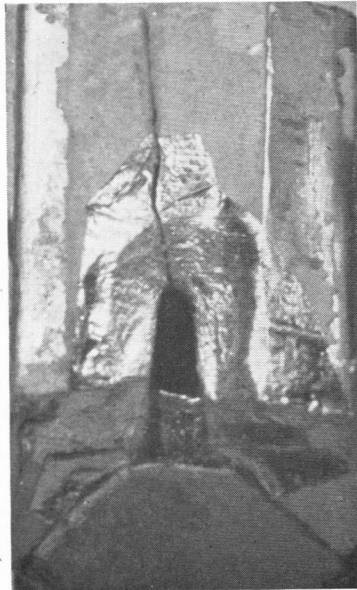


FIG. 6. SECTIONS ASSEMBLED SHOWING VENT IN WHICH WATER IS Poured AND HYGROSCOPIC WATER IS REMOVED. •

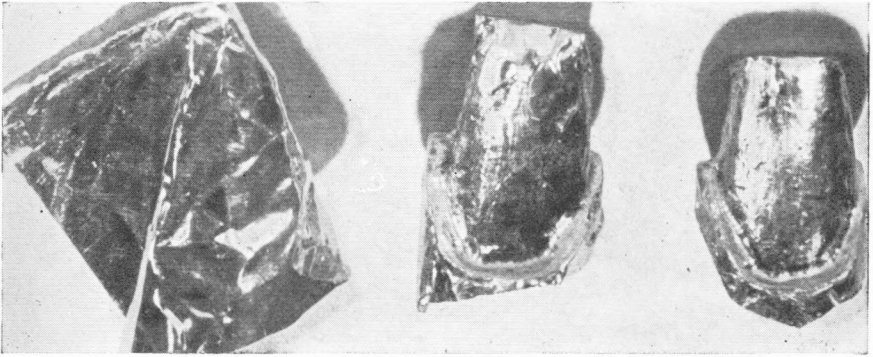


FIG. 7. SHOWING THE STEP IN THE MAKING OF THE PLATINUM MATRIX.

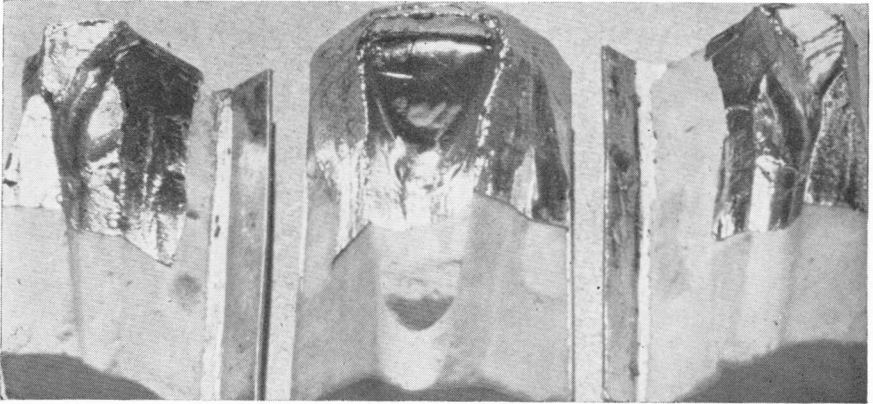


FIG. 8. TIN FOIL .0005 BURNISHED IN MOLD TO PREVENT WATER IN PORCELAIN BEING ABSORBED INTO MODEL AND ALSO SO CONDENSED PORCELAIN CAN BE REMOVED FROM MOLD.



FIG. 9. DIE AND PLATINUM MATRIX IN POSITION IN LINGUAL SECTION OF MODEL.

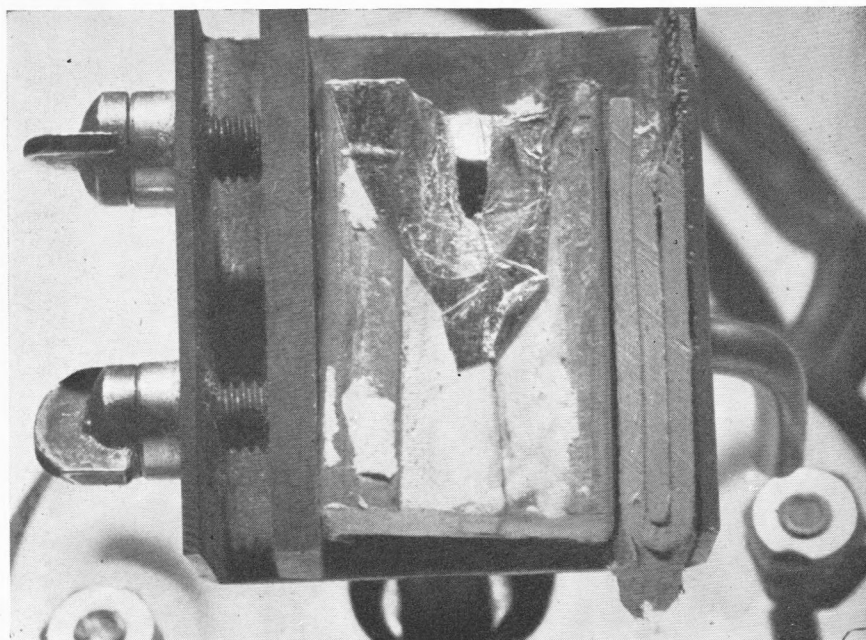


FIG. 10. MOLD IN POSITION IN VISE FOR VIBRATOR.



FIG. 11. TWO LATERAL SECTIONS REMOVED, SHOWING CONDENSED PORCELAIN IN LINGUAL SECTION.

