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THE JOURNAL OF THE AMERICAN ACADEMY OF GOLD FOIL OPERATORS

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THE PRESIDENT'S MESSAGE

Herbert D. Coy

How quickly the summer passed! Let us hope not too quickly for you to take time to plan for your attendance at the Annual Meeting of the American Academy of Gold Foil Operators in Los Angeles in October.

The attendance and support given in preceding years by our West Coast members calls for an all-out effort on the part of each of you to be present. Our immediate past-president, Dr. James P. Vernetti, is an excellent example of true devotion. Last year's meeting, combined with the Centenary of the American Dental Association, was outstanding; but we can make this one noteworthy also with a large attendance. May this message serve as an inspiration for you to consider more seriously the importance of our group and what it can mean in the life of each member.

Captain Robert B. Wolcott and his committee have worked enthusiastically to provide a truly great program of lectures and chair clinics. During our eight years of cultivation we have proved ourselves to be one of the most alive of dentistry's many organizations. We are grateful for the loyalty of such a man as Bob Wolcott, who has spent much energy in the building of an attractive and educational program.

An anonymous writer has said:

A task without vision is drudgery
A vision without a task is a dream
A task with a vision is victory.

"A task without vision is drudgery" goes without saying with those whose talents and ambition have caused them to seek membership in a group such as ours has become. We are rightfully proud of our roster, which includes many prominent names, and of the fact that we have added a gratifying number to our list. We have assisted this year in the organization of the New England Gold Foil Study Club.

"A vision without a task is a dream" merits a bit of study. Are you planning to be present at the Ninth Meeting of the

Academy? If you were asked to participate in the program, have you consented or did you pass up this rewarding opportunity?

We constantly read in our publications of the wonderful work being done to combat caries by the fluoridation of water supplies and of the exhaustive research to discover its cause; but, as yet, the problem remains unsolved. Until that time let us not be made to feel that we are wasting our time in trying to practice better operative dentistry.

I have become very hesitant about referring to the passage of time since at present there is a trend which so strongly accents youth. Will you excuse me for saying that ever since I can remember there have been those in the profession who have deplored the time spent in restorative dentistry and who have prophesied its decadence? Does the medical profession cease to treat malignancy because no cure has been found for it? Why, then, should we not do our utmost to repair the ravages wrought by dental caries?

"A Task With A Vision Is Victory." We have the vision and the task is before us. Let us make this a banner year by giving our time and our talents to the support of the Academy and its excellent program. Let this 1960 session find us enjoying this very pleasant and profitable association together.

This is your opportunity to combine work with pleasure. Come early and enjoy a vacation on the West Coast of our great country. May our aim and purpose for the intervening weeks be: Los Angeles (City of the Angels), California, October, 1960.

Herbert D. Coy
501 East Franklin Street
Richmond 19, Virginia

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Philosophy is of two kinds: that which relates to conduct, and that which relates to knowledge. The first teaches us to value all things at their real worth, to be contented with little, modest in prosperity, patient in trouble, equal-minded at all times. It teaches us our duty to our neighbour and ourselves. But it is he who possesses both that is the true philosopher. The more he knows, the more he is desirous of knowing; and yet the farther he advances in knowledge, the better he understands how little he can attain, and the more deeply he feels that God alone can satisfy the infinite desires of an immortal soul. To understand this is the height and perfection of philosophy.

Robert Southey

GOLD FOIL IN PEDODONTICS*

William S. Kramer,** D.D.S., M.Sc., Lincoln, Nebraska

Many interesting and exciting developments have occurred in pedodontics during the last ten years, for new concepts in the practice of dentistry for children are constantly being introduced. Pedodontists as a group certainly are not static; I have been stimulated by the enthusiasm with which these people pursue new knowledge and concepts. The program of total dental health care and growth supervision which the pedodontist now renders would be a revelation to the man in practice who no longer offers dental care for children.

For some years I was both a teacher of operative dentistry and a member of this Academy before I switched my teaching activities to pedodontics. My change from operative dentistry to pedodontics was undertaken with great reluctance because the teaching of gold foil is one of the most fascinating areas of clinical instruction. I knew that a few pedodontists were using gold foil in their practices, but this use was rather empirical and only subjective clinical opinions were offered to support its use.

Evaluation of Foil Technics

Dentistry has been beset with certain traditional opinions which have been handed down as dogma from generation to generation and which have been accepted without investigation. Fortunately, this attitude has been altered in the past fifteen years by the influence of well controlled research. Yet, in all honesty, we must admit that empiricism is still prevalent in dentistry. I do not mean to belittle the many fine clinicians who have given the profession so much by passing along their clinical observations; but dentistry, as a scientific discipline, has come to demand substantiation of clinical opinions. That is as it must be if progress is to continue, and if unsupported generalizations are to be abandoned as tenets upon which certain aspects of practice are founded.

I choose to challenge today the oft repeated assertion that gold foil is unsuitable as a restorative material for any tooth except

*Presented before the Interim Meeting of the American Academy of Gold Foil Operators, February 5, 1960, Chicago, Illinois.

**Formerly Professor of Operative Dentistry, presently Professor of Pedodontics and Chairman of the Department, University of Nebraska, College of Dentistry, Lincoln, Nebraska.

the adult tooth endowed with a completely developed and matured periodontium. All such assertions need constantly to be reexamined in the light of current information, available instruments, and newly developed technics.

Two conditions have been commonly cited as contraindications for the use of gold foil in the young permanent tooth. One of these relates to the danger of pulp exposure during cavity preparation. Recent texts [1] have given accurate evidence of the dimensions of the pulp and its spatial configuration as related to the external morphology of the tooth.

There is nothing essential to a properly prepared and adequately retentive cavity that demands exposure of the relatively larger pulp present in the young tooth. It is admitted that care and judgment must be used, but these attributes are necessarily characteristic of the gold foil operator. "Well-type" preparations for occlusal cavities admirably overcome the likelihood of pulp exposure in cases where the radiograph gives evidence of diminished operating space. Actually, it is seldom necessary to resort to this modification. In the properly developed Class III preparation the retentive features are so prepared as to "straddle" the area of danger of pulpal encroachment. It should not be necessary to belabor the point with this audience, for cavity preparation is only one of many areas where skill and care must be exercised by the dentist. The careless or sloppy operator soon loses interest in gold foil procedures anyway.

The second contraindication of the use of gold foil in young permanent teeth is the potential damage caused by (1) extreme dentin compression and (2) trauma to the periodontal ligament. This concept, when it originated, undoubtedly pointed up a very real danger. Excessively heavy hand malleting and pneumatic condensation are capable of dealing severe trauma to a young member of the dental arch. Certainly, as excellently as the gold foil restoration serves, its use is not justified if the integrity of the periodontal membrane is despoiled.

The introduction of the electronic condenser with its gentle method of condensation, utilizing blows of high frequency and low intensity, offered exciting possibilities in minimizing the traumatic effect which had militated against the more universal use of gold foil. The condensation is accomplished through the absorption of energy from the condensing point. The pneumatic condenser and the hand mallet incorporate this energy by a series of sharp, heavy blows. The electronic condenser transmits its given amount of condensing energy in the form of a multitude of light blows, relying upon the cumulative or additive effect to impart the necessary amount of energy.

The introduction of this rather dramatic change in condensation procedure offered the tempting possibility of circumventing

the latter of the two reasons for not using gold foil in the young tooth, i.e., damage to the periodontium.

Objectives and Methodology

In order to advocate and undertake to expand the usage of gold foil in the field of pedodontics it was deemed necessary to obtain through adequate study and documentation the answers to several questions:

1. Does this apparently gentler method of condensation really avoid the drastic periodontal effects ordinarily ascribed to other methods of condensation? In other words, is it a safe procedure for young teeth?

2. Are the physical characteristics of the gold foil restoration produced by electronic condensation similar to those produced by other methods? If not, is condensation adequate for restorative procedures, and will gold foil restorations produced in this manner exhibit the merit commonly associated with this type of restorative dentistry?

3. Will a clinical study substantiate research designed to answer the first two questions?

In regard to question one, the literature[2-8] deals primarily with the results of trauma inflicted over a longer period of time than that required to place a gold foil restoration. Then, too, the trauma reported is that induced by orthodontic appliances or occlusal contact, neither of which is quite like our problem.

In order to answer question number one, an investigation was undertaken to determine the periodontal reaction to gold foil condensation. In this study,[9] histologic sections of dogs' teeth were used to compare the effects of pneumatic and electronic condensation.

Two dogs were used in the experiment, and in each animal gold foil restorations were placed while the dog was under general anesthesia. Only single-rooted teeth were selected so the interpretation of results might be more significant when related to the problem associated with the anterior teeth of humans. Class V type cavities prepared near the incisal were used because, according to Goldman,[2] the tooth-supporting apparatus is made up in such a way that vertical force is easily assimilated, while lateral force used in the experiment was not readily assimilated. In each animal the pneumatic condenser was used on one side of the mouth and the Electro-Mallet was used on the other. A total of six teeth were treated on each dog, with one being filled with a sedative dressing and used as a control.

One dog was sacrificed at the end of 24 hours. The second dog was sacrificed at the end of 48 hours. The tissue to be studied

was immediately fixed in formalin, then decalcified in acid preparatory to embedding in celloidin and sectioning. The sections were stained in hematoxylin and eosin. After the slides were prepared, the areas of the periodontal ligament were diligently searched for signs of trauma or inflammation resulting from trauma.

Experimental Results

Figure 1 is a typical section from a control tooth which received only a sedative dressing. The periodontal tissue is normal and the numerous capillaries are mature.

Figure 1. Area of periodontal membrane at apex of tooth number LR4, dog number 1. This tooth received only a sedative dressing in the prepared cavity. Tissue appears normal, capillaries are mature. (48 hours)

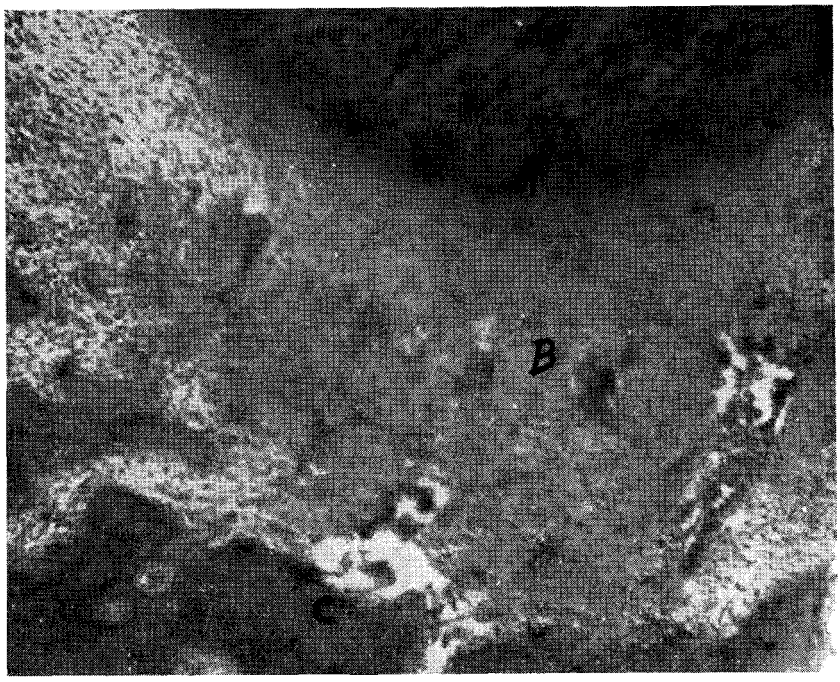


Figure 2. An area at apex of tooth number UR2, dog number 2. This tooth received gold foil restoration condensed with the Electro-Mallet at intensity 9. A, apex; B, periodontal membrane; C, alveolar bone. There is a slight loss of capillary integrity at the junction of the periodontal membrane and the bone. (24 hours)

Figure 2 is a section from a tooth filled by the Electro-Mallet. A is the apex; B is the periodontal ligament; C is the alveolar bone. This section shows only a slight loss of capillary integrity at the junction of the periodontal ligament and the bone. All other structures appear normal, and this was the only section in which any alteration could be detected. There was no evidence of any abnormality in any of the other Electro-Mallet specimens at both the 24- and 48-hour intervals.

Figure 3 represents a 48-hour section of a tooth which was filled with the pneumatic condenser. A is the apex; B is the periodontal ligament; C is the compressed periodontal ligament and new capillaries; D is the alveolar bone. This section exhibits the typical findings of compression of a portion of the periodontal ligament plus the formation of new capillaries. These findings, along with the round-cell infiltration, are indicative of an inflammatory process resulting from the trauma of condensation.

Figure 4 is a 24-hour specimen of pneumatic condensation. A is the dentin; B is the cementum; C is the periodontal ligament; D represents a thrombosed vessel. The cellular infiltration and the thrombosed vessel are evidence again of early inflammatory change.

One can only speculate whether these periodontal changes exhibited in the pneumatically condensed specimens would have been reversible. I believe that they would have been, since there is little evidence of mass destruction of tissue. It is quite evident, however, that the slight trauma from the Electro-Mallet was considerably milder and produced little, if any, evidence of an inflammatory reaction. In fact, as serial sections were studied, it was impossible to differentiate the control teeth from the teeth condensed with the Electro-Mallet.

In answer to the second question regarding physical characteristics, the details of a study of gold foil specimens produced by various methods of condensation appeared in *The Journal of the American Academy of Gold Foil Operators.*[10] I shall attempt