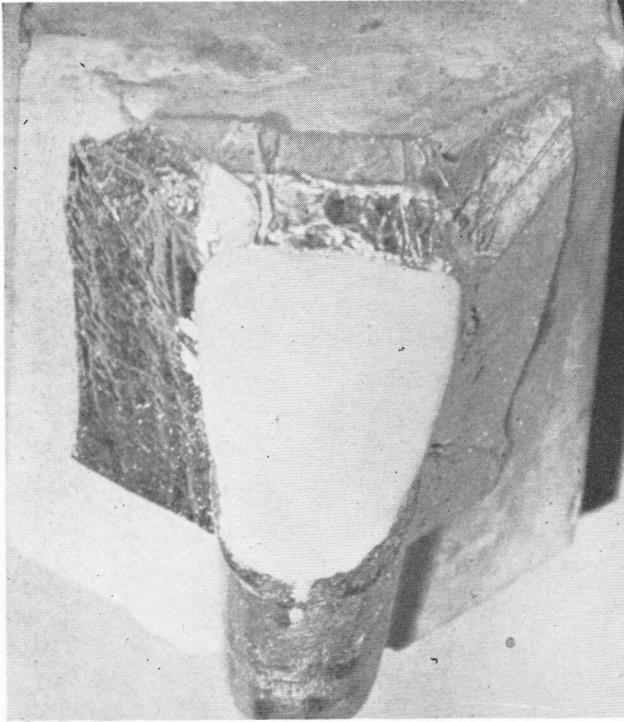


FIG. 12. EXCESS PORCELAIN THAT FILLED THE VENT IS REMOVED, SHOWING THE ANATOMICAL REPRODUCTION OF THE LABIAL SURFACE OF THE ORIGINAL MODEL.

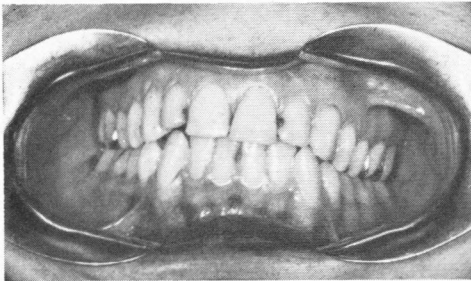


FIG. 13. FIRED CROWN PLACED IN POSITION IN THE MOUTH TO DETERMINE THE TYPE OF GLAZE NECESSARY TO OBTAIN THE PROPER ESTHETIC VALUE.

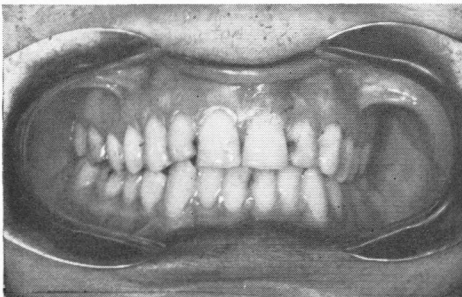


FIG. 14. PORCELAIN CROWN RECEMENTED.

THE APPROPRIATE AND INEVITABLE DECLINE OF MECHANICAL DENTISTRY¹

PROF. GEORGE T. BARKER, D.D.S.

Read at meeting of Pennsylvania State Dental Society, held at Minnequa, July 11th, 1877.

The thoughts here presented were suggested to my mind by reading a report of the remarks of Prof. D. D. Smith before the American Dental Association, August, 1876, when the subject of Mechanical Dentistry was under consideration (see *Dental Cosmos*, vol. xix, No. 3, page 123). He said, "It might be well to take a retrospect of this branch of dentistry, to see where we stand, and if possible from this time, this centennial year, take a new departure. Mechanical dentistry is in a lamentable condition; it receives no countenance or encouragement from the best men; they have, to use their own expressions, 'washed their hands of it.' . . . There is a demand for mechanical dentistry: many patients are thrown entirely upon its resources. We must supply the demand. We are not always able to preserve the natural organs; in many instances their loss is certain, not alone by decay, but by a disease with which we cannot grapple, viz., absorption of the process and loosening of the teeth. Until we can preserve all teeth, let us not say that mechanical dentistry has no place among our discussions. . . . The appliance, of whatever material it is made, must be fixed in the mouth, must admit of distinct enunciation, restore the features, and be so allied to the natural organs in color, shape, and general character, as not to be readily distinguished as artificial. There is now very frequently an entire want of harmony between the substitutes and the individual. Does not the packing of gold sink into the smallest insignificance compared with true dental prosthesis? Can true restoration be accomplished by the bases and teeth now at hand?" Prof. Smith answers it cannot, the nearest approach being with Allen's continuous gum or metallic plate with rubber attachments.

Upon carefully reading the above partially-quoted report, I was

¹*Dental Cosmos*, 20, 176; 1878.

led to ask, Why is it that the "best men have washed their hands of it?" Is it because, as would be inferred from the quotation, the "best men" are ashamed of being mechanics, or of works of their fingers strictly mechanical? Are they ignorant and unskilled in *mechanical* dentistry, or is there some deeper and more worthy reason, of which this washing of hands is but the appropriate sequence? It is true, lamentably true, that there is today in practice a small body of men who feel proud not to be able to do any mechanical dentistry. They feel ashamed of it because it is a mechanical art, and hence, when their services are demanded for artificial substitutes for their patrons, they respond with deep feeling and dignity, "I do no mechanical dentistry; I am a surgeon, and devote my whole attention to that branch of my profession." I have, however, noticed that this very class manage to divide the profits with the mechanical dentist who does the work, and they will at the same time employ their utmost mechanical skill, often very effectively, to construct some splint for a fracture of the maxilla, by which they may be brought in semi-professional contact with some medical magnate. But the "best men" are not, I believe, actuated by either pretentious pride or conceit, and hence we must look for some other solution than the one just mentioned. It may be asserted that the introduction of the cheap bases has been the cause of the "lamentable condition of mechanical dentistry," but this can hardly be conceded, for the current had commenced to set before the introduction of either rubber or celluloid, and, looking at the subject, it seems to me perfectly natural that it should be so. Every dental substitute introduced by the intelligent and thoughtful operator, is a source of mortification that the art and science he is practicing has failed, either through the patient's neglect or the dentist's want of skill, to preserve the organs that were designed to last the lifetime of the individual; and as the thoughtful man recognizes this fact he can no longer expose to view the little glass case that contained the different "show-pieces" which were to be found prominently exposed in the offices of the best men of twenty-five years ago, and which are now

banished to the cabinet drawer, to be shown only on demand of those interested. In this action the intelligent dentist but follows the lead of his medical brethren; no surgeon would think for a moment of keeping exposed prominently in his office an assortment of artificial limbs, though all must admit that under some circumstances they are demanded; and the surgeon of today will tell us that forty-nine out of every fifty limbs are now preserved that forty years ago would have been amputated by even the best and most cultured operators. This action, the banishing of artificial dental substitutes from public view, is then a healthy evidence, indicating as it does the appropriate and inevitable decline of mechanical dentistry.