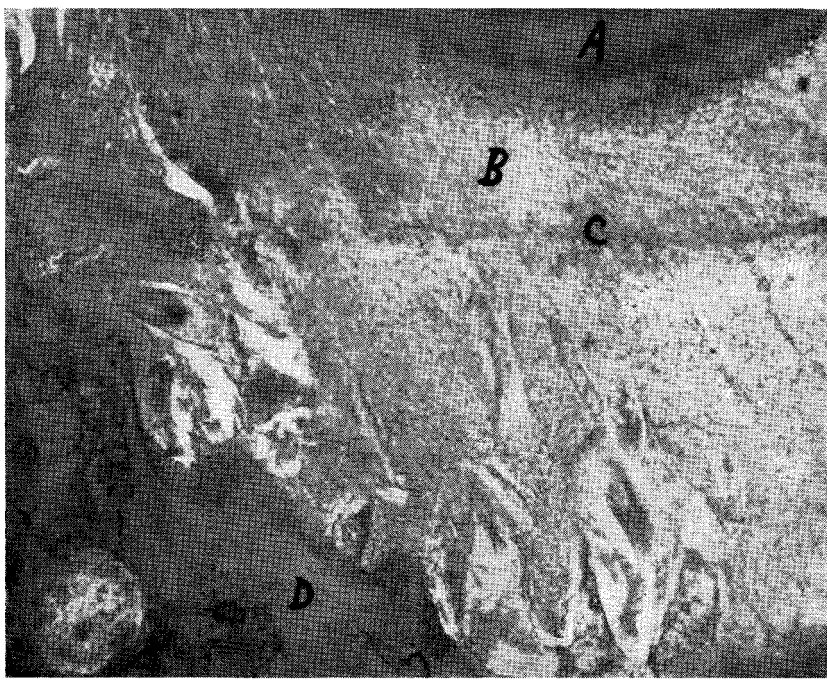
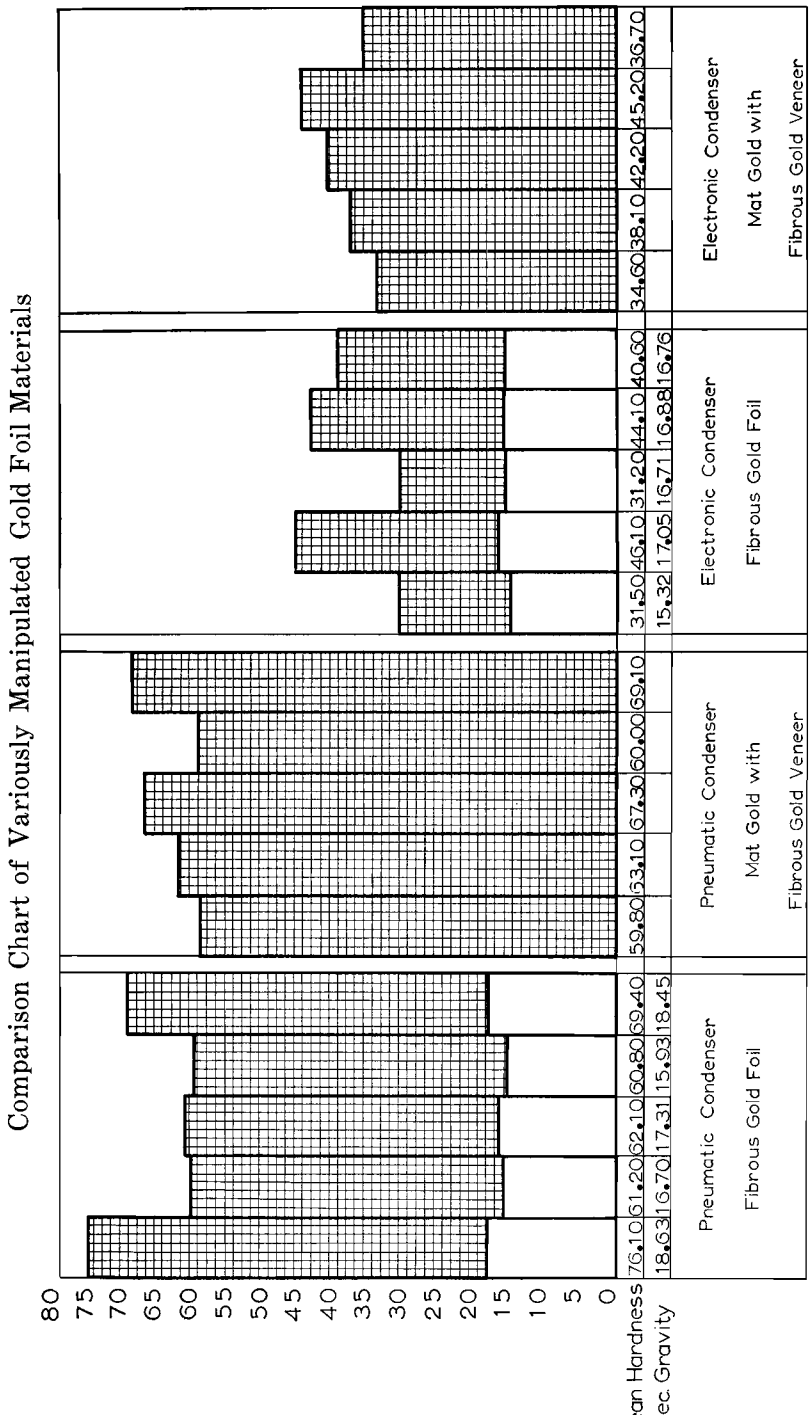
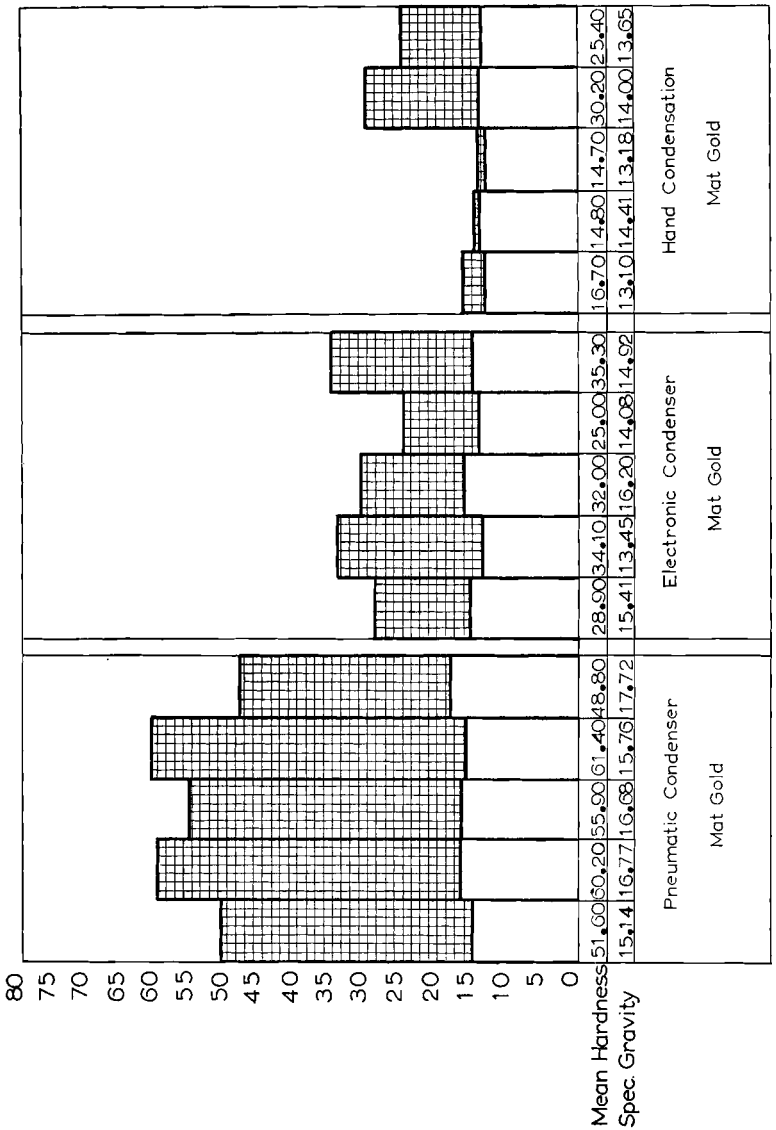


Figure 3. Area of apex of tooth number UR4, dog number 1. This tooth received gold foil condensed with a pneumatic condenser. A, apex; B, periodontal membrane; C, area of compressed periodontal membrane and new capillaries; D, alveolar bone. (48 hours)

Comparison Chart of Variously Manipulated Gold Foil Materials





Each section represents a group of five specimens. The solid-white vertical bars represent the values recorded for each specimen; the cross-hatched extensions of these solid bars (both bars emanating from the same base line) illustrate the mean hardness determinations for each sample.

Figure 4. An area of periodontal membrane tooth number UL2, dog number 2. This tooth received a gold foil restoration condensed with the pneumatic condenser. A, dentin; B, cementum; C, periodontal membrane; D, thrombosed vessel. (24 hours)

only to summarize the results of this work pertinent to the present discussion. The chart on pages 64 and 65 is reproduced from that article. It indicates both the Vickers hardness numbers and the specific gravity determinations which were recorded for a series of various types of gold foils condensed in different fashions. Two conclusions can be drawn regarding high-frequency, low-intensity condensation. First of all, specific gravity values of samples prepared in this way exhibit nearly the same values as those obtained by pneumatic condensation. These results mean that condensation (the amount of gold introduced into the given unit volume of the cavity) is approximately the same for both methods. Further comparative microscopic

study of cavity adaptation and specimen porosity substantiated these findings.

Secondly, the surface hardness values of the electronically condensed foil were uniformly smaller than those of foil condensed pneumatically. This difference is understandable when one realizes that it is strain hardening alone which is responsible for the development of hardness in a gold foil restoration. The sudden sharp blows of the pneumatic condenser are more effective in this strain hardening procedure than the gentle vibrations of the electronic condenser. Fortunately, the majority of cavities indicated for gold foil restoration are located so that the development of great hardness values is not of great importance.

Parenthetically, it might be well to remind ourselves that, in all areas of restorative dentistry, the dentist constantly must seek to effect the most suitable compromise, physiologically and mechanically, relating to the individual situation. To illustrate: were it not for the presence of the pulp, proximal amalgam cavities could be prepared in such bulky fashion that fracture would probably never occur. The operator must compromise the mechanical situation by avoiding the pulp in the cavity preparation. Conversely, if the operator were to prepare very shallow cavities, he would seldom encounter the pulp and would probably never be plagued with restorations producing postoperative sensitivity. However, he must compromise this ideal physiological situation in every case, because he is courting mechanical failure when he predicates his efforts entirely in a physiological direction. Extension for prevention versus retention is another of the many examples of compromise which must be resolved by the operator each time he operates. There are many other situations that manifest themselves in our daily practices.

To return to our gold foil situation, we again must face a compromise. Shall we mallet the periodontal structures to death for the sake of obtaining the hardest possible gold foil restoration, or shall we be satisfied with a restoration which possesses all the desirable attributes of condensation and adaptation even though the hardness values fall short of those values which can be produced by other means? An extremely hard foil is of little practical value if its development results in the loss of the tooth which it was designed to restore.

We believe that, in most instances, the hardness values of electronically condensed foil are adequate, particularly where the foil restoration is indicated in the child patient.

Clinical Results

The answers to our first two questions were accepted as presumptive evidence of the safety and practicality of electronic

condensation; accordingly, a clinical study was undertaken to substantiate this evidence in relation to the placement of gold foil in young permanent teeth.

Careful clinical records were kept of a total of 32 Class III and Class IV gold foil restorations placed with the Electro-Mallet in young permanent anterior teeth. The study involved 18 children ranging in age from 8 to 14. Preoperative, postoperative and six-month follow-up roentgenograms were made to determine the clinical success of the treatment. There were no cases which evidenced periapical or periodontal disturbance by these criteria, and in all cases where root development was incomplete at the time of operation, the six-month follow-up film showed root formation to be progressing satisfactorily. Cases selected for operation included only those teeth in which root formation had progressed at least to the apical one third.

The patient and parent were interrogated on the second day following the operation to determine if there were any complaints about postoperative soreness. This clinical study was complicated by the fact that 16 of the 27 Class III cases were made with a lingual approach and required some separation. Slight postoperative soreness was manifested in 3 cases. In each of these instances the tooth responded only mildly to percussion or lateral pressure, and these minor complaints disappeared in a couple of days. Subsequent roentgenographic evaluation and vitality tests revealed no deleterious changes.

Class III Restorations

The remainder of this discussion will be centered around the Class III restoration. Gold foil is of particular importance in this type of cavity in the young patient because of the lack of satisfactory alternatives. In many Class I and Class V cavities, silver amalgam can serve admirably. However, when a young person is afflicted with a proximal carious lesion in an anterior tooth, we have no such easy alternative.

One can use a Class III gold inlay for such a cavity. The preparation involves more tooth destruction than we would like; because of the small size and difficult manipulation, these small castings are not amenable to marginal adaptation procedures prior to cementation, and lack of marginal integrity is a common problem.

Another choice, obviously, is the use of silicate cement. With an average life expectancy of from five to seven years, silicate hardly seems desirable for the young patient. Indeed, it would seem that this length of service would particularly contraindicate the use of any temporary material. If gold foil is ever indicated in the Class III cavity, it surely must be considered for

the young tooth whose life expectancy is even greater, in terms of time, than the adult tooth for which we commonly use gold foil. To wait another ten years for a foil restoration might well mean two subsequent replacements of the initial silicate, with each replacement requiring a larger restoration. Such necessary extensions of cavity outline could well rule out the use of gold foil by the time the individual reached adulthood. When could we have greater need for all the attributes of permanency characteristic of gold foil than in preserving the young tooth which has been prematurely attacked by caries? The need is greater at this young age than it will be later. Everyone will agree that gold foil is the restoration of choice for the small Class III cavity in the adult. If it is desirable for the adult, it is even much more desirable for the young patient.

In many cases, a Class III gold foil restoration in the young permanent tooth can be admirably accomplished, utilizing a lingual approach to prepare the inconspicuous type of cavity. In fact, this approach should be used whenever possible. Actually, at this age when the dentition has not yet stabilized, the lingual approach is usually a great deal more convenient than it will be later in the adult when diastematous spaces are no longer present or when crowded anteriors are firmly overlapped.

I believe that those practitioners who provide this service to the young will find that operating conditions are nearly always less difficult. A knowledge of the growth, development and the dynamics of the evolving dentition is most useful. Prior to stabilization of the anterior segment of the arch, tooth eruption patterns often do not reflect the interproximal spatial relationships which will ultimately exist. Predictive knowledge on the part of the practitioner will enable him to take these changing relationships into consideration so that cavity outline may be modified accordingly. The anticipation of these dynamic adjustments will mean that proper restorative design will prevail even after the dentition has stabilized itself. For example, when one encounters proximal cavities between maxillary centrals and laterals during the "Ugly Duckling" stage of development, as characterized by Broadbent, the operator must recognize that the lingual position of the lateral is normal but only temporary. Failure to consider this stage of development could well mean that the labial cavity outline created at this time for a foil restoration might prove quite unsatisfactory when the lateral assumes its usual position. Specifically, if the restoration were on the central, the labial outline might later be located in an area cleansed with difficulty. In the case of the lateral, the labial outline could well become unsightly as the tooth moves labially into its final position.

It is safe to say, though, that more opportunities for cavity modification will present themselves in the young dentition than

in the adult dentition. However, a rather classical concept of the inconspicuous preparation is always used as the starting point, and modifications are made from there. Then, too, the alert dentist can seize the opportunity to create favorable alterations in the alignment of this changing dentition by the influences he can create with rather simple tooth-moving or tooth-guiding appliances. It has been found advantageous in many cases to institute these corrective measures prior to restorative procedures, thereby making restoration less difficult and more satisfactory. One should not overlook the opportunity to provide this service. Unfortunately, many of us become so engrossed in individual reparative procedures that we fail to consider the dentition as a functioning organ or entity.