There is another reason which should be considered, and it is presented also in the remarks of Prof. Smith when he refers to the restoration of the features, and the necessity for harmony between the substitute and the individual. During the twenty years that I have been in attendance, from time to time, at the dental gatherings, I have heard over and over again, when the subject of mechanical dentistry was under consideration, the necessity of restoration of the human face divine. Like the "pure virgin gold" of the contour operator, it sounds pretty, it is euphonious, and it is sentimental. But is it true? Is there ever a possibility, not to say probability, except in very rare cases, of restoration of natural expression after mutilation of neighboring organs (extraction of teeth)? After an extended experience with gold and silver, fusible metals, rubber, continuous gum, and celluloid, all of which I am happy to say I can put up myself, I have no hesitation in stating that the restoration of natural expression is a conspicuous failure. Nor do I need to confine myself to my own experience, for the "store teeth" of my acquaintances who patronize the most favored operators, whose prices and patrons are both wonderful and numerous, are just as suggestive of artificiality, for the oral muscles play over the porcelain wall with the same automatic action, indicative of want of coordination, or rather normal muscular contraction. It will be observed that Prof.

Smith, who may justly be looked upon as a representative mechanical dentist, is very careful not to assert that restoration of natural expression can be accomplished by any of the bases now known, but thinks a closer approximation to success can be accomplished by the use of continuous gum, or gold with rubber attachments, and I would add celluloid; but all must in fairness confess that a changed expression is the rule rather than the exception. It is not asserted that this statement will apply with the same force to partial substitutes, but more particularly to entire upper plates or those inserted to supply the loss of the superior anterior teeth, unless the canines remain in position. Many explanations have been given for inability to restore natural expression, the most prominent one being the change which takes place in the insertion of the muscles of expression and the oral muscles, in consequence of the absorption of the alveolar processes, and the consequent alteration in the anterior plate of the superior maxillae, particularly in the region of the canine fossae, as at this point several of the muscles of expression have their insertion; but to my mind this explanation is but partial, and we must search for some other solution, and I would present the following views for consideration:

The human system, like a complicated mechanical instrument, is made up of numberless parts, each of which has its appropriate function and use, and when from any cause the mutual relations of parts are interfered with, disturbed, or destroyed, a modification of nutrient action is the result. So with diseased products in the economy, morbid growths occur, or functional or organic changes are induced. If this law holds good, why should not mutilations produce like results, only modified by the vascularity of parts and their functional activity? The changes which occur in the muscles of expression I consider due to the extraction of the anterior teeth, and these changes are modified functional activity and organic structure, and take place most prominently in the following muscles: compressor naris, orbicularis oris, levator labii superioris alaeque nasi,

levator labii superioris, zygomaticus major and minor, levator anguli oris, and depressor anguli oris.

It may be well to inquire what and by what agencies changes take place. Immediately at the time of the extraction of teeth there is a shock to the nutrient vessels in the neighborhood, which is not without its modifying influence. To the casual thinker this may seem preposterous, but it is no more wonderful than what comes under our notice almost daily, as, for instance, the marks of malnutrition on the anterior teeth, the result of *one* convulsion, or of an accident received during childhood, while the teeth were undergoing the process of calcification, by which for a few moments, or even a second, the harmonious action of each individual cell in the whole economy was suspended, and as a sequence modification of structure is noticeable. Added to the shock, we have left structures which may now be considered foreign bodies, viz., the alveolar processes, and hence there must be functional activity to carry off these foreign products. The increased action of the absorbent system in the neighborhood is also followed by more or less obstruction and obliteration of arterial vessels, they being converted into fibro-cellular material, as in other parts of the body, and as a consequence destruction of their capillary (nutrient) vessels. These influences acting upon the vaso-motor nervous system of the structures in the vicinity will account for the atrophied condition, imperfect muscular contraction and want of coordination on the part of the muscles, to which I have referred. If this position be a true one, then it is right to reduce the quantity, not the quality, of artificial substitutes; and it is folly for any one to advance the idea that the "best men" are "washing their hands" of mechanical dentistry from any cause save an honorable desire to preserve natural teeth first and foremost, and that they turn to mechanical dentistry with sorrow and shame, as the medical man does to the barber for the wig for his hairless patient, or to the instrument-maker for the tin horn for his deaf one. He cannot feel proud of it, for it is to him a symbol of the utter failure of his cherished art.

In my remarks I have said nothing of a class of men who ostensibly practice dentistry, who in inserting artificial substitutes show neither taste, skill nor artistic ability. This class of men is to be found everywhere; they flourish by what they destroy; their places of residence are recognizable by the grinning ceramics, which their patrons exhibit without shame and almost with pride. In this community you will often hear the remark to the dentist, "I am going to let my teeth go, and then have a set that will never give me any trouble." The man who will hear such remarks without rebuking the speaker deserves no place in dentistry, and if he lend his encouragement to it, by saying, "Take gas and have them all out, and come to me for a new set," he deserves something which I will not name in this assembly. To that man, or to all who are destroying in great numbers valuable organs, I would say, Come up higher, come up higher. All diseases of the teeth, with the sole exception of wasting of the alveolar processes, are curable in nearly every instance. We have learned to preserve the pulp, to cure the diseases of the teeth; we can make roots that were troublesome healthy and comfortable; we are making rapid progress in treating successfully atrophy of the alveolar processes; then, am I claiming too much when I assert that the washing of hands by the "best men" is a good sign, and only precedes the hearty handshake over the appropriate and inevitable decline of mechanical dentistry?

THE JOURNAL FORUM

Conducted by HARLAN H. HORNER,¹ Chicago

THE PROBLEM: DIAGNOSIS AND TREATMENT PLANNING IN THE DENTAL SCHOOLS

In its survey of the dental schools, the Council on Dental Education rated the teaching of the clinical subjects on the basis of A=Excellent; B=Good; C=Fair; D=Poor. In determining relative standings, points were assigned to the different ratings as follows: A=4; B=3; C=2; D=1. The following table gives the ratings of the clinical subjects in the 38 schools considered. The table is arranged in the order of rank by subjects. It will be observed that Prosthodontia received the highest rank and Diagnosis the lowest. The visitors for the Council were all impressed with the general need for improvement in diagnosis and treatment planning. I have asked Professor Gabel and Deans Myers and Hine to discuss this subject from the standpoint of their schools.