Preventive Treatment

As an additional commentary about this state of enamorment with individual restorative units, it should be pointed out that a further responsibility exists. We are obligated to expand our thinking about the youngster who presents as a patient requiring our services for Class III cavity restoration. Here is a youngster in trouble. Proximal cavities on anterior teeth indicate marked caries susceptibility. This patient needs not only the best in restorative dentistry, but also our best advice and counsel if this disease is to be brought under control. Our obligation is not fulfilled when we restore his teeth. He also needs rather formidable measures of protection or our efforts and his parent's money will have been spent in vain. Topical fluorides, strict dietary supervision and good oral hygiene must be instituted. Cavities in anterior teeth alarm parents far more than do cavities in posterior teeth. Here is our opportunity to practice preventive dentistry, for our advice will at last fall upon attentive ears. We, as dentists, have the information necessary to deal successfully with the problem of controlling caries. It is up to us to present this information effectively so that patient-parent cooperation will be obtained. This effort consumes time and skill—the same ingredients of service which constitute the basis for the fees charged for the gold foils we construct. We are entitled to a fee for our counsel, and we have the responsibility to provide this service in a most effective manner. Time does not permit a description of the technics involved; but such items as a patient-kept dietary diary, followed by acidophilus or Snyder tests, a counseling period, followed by bacterial tests, and disclosing solution demonstrations have proved effective. This area of service is just as important as our gold foil restorative procedures, and I regret that I cannot dwell on it at equal length. The unrestored tooth is superior to the tooth which has been restored. It must suffice for the moment to say that, if we

are unwilling to follow through on our counseling and thus render truly professional care, we should not have prescribed gold foil in the first place. We are building on a shaky foundation if the caries is not brought under control. Subsequent failure of these restorations will be blamed on the restorative material rather than on our inability to perform our function as a health counselor.

Summary and Conclusions

The assertion that gold foil is unsuitable for young permanent teeth should be reexamined in the light of current scientific information and newly developed technics.

The introduction of the electronic condenser has provided the means for minimizing the trauma often encountered with other methods of condensation.

Periodontal injury can be decreased and practically eliminated with the Electro-Mallet.

The physical properties of electronically condensed gold foil are adequate, particularly where the gold foil restoration is indicated in the child patient.

The clinical study undertaken substantiated the research results and demonstrated that gold foil can be used efficiently in young permanent teeth.

The preservation of the dentition is accomplished not only by restorative procedures but also by a combination of all the preventive measures at our disposal.

College of Dentistry
University of Nebraska

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AMERICAN DENTAL ASSOCIATION MEETING

The program of the American Dental Association Meeting at Los Angeles, October 17-20, 1960, contains several areas of particular interest to members of the Academy. Dr. Drexell A. Boyd, Chairman of the Operative Dentistry Section, will preside over a panel discussion on "Practical Restorative Procedures" to be held on Wednesday, October 19 at 10:00 a.m. Dr. Robert B. Wolcott, our President-Elect, will serve as moderator; Dr. James P. Vernetti, Past-President of the Academy, will be a member of the panel.

In addition to the above essay program, table clinics will be presented by Dr. Paul T. Dawson on "Conservative Gold Foil Restorations," and by the John C. Metcalf Gold Foil Seminar on "Gold Foil Made Easy."

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Every man is a missionary now and forever, for good or for evil, whether he intends or designs it or not. He may be a blot, radiating his dark influence outward to the very circumference of society; or he may be a blessing, spreading benediction over the length and breadth of the world; but a blank he cannot be. There are no moral blanks; there are no neutral characters. We are either the sower that sows and corrupts, or the light that splendidly illuminates, and the salt that silent operates; but being dead or alive, every man speaks.

Thomas Chalmers

GOLD FOIL—DOES IT HAVE A FUTURE?*

Charles M. Stebner, D.D.S., Laramie, Wyoming

It is right that we should pause at the 100th anniversary of the American Dental Association to evaluate and discuss the future of gold foil as a restorative service. In such an evaluation, service should be our keynote because it makes all that we do valid and worthwhile. The service that any material renders should be our primary consideration, and by that measurement only should we judge its value. If we accept the concept of service to our patients as primary, then we as dentists should endeavor to maintain the natural dentition in its most desirable state of health and function. Gold foil, then, has not only a commendable past but also a promising future.

A century ago, because of the shorter average life span, it was not as necessary for dentistry to preserve a natural tooth for as many years' service as it is today. Increased longevity demands of the operator that he restore diseased and missing portions of the natural tooth with the most permanent material available. Recently, an artistic gold bowl was discovered. It had withstood the natural elements for 1100 years and was recovered undiminished in form and volume, and unblemished in beauty.[1] We wonder what would have happened to a plastic or silicate bowl during that same period of time. In restoring the interproximal or gingival areas, where foil is usually used, it is not necessary for these restorations to last more than the life of the patient, but they should remain undissolved and undistorted for at least sixty or seventy years, because our objective should be to save the involved tooth for that length of time.

In evaluating foil and its future it is logical that we should look into the past. History tells us that this material, even with older technics and instrumentation, served the public before our organized profession's first birthday, and, that after a moderate lapse a decade or two ago, it is returning to increased activity and service. The present trend and the reason for increased usage of this old and venerable material should be surveyed. Why did a group of conscientious dentists meet during the American Dental Association Meeting in Saint Louis in 1952 and organize the American Academy of Gold Foil Operators? Why has its membership grown to more than 350 in 1959? Why is there a stimulated activity in the growth of many gold foil study clubs throughout the country? Why is there also a vital interest in postgraduate courses on foil technic in various dental schools? To one who will investigate and survey the materials available in restorative dentistry, the answer is obvious. Silicate cement

*Presented before the One Hundredth Annual Meeting of the American Dental Association, New York, September 14-18, 1959.

and acrylic resin, the two materials which are normally used instead of foil in the Class III, IV and V cavities, have so often failed because their inadequate physical properties do not enable them to properly seal the cavities, protect the health of the tooth, and restore its function. The conscientious operator has been disheartened and disillusioned by failures and inadequacies, and, in his desperation to save natural dentitions he has returned to gold foil. The gold inlay and amalgam have replaced gold foil adequately in the occlusal and interproximal areas of posterior teeth; however, these restorations require too much bulk and the sacrifice of vital and healthy tooth structure in the other surfaces of the teeth.

Let us evaluate the present status and service of foil and judge its future from this point of time. The profession generally has realized the responsibility of dentistry in preserving and maintaining the natural dentition in a state of good health and function during the natural life of the patient. The increased interest in the fields of endodontics and periodontics is proof of this realization. It is a philosophy which is compatible with professional objectives. In order to grow in professional stature during the next 100 years as we have during the past century, we must (1) prevent all the dental caries we can by means of fluoridation and prophylactic treatment, and (2) diagnose and restore incipient, initial lesions with the most permanent and serviceable material available.

At the birth of our profession dentistry was largely an art, but today it is also a science. When we select a restorative material we must use all of the scientific information and practical experience that are available. As a segment of the health professions we must treat the diseased and carious area in a manner which will prevent the entrance of bacteria into surrounding dentinal tubuli. To restore mastication we must restore tooth form with materials that are stable and will adequately resist wear, dissolution and distortion. To achieve these objectives we must evaluate restorative materials in the light of the voluminous scientific data in journals and textbooks on the subject of dental materials. It is a simple matter to review this literature and compare the various materials one against the other and all of them against the natural tooth structure. The material that most nearly matches tooth structure in strength, insolubility, Brinell hardness, coefficient of expansion, etc., is obviously the material that should be used to restore missing portions of the natural tooth. As scientific men we should review all available materials objectively. An attempt to undertake this evaluation with the three materials available for the Class III, IV and V cavities was made several years ago.[2] Five well-known dentists, teachers and clinicians agreed very closely in an effort to grade three materials objectively. It was determined that we have no ideal or utopian material, but that even after a century

of service gold foil met 80.5% of the requirements for the ideal, while silicate accomplished 60.5%, and acrylic, 47.0%. To date no one has challenged this evaluation; and if we assume it is reasonably accurate, gold foil has, at least, an immediate serviceable and active future.

The experience of many operators has proved that the average patient wants, readily accepts and pays for gold foil restorations in preference to several less serviceable materials that have previously been placed in their mouths without any choice of their own. Often, if all scientific facts and truths had been offered them first, their choice would have been gold foil. We should admit that many patients have not heard of gold foil because their dentists had not offered to them the most worthy and ideal material that is available. Why is this so often the situation? Is it because the construction of the restoration is difficult? Is it because the dentist is uninformed about foil and untrained in its manipulation? Or is it because areas of dental education have not faced the issue? If it is because of the first reason (difficulty), we have reacted unprofessionally; if because of the second reason (inadequate training), the members of the Academy of Gold Foil Operators have a challenge to meet; if dental education has neglected to face the scientific truths involved, we must all help it to meet the problem fairly and honestly.

The trend toward foil is an indication that dentistry wants to serve according to its greatest potential, and that both the operators and the public are growing weary of halfway measures and downright failures. By halfway measures we mean the use of materials which fail to restore the important contact point (the silicate in Class III restorations), which fail to seal the margins against fluid and bacterial invasion (the acrylic resin in all classes of cavities), or which fail to maintain proper form and margins (the amalgam, especially in shallow Class V cavities). The well-made gold foil performs all of these services adequately.

Training Values of Gold Foil

The importance of gold foil as a teaching aid has long been recognized; for, as Romnes observes, "the discipline and attention to detail are often carried over to other fields of dentistry."[3] There is little doubt that one of the principal reasons for using foil in some teaching programs is to develop the student's digital dexterity. Although it is commendable and effective to use foil technic as an exercise, it is not reason enough. Simon notes that the teaching of gold foil in dental school aids in the development of the student's judgment, as well as his skill. He also notes that some state boards are checking the applicant's judgment by having him formulate treatment plans.[4] Experienced operators realize that there is a place in most of these treatment

plans where foil could be used as the material of choice. This selectivity recalls to mind the words of Mosteller: "How could I have restored that dentition as adequately if I had not used foil in the bucco-gingival of that second molar to be consistent with the fixed bridge, jacket crowns and inlays?"[5] A patient who submits himself for complete mouth rehabilitation may be receiving an inadequate service if the gingival areas in the posterior teeth and the smaller anterior interproximal areas are restored with materials that are unable to serve the patient as well as gold foil.

Patient Acceptance and Esthetics

The dentist who is not well trained in the use of foil will often state that the patients in his practice and/or geographic location will not accept foil. However, the dentist's scientific judgment and training will prevail in most of the treatment plans and ultimately in the patient's acceptance. This is also true of the man who *believes* in the fixed bridge in preference to the removable, or of the man who *believes* in the gingivectomy in preference to extractions and complete dentures. There are practices that demonstrate the fact that patients of very moderate means request and receive foil restorations when they understand the value of their services. They appreciate the truism that the initial investment may be greater but the ultimate expense is less. The great majority of the patients who enter our offices do so because they want to *save* their teeth—few actually want to become edentulous. For patient acceptance, then, all we have to do is to convince ourselves that foils *save* teeth and then communicate this truth to our patients.

Psychologically, our patients are basically the same wherever they live. World War II and the economic changes that followed have made our population much more homogenous. Americans think about and want the same commodities and services. Regardless of their geographic position they all like the modern automobile; the acceptance of television is almost universal. When the dentist is properly equipped, informed and enthused about gold foil service, his patients not only accept but often request the service of foil.

Undesirable appearance is a point that is often used in discouraging the use of gold foils. Unfortunately it is often necessary to use foil for the replacement of a second or third restoration of a "white" material. In these cases when we are forced to use it in order to finally save the tooth is esthetics a legitimate objection. We must admit that old silicates or resins are often not very esthetic in these larger cavities. Prevention of the need for replacement should be our answer to this problem of esthetics, and also to the problem of economics. There are thousands of gold foils in the mouths of patients, often placed when they

were quite young, that are never criticized because of their appearance as they are never seen. These restorations are often placed so that they are entirely inconspicuous.[6] It isn't fair to judge them by the heroic efforts that are often necessary when replacing other materials. Esthetics is a very minor consideration in the practice of the well-trained foil operator who has a rigid recall system beginning with the younger patients.

Foil as a Repair Material

As long as the future requires the timely repair of inlays and bridges, there is a future for gold foil. Additions and repairs with gold foil often prolong or save the life of serviceable inlays, crowns, and bridges. The handling of these problems cannot be as desirably or effectively accomplished in the offices that do not use gold foil. The white materials, or even silver amalgam, are too weak when these additions must be made in areas of incisal or occlusal wear. The undesirable effect of mercury on castings should further discourage the use of amalgam—these repairs or additions with any material other than foil seldom please either the operator or the patient. Foil has often proved to be a life-saver in making a perfect incisal margin on a three-quarter crown of a new bridge, when, in the finishing or cementing procedures, a few enamel rods are lost at the margin. All castings are not perfect, but many of them become nearly that good and certainly are more serviceable with the addition of a few pellets of foil. We have all seen the casting that wears through at a spot on a heavily occluding cusp. It is not always possible for the operator to correctly judge the amount of occlusal wear that will occur in some cases. These castings can be repaired with foil to make them look and serve as well as the original restoration.

Foil in Class VI Cavities

There are two conditions that we cannot care for both conservatively and well except with gold foil. Although the usual process of caries associated with other types of cavities is not the problem here, the problem of restoration is none the less important. First, we see hypoplastic areas on the incisal surfaces of anterior teeth—often maxillary cuspids, and similar deficiencies are occasionally found on occlusal cusps of posterior teeth. The areas are deficient in enamel covering because of an early acute illness that interfered with developmental growth. If any other material but gold foil is used in these areas, it does not withstand the severe stress that is applied. Foil serves beautifully in these areas because it becomes highly tempered and wears evenly with the surrounding tooth structure. There is a tendency for the opposing tooth to burnish it over the surround-

ing enamel, and this action prevents further cupping if the cavosurface enamel is strongly beveled. With conservative undercutting and retention the surrounding enamel does not chip away, a result that is typical with other materials.

The second problem we note is the great need for a more general usage of gold foil in the cases of ordinary dentin abrasion at the incisal edges of all the anterior teeth and often on the lingual surfaces of the upper anteriors. Many of the healthier mouths we encounter present this problem of cupping of the dentin that causes the surrounding enamel to chip and become ragged. In closed bite cases we often observe large lingual areas worn in upper anterior teeth. The anatomy and function of these areas can be very well restored with gold foil. It is surprising to the uninitiated how hard the gold becomes and how well it serves in conjunction with the opening of the occlusal dimension with castings in the posterior areas. These restorations are accomplished with the minimum of cavity preparation to maintain the maximum strength of the tooth. Foil properly used in these cases will prevent the great sacrifice of tooth structure, with the accompanying expense and risk, that is usually required by full and three-quarter crowns. When we survey the application of foil in these cases we are aware of the ultimate in tooth conservation.

Mesial Class V in the First Permanent Molar

The author has for many years used gold foil as a most effective service for the young patient in the early mesial carious area of the first permanent molar. This application has been well demonstrated by Alexander Jeffery.[7] The approach is used when the patient is about to lose, or has just lost, the second deciduous molar. At this age we often find incipient caries at the contact area between the second deciduous and the first permanent molar. When we consider the increasing life span of our patients we must realize that the latter tooth is of great importance, possibly during the next sixty years.[8] We sometimes remove the second deciduous molar a few weeks early to gain perfect access to this diseased area, but usually we can wait until the time the deciduous tooth is lost naturally and do our operation before the complete eruption of the second bicuspid. We have observed some of these foils for fifteen years, and in cases of relative immunity to caries there is little doubt that they will serve three or four times that long. There are few who would not appreciate this restoration in preference to the conventional mesioocclusal amalgam, which is basically weaker and causes structural weakness in the tooth that will call for more radical preparations in the future. The hazards of a mesioocclusal inlay in these young teeth, the necessary removal of

healthy structure and the resulting weakening of the surrounding cusps in these cases are not desirable. Silver amalgam, in the conservative Class V where indicated, lacks stability and fails to seal the margins as time goes on, with recurrent caries resulting. The physical properties, particularly the solubility of silicate [9] and the percolation of acrylic,[10] eliminate them as the choice for long serviceable restorations in this area. Gold foil serves ideally, and it should be used oftener for the young patient who wants the best that is available. Most parents would choose it for their children if its potential were understood and explained by the dentist.