<i>Subject</i>	<i>A's</i>	<i>B's</i>	<i>C's</i>	<i>D's</i>	<i>Total Points</i>	<i>Possible Maximum</i>
Prosthodontia	7	23	6	2	111	152
Oral Surgery	6	16	13	3	101	152
Anesthesia	5	14	17	2	98	152
Operative Dentistry	2	16	19	1	95	152
Roentgenology	4	15	15	4	95	152
Orthodontics	3	17	11	7	92	152
Dentistry for Children	3	13	17	5	90	152
Dental Materials	3	13	15	7	88	152
Pulp Canal Therapy	0	15	15	8	83	152
Periodontia	2	8	22	6	82	152
Diagnosis	2	11	14	11	80	152
Grand Totals	37	161	164	56	1015	1672

AT THE UNIVERSITY OF LOUISVILLE
RAYMOND E. MYERS, *Dean, School of Dentistry*

In the general clinic, the student makes a complete examination and diagnosis for each patient assigned to him. The examination and diagnosis chart which is used for this purpose is believed to be quite complete and a copy is enclosed. Each chart is checked by a member of the staff of this Division, and the examination and diagnosis are approved before treatment is begun.

¹Secretary, Council on Dental Education, A.D.A.

Medical histories are secured whenever indicated and possible, and a constant effort is made to emphasize in the student's mind and in his routine practice the importance of considering the patient as a whole.

Demonstrations are given in the use of the various diagnostic aids such as electric pulp testing, transillumination, radiographic interpretation, bacteriological tests, etc.

The plan of treatment recommended by the student is approved or modified as needed, through consultation with the staffs of other departments, before other than emergency treatment is started.

Each senior student is required to complete a detailed "Case Analysis" for one of his patients selected and approved by the clinical staff on the basis of unusual problems presented in the general and oral diagnosis of the patient's condition. This is usually a case of periodontitis complex, and the student is required to present in writing a detailed account of the medical and dental history including the laboratory tests, nutritional conference, the clinical examination, the diagnosis, and the complete recommendations for treatment. The student carries out this analysis on his own without the assistance of the faculty and, when complete, the case is discussed individually with the student and the full plan of treatment is confirmed through consultation with the staffs of other departments.

Throughout the clinical experience of the student, an effort is made to evaluate his progress and to insure at least a minimum amount of experience in each of the clinical activities, depending upon the needs of the individual student. Grading is employed for all phases of the clinical teaching program, but a point system is not used because of the considerable variation in the needs and abilities of the individual student. Conferences with the students are held as frequently as possible, to help in the evaluation of their progress in the junior and senior years.

AT INDIANA UNIVERSITY

MAYNARD K. HINE, *Dean, School of Dentistry*

This course in diagnosis has for its purpose the study of diseases found in or associated with the oral cavity. This is accomplished by learning to make examinations of a searching character, using systematic methods for recording data to provide adequate case records.

Emphasis is placed upon: 1) detecting differences between various types of lesions; 2) distinguishing various stages; and 3) detecting etiologic factors both systemic and local of the ordinary dental abnormalities and pathologic processes. Consideration is also given to the needs for recognition of potential sources of disease so that preventive measures may be planned.

Since some diseases are easily diagnosed, while others not only occur infrequently but are complex in etiology, symptomatology, and systemic involvement, both actual practice in the clinic and studies of already worked up case histories with color photographs are used in the teaching.

No attempt is made to make physicians out of dental students, but many techniques for physical and laboratory examinations used in medicine are discussed. Some of the simpler methods are used particularly where they apply to the diagnosis of mouth conditions based on systemic diseases.

Over 7,000 patients are examined each year. Since all of these examinations are made by students of the third and fourth years, each student comes in contact with a good cross-section of the type of patient applying for dental service in this community.

Whenever unusual cases are encountered, they are referred to specific departments for demonstration, or to the class discussion period which includes the members of the third year class. These meet once each week during the school year.

AT THE UNIVERSITY OF PENNSYLVANIA

ARTHUR B. GABEL, *Darby Professor of Operative Dentistry*

Clinical teaching in the dental school too often implies putting the emphasis upon technics to be carried out, missing the real object of dental teaching—namely to train the student to render the best possible dental service from the broad view-point of the patient's general welfare. Just how far the dentist should go in considering the patient's general welfare may be a moot question, but according to present day standards consideration of all of the tissues of the mouth, both hard and soft, would be the lowest limit of the dentist's responsibility.

In order to render adequate service it is necessary first that a thorough examination be made and all data recorded; secondly these data (with the patient still present) should be correlated and conclusions drawn as to the type of treatment to be given. It is not fair to expect the student who has been trained to carry out individual restorations on teeth or to construct a prosthetic piece to be able to make this correlation without previous experience. This experience may be gained in two ways, either as an under-graduate under the guidance of instructors, or through hard knocks entailing many failures after he goes out into practice.

In the Dental School of the University of Pennsylvania increasing responsibility for diagnosis and planning of cases is placed on the student in the third and fourth years. The Sophomore who comes into the Operative

Clinic in the middle of the second year is not considered qualified to make any decisions. Every operation he is to carry out is indicated to him by an instructor. In the Junior and Senior years all cases are planned. In addition, in the Senior year a special case known as a "qualifying" case is selected on the basis of the difficulties involved in diagnosis and planning (not in the technic of execution) as a requirement for graduation.

After the case has been assigned to the student he completes a prophylaxis and charts the mouth with a mouth mirror and explorer supplemented by radiograms. He records on the chart untreated carious lesions, faulty restorations, satisfactory restorations, missing teeth, unerupted teeth, teeth to be extracted, pulpless teeth, root canal fillings, apical involvement, crowns, fixed bridges, etc. Study models are made when indicated in all cases and always for the "qualifying" case plans.

The student then plans all the restorative work in pencil. In addition a fairly complete past medical history, particularly relating to children's diseases, is taken at the beginning, together with a survey of the present symptoms of the cardio-respiratory, gastro-intestinal and genito-urinary systems. The front of the card contains besides the patient's full name, the master file number, the date of registration, address, age, sex, nationality, race, telephone, occupation, marital status and family physician.

The student has the privilege of consulting with instructors in the various departments concerned, but must do the actual planning himself, and further, he must submit in writing, on another form, the order in which the various steps in the treatment are to be carried out, stating the reasons for his decision. Upon his completion of the plan he goes with models, radiograms and patient to the clinics involved where he submits his plan which is approved or modified and is then checked on the front of the card in pencil. He then inks in the chart and re-submits it (patient's presence not being necessary) to each department where it is signed off in ink. The plan is now completed and the student proceeds with the treatment in the order indicated on the separate Order of Procedure form.

The plan of the entire mouth including Bridge and Prosthetic appliances is made, the latter drawn on a plan and side and front elevations of models of the mouth. This gives on the one chart, the Operative and Case-Plan Chart, a complete recording of the entire case. Each department with the exception of the Operative has separate cards for recording special data and the progress of the treatment.

All edentulous spaces with teeth at the distal ends are sent first to the Crown and Bridge Department for consultation and from there may be

sent to the Prosthetic Department. Where no distal abutments are present the case goes to the Prosthetic Department. In each department the patient states in the presence of an instructor, his willingness or unwillingness to proceed with the various steps of the treatment. Refusal to have some of the treatment carried out does not invalidate the case-plan since this also occurs in practice. The plan, however, may have to be modified as a consequence.

When each of the departments involved has approved the plan for that department the entire plan may then be approved as satisfactory by the last department checking it, or may be returned to the department in which it originated. The decision as to what types of cases are to be accepted for "qualifying" case plans may be made by any of the major clinical departments teaching restorative dentistry, namely Operative, Crown and Bridge and Prosthetic. For example, cases in which the major problem was a prosthetic one would be accepted or rejected by that department. The case is then accepted by the other departments on the basis of the recommendation of that department, regardless of the problems in their field. Consultation may be had, either at the discretion of one of the clinical departments or of the student himself with other clinical departments such as Oral Medicine or even pre-clinical departments such as Oral Pathology or Bacteriology, where the need arises so that the student may gain the broadest concept and be able to make the best correlation between his clinical experience and his basic sciences.

In the "qualifying" case plan the student makes his own radiograms and does the extractions except where more extensive surgery is required.

The completion of the treatment in each department is indicated on the card, together with the date. When all the departments have been satisfied the case is closed. Should it become necessary after beginning treatment to change the plan and alter the procedure this is indicated on the chart by crossing out, but not erasing, the original plan and outlining the change, stating the reason. In other words the finished chart should show the original condition of the patient's mouth, the entire plan for treatment, any modifications of the plan made necessary after treatment has been begun and finally a complete record of the treatment carried out.

Many of the cases presented have been extremely valuable in pointing out to the student not only the approach to and technic of case planning but also the scope and depth to which the study of a case must be carried in order to obtain a satisfactory result.

The "case-plan" has been in use in this school for about 12 years and every clinical department has on numerous occasions expressed itself as feeling that

the opportunity of teaching good dentistry was well worth the additional time and effort expended. Students returning sometime after graduation have also stated that the system has benefited them both by the experience gained and by the increase in their self-confidence. In general it may be said that diagnosis and treatment planning applied to modern dental teaching helps in some measure to off-set the disadvantages of departmentalization, at the same time retaining its advantages and to give the student some experience in rendering a type of service which measures up to the profession's highest ideal.

AMERICAN COLLEGE OF DENTISTS

PROCEEDINGS OF THE MEETING OF THE BOARD OF REGENTS, CHICAGO, ILLINOIS, FEBRUARY 10, 11, 1946

REPORTS OF COMMITTEES AND THE SECRETARY¹

(Concluded)

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III. PREVENTIVE SERVICE

J. T. O'ROURKE, D.D.S., *Boston, Chairman*²

Any consideration of preventive service at this time places the dental profession in a position where it is confronted by three significant problems. While the problems themselves are not new, pressure for their solution has been greatly increased during the war, and it will very likely become much more potent during the next several years. These problems are closely related and involve specifically, the control of dental disease, questions of dental personnel, and the expansion of dental research.

The problem of organizing effective programs for the control of dental caries is most pressing. That caries can be controlled through early treatment, and modifications of diet is not too well known by either the profession or the public. Certainly, if such a fact has been known, it has stimulated very little action when measured against the scope and importance of the problem. Although control of dental caries is possible, the shortage of civilian dentists during the war, the greatly increased effective demand for adult dental care has caused a reduction in emphasis on dental care for children, the population group in which control measures would bring the greatest long range benefits.

If it is true, as it appears to be, that there was a decline in the amount of child dental service rendered during the war, and if this is weighed against the fact that the child population has grown at an unusually high rate in the last four years it then becomes quite evident that the total need for control

¹Some reports for 1944-5 were submitted to the Secretary in the fall of 1945, at which time there was no meeting. All were reported to the Regents in Chicago, February, 1946.

²The other members of this committee for the years 1944-5 and 1945-6 are: L. M. Childers, C. S. Foster, K. A. Easlick, G. R. Lundquist.

dental service for children is now, and will continue to be outstanding for a number of years to come.

The problem of utilizing existing knowledge for the control of dental caries involves dental health education directed specifically to the points (a) that the effective administration of preventive measures is not as yet possible (b) that while some contribution may be made by self administered mouth hygiene measures they are not to be relied upon as major factors in control, and (c) that early treatment, and dietary modifications are at present the only certain measures at the command of the dentist. Announcement of these facts would do much to clarify that whole situation to a public which for many years has been confused, and has seen magic in many of the devices and nostrums placed before it. In this confusion the factors encouraging postponement of dental care have been many. While economic barriers to adequate dental service may be difficult to eliminate, those arising from faulty concepts regarding control measures should give way to well organized educational programs—programs which are direct, and do not evade the issues involved.