Most of us were taught that gold foil should be applied in mature teeth only, because the young pulp and periodontal membrane would not tolerate the operation. It has been proved that as soon as caries is apparent in recently erupted and young anterior or posterior teeth, we can safely restore them with gold foil, and that the ultimate economic, health and esthetic benefits to the patient justify this early use.

Too many dentists judge gold foil by what they saw and were taught in their undergraduate training. They should evaluate its technic and service in the light of modern cavity design, condensation and instrumentation.

We know of gold foil's service by reviewing the past. Foil has proved itself by the service it has rendered in the mouths of many of our older patients. We can also evaluate the activity in the teaching and usage of foil at the present. But we can only speculate on the future of gold foil. Many of the present generation of dentists have neglected gold foil technic because they anticipate the introduction of a superior material that would replace it from the standpoint of service. Such a material has been on the threshold of dentistry continuously during the last thirty years; however, in the name of practical service gold foil seems to have a serviceable future until the utopian material we all hope for shall have finally arrived and been tested and proved. In the meantime we must apply ourselves to become proficient in the most modern technics of this old and proved material.

Summary and Conclusions

1. Many older patients have not heard of the service that gold foil has to offer them, but they would choose it and be glad to pay for it if they knew of it. Difficulty of manipulation and lack of training are not valid excuses for not offering this service.

2. New interest and activity are observed in the teaching of gold foil technic.

3. Although we recognize the value of gold foil technic in training students' dexterity and judgment, and its value for

critical examination of dentists' operative ability, these points should not overshadow the value of foil as a service to the patient.

4. Undesirable esthetics is an argument often used against the application of foil, but critical examination of this point proves it is not a valid objection.

5. Scientific treatment planning must include the use of gold foil.

6. Many restorations can be saved by repair with gold foil. This practice offers a great economic saving to the patient.

7. No other material is so well designed as gold foil to restore the Class VI cavity.

8. Recently erupted teeth tolerate the application of gold foil well, and its conservative application is important in planning for longevity of service.

9. Dentistry has a moral and scientific obligation to keep up with the recent progress in the use of this old and dependable material.

10. A prominent position in the foreseeable future is predicted for gold foil as a restorative material.

903 Grand Avenue

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THE 1960 ACADEMY AWARDS

On February 5, letters relative to the 1960 Academy Award were sent to forty-one dental schools in the country. Seven schools did not respond to the Secretary's inquiry.

New York University responded favorably, but did not submit a recipient's name; The University of Southern California stated that the Award would duplicate a long established award for gold foil excellence, and, therefore, the University could not accept the offer; and The University of Alabama did not feel that a member of the graduating class was deserving of this distinction.

The remaining thirty-one schools submitted the names of those students selected to be recipients of the Award. However, The University of Illinois submitted the names of two students who were considered equally deserving, and Loyola University (Chicago) requested that a certificate be forwarded to a 1959 graduate as well as to its 1960 recipient. Therefore, thirty-three certificate awards for gold foil achievement were presented to the following recipients:

ANTHONY J. BADALAMENTI, *Georgetown University*
THOMAS E. BOYLE, *Creighton University*
WILLIAM ROBERT BRADLEY, JR., *Tufts University*
DOUGLAS L. BUCK, *The University of Minnesota*
JAMES ALEXANDER CALDER, *Loyola University (Chicago)*, 1959
DONAID FRANKLYN CALLAHAN, *Fairleigh Dickinson University*
GAIL MERIVALE CAMPBELL, *The University of Texas*
RICHARD L. CLARDY, *The University of Tennessee*
THEODORE J. DEMAS, *The University of Detroit*
MICHAEL W. DIAMOND, *Columbia University*
JOE HOLLAND DOWDY, *Baylor University*
ARTHUR FERTMAN, *University of Pennsylvania*
FRED FIELDER, *Meharry Medical College*
ROBERT PAUL FORTE, *Seton Hall University*
CLIFFORD W. FOX, *The Ohio State University*
MARVIN GORENBERG, *University of Illinois*
ARNOLD GREENBERG, *Temple University*
RICHARD HENRY, *Indiana University*
JAMES KELLEY HOCOTT, *The University of Kansas City*
ROBERT L. HORCHOVER, *University of Washington (Seattle)*
MARLIN R. LEWIS, *Marquette University*
RODNEY LONGFELLOW, *College of Medical Evangelists*
ROBERT EDWARD MCFERRAN, *Northwestern University*
M. BERNARD MOSKOVITZ, *The University of Pittsburgh*
ERICK C. NEHLS, *Loyola University (Chicago)*
HOWARD E. OTTESON, *University of Oregon*
HELMER EUGENE PEARSON, *University of Maryland*
WILLIAM FRANK RODDA, *State University of Iowa*
HARRY LEE RYBURN, *Washington University (St. Louis)*
DONALD DALE SPENCE, *Howard University*
JAMES R. SUBJECT, *College of Physicians and Surgeons*
MELVIN J. WILLENBORG, *Saint Louis University*
NELSON YOGI, *University of Illinois*

INTERIM ACADEMY MEETING

The 1961 Interim Academy Meeting will be held at Loyola University, School of Dentistry, in Chicago, Illinois on Friday, February 3, 1961. The meeting, which will precede the Chicago Mid-Winter Meeting, will consist of a one-day session of formal presentations and chair clinics. All Academy members as well as guests are invited to attend this meeting.

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NOMINEES FOR ACADEMY OFFICES

The Nominating Committee has submitted the names of the following members for offices during the 1960-1961 term: Dr. George A. Ellsperman, *President-Elect;* Dr. Charles C. Latham, *Secretary-Treasurer;* and Dr. Henry A. Merchant, Executive Council (3-year term). The balloting will take place during the Annual Business Meeting on Friday, October 14 at the Mayfair Hotel in Los Angeles.

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PROGRAM OF THE NINTH ANNUAL MEETING

Arrangements for the Annual Academy Meeting to be held October 14 and 15 in Los Angeles have been completed. The formal presentations, chair clinics, demonstrations and table clinics will be conducted at the University of Southern California, College of Dentistry, 925 West 34th Street; the social hour, banquet and business meeting, at the Mayfair Hotel. This hotel will be the headquarters for the Academy during its Ninth Annual Meeting.

In addition to the regular meeting, a one-day program has been planned for October 13 at the College of Medical Evangelists, Loma Linda, California. Transportation for those wishing to attend this meeting will be provided from the Mayfair Hotel, as long as there is space available on the buses.

The committee responsible for arranging these excellent programs consisted of Dr. Robert B. Wolcott, Chairman, Dr. Lloyd Baum, Dr. Rene W. Eidson and Dr. Henry M. Tanner. The Academy owes a debt of gratitude to these men for making all the arrangements. The Academy would also like to express its appreciation to the participating clinicians, who will contribute their time, effort and skill to provide for the members a magnificent program.