Because as many teeth are lost from diseases of the supporting structures as are lost from dental caries, control of periodontal disease is worthy of serious consideration in programs the objectives of which are the conservation of human teeth and oral and general health. The many conditions of the supporting structures which affect all age groups, but which are more pointedly manifest after middle age, lend themselves effectively to control measures. The control of these conditions naturally carries the dental profession into consideration of the new knowledge of nutrition, the oral manifestations of systemic disease and metabolic disorder. Furthermore, this control would seem to require reorientation of the public in the matter of self administered mouth hygiene measures which although they have been directed largely to attempts toward the control of dental caries undoubtedly bring more certain benefits in maintaining the health of the supporting tissues.

The prevention or control of diseases of the supporting tissues, much like the prevention or control of dental caries, can best be initiated in childhood. It is obvious that mal-formation of the jaws, and improper positioning of the teeth should be viewed as conditions which in their implications go far beyond the problem of facial disfigurement. They are too often clear indications of the probability that supporting tissue diseases will affect the individual later in life. Mal-occlusion and inadequate mastication so often created by mutilation of the deciduous denture and early erupting permanent teeth also sets the stage for short life expectancy of the permanent denture.

Thus, if there is to be serious consideration of preventive or control measures, it is evident that it should include plans for the expansion of dental service for children, and a significant rise in interest in child dental welfare—an interest based on the long range benefits springing from various types of effective dental service in the earlier years.

In addition to attempts toward convincing the public that control of dental disease is possible, there will need to be provisions for control service in the pattern of dental practice. This problem brings to the front, questions regarding the numerical adequacy of dental personnel in the United States. This is the second major problem facing the dental profession. Because of the recognized shortage of dental practitioners, and also because of the recent rapid growth in population, and the anticipated increased demand for dental service in the future, a number of plans have been advocated for the creation of new auxiliary service groups or for the greater use of those which now exist. It is clearly apparent that something should be done to supplement existing graduate personnel. However, it is also clear that the creation of new auxiliary groups will have to await the focussing of evolutionary forces as has been the case in medical practice. It is probable that the use of dental technicians, hygienists, and assistants could within a few years be expanded to an extent which would conserve the time equivalent of at least 30,000 dentists. There are still a great many dentists who fail to use any type of auxiliary personnel. This is especially true among older practitioners, and those located in rural districts. Expansion of these already existing groups would constitute a marked contribution to the solution of the problem, and this expansion, it appears, should be the starting point in our thinking.

It has been suggested that the problem of expanding dental service in the United States is characterized by a race between manpower and research, and there are good reasons for believing that research offers the greatest possibilities for solution of the problem. There is little hope for any significant increase in the number of dental practitioners in the next ten years, and the possibilities that new auxiliary groups will come into the field during that time appears to be somewhat remote. Consequently, the most significant point of attack appears to be through research.

The whole problem of preventing dental caries is surrounded with many potentially favorable possibilities all of which need further explanation. An example is to be seen in topical applications of fluorides, or their ingestion in early life. Dietary control while extremely difficult to administer, nevertheless has outstanding possibilities. These, and other promising findings of research serve to indicate that in intensive research lies the greatest hope for

knowledge which will lead to the prevention of dental caries and diseases of the supporting tissues.

But there is now apparent a need for investigations which will provide the public with greater motivation for conservation of the teeth as far as this may be possible in terms of existing knowledge. The ease with which teeth may be replaced, the fear of pain, the high cosmetic value of denture prosthesis, are potent factors in the postponement of dental care. The human denture is generally awarded low functional values, and only when these values are raised will the public increase its interest in conservation of the teeth.

During the war, research workers have advanced our scientific frontiers from ten to twenty years, and finally crowned their efforts in the field of atomic research with developments many years ahead of their time. The development of some of the outstanding instruments of war, springing as they have from the research laboratories of universities and industry illustrate the progress which can be achieved when scientists are mobilized and research receives adequate financial support. The encouragement of legislation for the promotion of research in dental disease is one of the most forward-looking movements in organized dentistry. It deserves the support of every dentist and every dental organization.

The three aforementioned problems are quite natural to the present era. We are entering a period in which preventive medicine and public health will receive new and greater emphasis. There is nothing radical about this new emphasis. We have now the largest population in the country's history. There is greater social consciousness, more significant recognition of the value of general and dental health, and the contributions which they make to the life of the individual and the welfare of the nation. As a consequence, organized dentistry should approach the three related and challenging problems of control, dental personnel, and research with the utmost diligence.

The committee wishes at this time to call attention to the splendid progress being made by the Council on Dental Health of the American Dental Association, the Legislative Committee, and its activities, and other agencies and committees the work of which touch upon the three problems under consideration in this report. While continuing with its own excellent work of studying the problem of dental care and the fostering of dental research, the American College of Dentists can do much to encourage individual members of the dental profession to achieve an interest in these problems, and to give the various national and state committees their active support.

IV. SOCIO-ECONOMICS

GEO. W. WILSON, D.D.S., *Milwaukee, Chairman*³

The Committee began its work on April 27 when a letter was sent to each member of the Committee by the Chairman for the purpose of receiving suggestions from them concerning a program of activity for the Committee. It was pointed out that the work of the Committee must be restricted to correspondence, since the budget did not permit of anything more extensive. In this letter it was suggested that the several sections of the College be used as cooperative or consultant groups in whatever program that might be adopted.

The result of this initial effort was not very encouraging, for the returns from the Committee were very slow. No doubt this could be attributed to the fact that everyone in the profession these days is overworked. Finally, however, one of the members of the Committee offered two suggestions as a program of activity. The first dealt with the cost of rendering dental service in private practice for different age groups. The second was based upon the premise that "The dental profession was not equipped by training, experience, or inclination to supply adequate treatment service to children of all age and economic levels."

These suggestions were, in turn, presented to the members of the Committee with the final result that the Committee decided to make a study of the above-quoted premise. It was also decided that under the circumstances the best way to make this study and analysis of how to supply adequate treatment service to children of all age and economic levels would be to prepare a questionnaire which would require merely a check mark after each question. It was suggested that this questionnaire be mailed to the younger men in the profession, preferably those who had been in practice under 20 years. If this were strictly adhered to, due to the fact that many of these men are now in Service, the scope of the study would no doubt be too limited.

It seems expedient, therefore, in view of the possible advantages of making use of the Sections of the College, to send the questionnaires to all the members of the several Sections for their opinions. A sub-committee of the Committee will meet very shortly to inaugurate the preparation of the questionnaire, following which it will be sent to the other members of the Committee for additional suggestions as to content.

Early in 1945 the Council on Dental Health of the American Dental

³The other members of this committee for the years, 1944-5 and 1945-6, are: A. O. Gruebbel, D. W. Gullett, W. H. Mork, M. W. Prince, K. C. Pruden, E. G. Sloman, F. W. Swanson.

Association adopted a report submitted by the Low Income Committee of the Council which proposed a dental care plan for low-income groups. This plan, prepared in pamphlet form, was sent to the members of the A.D.A.

The plan focused its greatest attention upon early and continued care for the younger group of the population. It appears that if the Socio-Economics Committee of the College could make an effective study and analysis of the problems of supplying an adequate treatment service to children of all age and economic levels, it may well be an important contribution and adjunct to the proposed plan of the Council on Dental Health. A dental treatment program for children cannot be applied unless a study is made of how better to equip by training, experience and inclination the members of the dental profession to carry on a program of service for children.

The Committee, at this time, is about to prepare the questionnaire. Following this, it will be sent to the members of the several Sections of the College and later evaluated, and a final report is expected to be ready late this year.

V. ORAL SURGERY

LESLIE M. FITZGERALD, D.D.S.⁴

The Committee on Oral Surgery has devoted its entire efforts on the standardization of Oral Surgery and the formation of an American Board of Oral Surgery.

We expect to complete this organization of the Board by the next regular meeting of the College.

VI. MINUTES OF THE MEETING OF THE BOARD OF REGENTS

CHICAGO, ILLINOIS, FEB. 10, 11, 1946

(Abbreviated)

O. W. BRANDHORST, D.D.S., *Secretary*

The Board of Regents met in the Stevens Hotel, Chicago, Ill., Sunday, February 10, and Monday, February 11, 1946, first session convening at 9:30 a.m., February 10. Eight members were present. Minutes of the February, 1945 meeting were presented and approved.

The treasurer's report showed that on February 5, 1946, the cash balance in the Continental Illinois National Bank and Trust Company of Chicago to the credit of the American College of Dentists was \$15,642.66. As of the

⁴The other members of this committee for the years, 1944-5 and 1945-6, are: S. H. Brock, H. L. Carter, S. M. Morse, C. W. Waldron.

same date there were held by the bank as Custodian for the College, securities amounting to \$7,000 par value and \$50 in cash.

The secretary reported that by mail ballot Dr. John E. Gurley had been elected Editor; Dr. James Nuckolls, Assistant Editor and Drs. Ernest M. Jones and E. G. Meisel were elected Contributing Editors.

The Secretary reported the following deaths:

Arthur D'Alanson Barber, Ogden, Utah.....	December 7, 1944
Leland Barrett, New York, N. Y.....	March 7, 1945
Wm. W. Brown, Joplin, Mo.....	April 1, 1945
John V. Conzett, Dubuque, Ia.....	November 19, 1945
Augustus R. Cooke, Syracuse, N. Y.....	April 17, 1945
Arthur J. Cottrell, Nashville, Tenn.....	October 31, 1945
Lynn A. Fonner, Ft. Wayne, Ind.....	December 7, 1944
Chas. F. GaNun, New York, N. Y.....	November 30, 1944
Nye White Goodman, Los Angeles, Calif.....	June 28, 1945
J. F. Hasbrouck, Pasadena, Calif.....	October 13, 1945
Henry Allen Kelley, Portland, Maine.....	February 21, 1945
R. G. Hutchinson, Jr., Essex Falls, N. J.....	September 23, 1945
Robert R. Linville, Olivett, Ky.....	August 10, 1945
S. Blair Luckie, Chester, Pa.....	December 21, 1945
J. P. Massicotte, Providence, R. I.....	December 27, 1945
Horace G. Meek, Oakland, Calif.....	November 19, 1945
Arthur J. Noetzel, Milwaukee, Wis.....	December 1, 1945
John L. Peters, New York, N. Y.....	May 18, 1945
Paul R. Stillman, Longwood, Fla.....	December 15, 1945
T. Irving Way, Cincinnati, Ohio.....	March 16, 1945
Arthur C. Wherry, Salt Lake City, Utah.....	December 26, 1945
Allen Scott Wolfe, Washington, D. C.....	September 29, 1945

The Secretary reported that the following persons had had Fellowship conferred at the several Section meetings:

Kentucky Section—Brown Hotel, Louisville, Ky., October 29, 1945.

Philip E. Blackerby, Battle Creek, Mich.
 H. H. Bryans, Birmingham, Ala.
 H. T. Knighton, Louisville, Ky.
 O. D. Wilson, Owensboro, Ky.

Northern California Section—Fairmont Hotel, San Francisco, Calif., December 7, 1945.

Wm. B. Ryder, San Francisco, Calif.

Elmer C. O'Connell, San Francisco, Calif.
H. G. Reibe, Alameda, Calif.
E. F. Soderstrom, Modesto, Calif.
T. H. Terwilliger, Oakland, Calif.
A. E. Wrigley, Eureka, Calif.
Henry Clay Veatch, San Francisco, Calif.

Texas Section—No meeting.

Florida Section—Princess Martha Hotel, St. Petersburg, Fla., November 11, 1945.

Bryant S. Carroll, Jacksonville, Fla.
E. C. Lunsford, Miami, Fla.
Clarence J. Speas, Burlington, Vt.

Indiana Section—Columbia Club, Indianapolis, Ind., October 28, 1945.

Drexel A. Boyd, Indianapolis, Ind.
Frank J. Denny, Indianapolis, Ind.
R. T. Miller, Muncie, Ind.

Pittsburgh Section—University of Pittsburgh, School of Dentistry, Pittsburgh, Pa., October 17, 1945.

W. W. Booth, Pittsburgh, Pa.
J. F. McParland, Pittsburgh, Pa.
Jay G. Roberts, Buffalo, N. Y.

(Clyde A. Jack had his fellowship completed at this time, fellowship having been previously conferred in Absentia.)

Iowa Section—Roosevelt Hotel, Cedar Rapids, Ia., November 25, 1945.

Virgil D. Cheyne, Iowa City, Ia.
(George S. Easton had his fellow hip completed at this time, fellowship having been previously conferred in Absentia.)

Illinois Section—No meeting.

St. Louis Section—University Club, St. Louis, Mo., November 26, 1945.

Cecil C. Connelly, St. Louis, Mo.
Charles W. Digges, Columbia, Mo.
Clement J. Gaynor, Jefferson Barracks, Mo.
Hilery E. Hanna, El Dorado, Ark.
Oliver F. Steber, St. Louis, Mo.

(Walter D. Vail had his fellowship conferred at this time, fellowship having been previously conferred in Absentia.)

Oregon Section—Heathman Hotel, Portland, Ore., November 17, 1945.

D. A. Spratley, Mt. Vernon, Washington
Geo. W. Redpath, Portland, Ore.

Maryland Section—Belvedere Hotel, Baltimore, Md., November 27, 1945.

Marion W. McCrea, Baltimore, Md.

New York Section—Hotel Pennsylvania, New York, N. Y., November 20, 1945 (combined meeting with the New Jersey Section).

Louis Citron, White Plains, N. Y.

Ernest Charron, Montreal, Can.

Leon J. Gauchat, Buffalo, N. Y.

David P. Cool, Brooklyn, N. Y.

C. Raymond Wells, Brooklyn, N. Y.

D. P. Mowry, Montreal, Can.

W. Ray Montgomery, Buffalo, N. Y.

Theodore Kaletsky, New York, N. Y.

(Robert C. Craven, West Point, N. Y., had his fellowship completed at this time, fellowship having been previously conferred in Absentia.)

Minnesota Section—Minnesota Club, St. Paul, Minn., December 8, 1945.

R. W. Delton, Minneapolis Minn.

J. A. Millhon, Rochester, Minn.

Chas. Peterka, Minneapolis, Minn.

F. C. Thiers, St. Paul, Minn.

New England Section—Forsyth Infirmary, Boston, Mass., October 31, 1945.

John E. Fauber, Ft. Devens, Mass.

F. J. Feeney, Lawrence, Mass.

F. A. Holland, Providence, R. I.

L. J. Obrey, Needham, Mass.

H. H. Reid, Barre, Vt.

Alton H. Swett, Portland, Me.

G. F. Winchester, Boston, Mass.

Colorado Section—Shirley Savoy Hotel, Denver, Colo., November 30, 1945.

Oliver J. Shaffer, El Paso, Tex.

(Oscar P. Snyder, Fitzsimmons General Hospital, Denver, Colo., had his fellowship completed at this time, fellowship having been previously conferred in Absentia.)

Washington, D. C., Section—Broadmoor Hotel, Washington, D. C., November 9, 1945.

Chas. R. Singleton, Charleston, W. Va.

(Rear Admiral A. G. Lyle and Commander David Cooper had their fellowships completed at this time, fellowship having been previously conferred in Absentia.)

Southwestern Section—University Club, Los Angeles, Calif., November 17, 1945.

J. Eugene Ziegler, Los Angeles, Calif.

New Jersey Section—(Combined meeting with the New York Section, Hotel Pennsylvania, New York City, November 20, 1945.)

Kansas City-Mid West Section—Bellerive Hotel, Kansas City, Mo., October 22, 1945.

Ralph W. Frost, Kansas City, Mo.

Lester M. Gates, Kansas City, Mo.

Fellowships conferred in Absentia:

Edw. C. Berwick, Austin, Tex.

John B. Falls, Houston, Tex. (in service)

W. C. McNeil, Silsbee, Tex.

E. S. Weyer, Billings, Mont.

Horace G. Meek, Oakland, Calif. (now deceased)

The Secretary reported on his visits to several Sections, presenting various suggestions in accordance with his discussions at these meetings, as well as Section correspondence.

Adjournment, 12:30 p.m.

The Second session of the Regents convened at 9:00 o'clock Monday morning, Feb. 11. The session was devoted to a discussion of the work and reports of the standing committees.

Adjournment, 12:15 p.m.

The Third session of the Regents convened at 1:50 p.m., Monday, February 11. Reports of Special Committees considered.

(Action on report of Research Committee was published in the March, 1946, JOURNAL.)

The proposed changes in the Maryland Section by-laws were approved.

Definite decision regarding the holding of a regular Convocation was deferred, but all were hopeful that it should be done at the earliest possible time.

BOOK REVIEWS

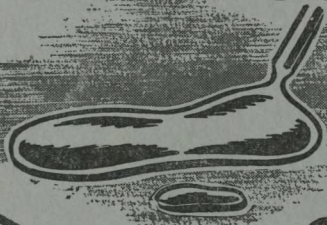
Oral Diagnosis and Treatment: (2nd Edition); by Miller and contributors. It contains 903 pages, 574 illustrations and 39 color plates. It is edited by Samuel Charles Miller, D.D.S., Associate Professor of Peridontia, New York University, College of Dentistry, Author of Miller's Textbook of Peridontia.

This book was written by a group of well known writers, teachers and practitioners in collaboration with Dr. Miller, the editor. The aim of the book is to teach the student how to utilize the experience and training of others in the fields of both dentistry and medicine in determining the type of lesion and prognosis of a case. Published by Blakiston Company, Philadelphia 5, Pa. Price, \$10.

Accepted Dental Remedies: This is the 12th edition of this little book published by the Council on Dental Therapeutics of the American Dental Association. More need not be said about it for it is so well and favorably known within the profession. As each year goes by, new developments and new discoveries are made, resulting in an increased paging in each issue. This book is larger and therefore more complete than preceding issues. Price \$1.50 through the American Dental Association, Chicago, Ill.

Dentistry—An Agency of Health Service: This is the title of a book under the authorship and editorship of Malcolm W. Carr, D.D.S., New York City, New York. Dr. Carr is well known within the profession as one of our leading oral surgeons and is at the present time President of the American College of Dentists. It is a report of a study of the question of health service by the Committee on Medicine and the Changing Order of the New York Academy of Medicine. Many different individuals, among whom are Drs. Brandhorst, Dean, Gies, Horner, Lynch, Mead, have made contributions to this study. It is very general in its scope, consisting of six parts: history, education, dental practice, research and socio-economics, with the last part consisting of a summary and conclusion. It is one which should be pondered by every practicing dentist as we contemplate present apparent social conditions. The book is published by the Commonwealth Fund, 41 East 57th St., New York, N. Y. The price is not quoted.

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