PROGRAM

COLLEGE OF MEDICAL EVANGELISTS

Thursday, October 13, 1960

(*Buses will leave the Mayfair Hotel at* 7:45 *a.m.*)

9:30 a.m. — Registration

10:00 a.m. — Opening Ceremonies

Call to order.....*President*, DR. HERBERT D. COY
Invocation.....DR. HAROLD E. SCHNEPPER
Greetings.....*Dean*, DR. CHARLES T. SMITH
Remarks.....*Program Chairman*, DR. ROBERT B. WOLCOTT

10:15 a.m. — Motion Picture—"The Class V Gold Foil Restoration"
Dr. Gerald M. Stibbs, Seattle, Washington

11:15 a.m. — "The Inconspicuous Class III Gold Foil"
Dr. Paul T. Dawson, Chicago, Illinois

12:15 p.m. — Lunch Recess

1:30 p.m. - 5:00 p.m. — Chair Clinics

Class II Restoration
DR. BRUCE B. SMITH, *Seattle, Washington*

Class III Restorations

DR. A. F. DOLAN, *Seattle, Washington*
DR. GEORGE A. ELLSPERMAN, *Bellingham, Washington*
DR. JOHN T. RYAN, *Seattle, Washington*
DR. DONALD A. SPRATLEY, *Mount Vernon, Washington*
DR. J. R. SUBJECT, *San Bernardino, California*

Class V Restorations

DR. RALPH A. BOELSCHE, *Houston, Texas*
DR. JOHN C. HAMPSON, *Seattle, Washington*
DR. ROSS C. HUNTLEY, *Sherman Oaks, California*
DR. NORWOOD E. LYONS, *El Toro, California*
DR. WALTER B. MARTIN, *Seattle, Washington*
DR. OLAF T. OLSON, *Langley, Washington*
DR. LYLE E. OSTLUND, *Everett, Washington*

7:00 p.m. — Executive Council Meeting, Mayfair Hotel, Los Angeles

UNIVERSITY OF SOUTHERN CALIFORNIA

Friday, October 14, 1960

8:00 a.m. — Registration

9:00 a.m. — Opening Ceremonies

Call to order.....*President*, DR. HERBERT D. COY
Invocation.....*Reverend* C. A. NEYMAN
Greetings.....*Dean*, DR. ROBERT W. MCNULTY
Remarks.....*Program Chairman*, DR. ROBERT B. WOLCOTT

9:15 a.m. — Panel Discussion—"Vital Factors Interrelating Periodontia and Operative Dentistry" — Dr. Bruce B. Smith, Moderator

Dr. Alfred L. Ogilvie, *Seattle, Washington.* "Histologic and Research Phases of Periodontia and Operative Dentistry"

Dr. Donald A. Spratley, *Mount Vernon, Washington.* "Technical Procedures in Gold Foil and Their Relation to Periodontia"

Dr. J. W. Nielson, *Winnipeg, Manitoba.* "Clinical Aspects of Periodontia"

Dr. Lyle E. Ostlund, *Everett, Washington.* "Summary of the Interrelation of Periodontia and Operative Dentistry"

10:30 a.m. — Donation of Motion Picture: "The Class V Gold Foil Restoration"
Mr. H. Walter Smith, Philadelphia, Pennsylvania

10:35 a.m.—"A Quarter of a Billion New Places for Gold Foil"
Dr. J. C. A. Harding, San Diego, California

12:00 Noon — Lunch Recess

1:30 p.m. - 5:00 p.m. — Chair Clinics

Class II Restoration

DR. ELDON E. BRANDT, *Buena Park, California*

Class III Restorations

DR. THOMAS M. BLEAKNEY, *Seattle, Washington*
DR. ALAN Y. CLARKE, *Portland, Oregon*
DR. RAYMOND W. DOLPH, *Corona, California*
DR. ROY A. FETTERMAN, *South Pasadena, California*
DR. WILLIAM F. HEMPHILL, *Omaha, Nebraska*
DR. MELVIN R. LUND, *Loma Linda, California*
DR. EARL C. MASTON, *Seattle, Washington*
DR. EUGENE S. MERCHANT, *Omaha, Nebraska*
DR. R. G. WIGHT, *Yakima, Washington*

Class IV Restoration

DR. LLOYD BAUM, *Loma Linda, California*

Class V Restorations

DR. IRVING D. ANDERSON, *Seattle, Washington*
DR. A. FRANK EYER, *Arcadia, California*
DR. W. MORGAN, *Salt Lake City, Utah*
DR. OLAF T. OLSON, *Langley, Washington*
DR. HAROLD W. SIDWELL, *Villisca, Iowa*
DR. WILLIAM M. WALLA, *Fremont, Nebraska*

Demonstration — Golden Gate Study Club—Dr. Harry A. True, Commentator

(Note: Armamentarium and Chairside Assisting Included)

DR. LEROY D. CAGNONE	—	Class V
DR. CHARLES E. CARARA	—	Class III
DR. LAWRENCE R. LUDWIGSEN	—	Class III
DR. NORWOOD E. LYONS	—	Class V
DR. JOHN S. SHAW	—	Class III
DR. J. R. SUBJECT	—	Class III
DR. CARL H. SUNDAHL	—	Class II
DR. WILLIAM F. R. TRUE	—	Class III

Table Clinic — "Adolescent Foils"

DR. ROLAND K. MILLER, *Redlands, California*
DR. CHARLES S. WOOD, *Twentynine Palms, California*

Motion Picture — "The Class V Gold Foil Restoration"
(Continuous showing)

Friday, Evening Program

Mayfair Hotel, Los Angeles
(Ladies Invited)

6:30 p.m. — Social Hour
7:30 p.m. — Annual Banquet
8:30 p.m. — Annual Business Meeting

Saturday, October 15, 1960

8:45 a.m. - 12:00 Noon — Chair Clinics

Class II Restoration

DR. NORMAN L. BEYER, *Whittier, California*

Class III Restorations

DR. A. F. DOLAN, *Seattle, Washington*
DR. GEORGE A. ELLSPERMAN, *Bellingham, Washington*
DR. ROBERT E. HAMPSON, *Seattle, Washington*
DR. ROSS C. HUNTLEY, *Sherman Oaks, California*
DR. J. B. JACQUES, *Palos Verdes, California*
DR. EDMUND F. MADDEN, *Honolulu, Hawaii*
DR. LESTER E. MYERS, *Omaha, Nebraska*
DR. J. F. STEWART, *Arcadia, California*
DR. THEODORE L. TAYLOR, *Madison, Wisconsin*

Class V Restorations

DR. RALPH A. BOELSCHE, *Houston, Texas*
DR. D. F. BOURASSA, *Seattle, Washington*
DR. T. HAINES, *Clairmont, California*
DR. JOHN C. HAMPSON, *Seattle, Washington*
DR. W. I. MCILWAIN, *Pasadena, California*
DR. RALPH G. STENBERG, *Lynnwood, Washington*
DR. ROBERT L. SWEETEN, *Salt Lake City, Utah*

Chair Demonstration — "A Study of Time and Motion with Gold Foil"—John C. Metcalf Gold Foil Seminar—Dr. James P. Vernetti, Director

DR. EDWARD R. HILDRETH	—	Class III
DR. EARL A. NEURU	—	Class III
DR. D. E. SNYDER	—	Class III
DR. R. SPAMER	—	Class III
DR. CARLO A. DELAURENTIS	—	Class V
DR. MARTIN E. WICARIUS	—	Class V

Table Clinic — "Adolescent Foils"

Motion Picture — "The Class V Gold Foil Restoration"
(Continuous showing)

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Volumes 1, 2, and 3

(Numbers in **bold face** indicate the volume; numbers in light face indicate the pages.)

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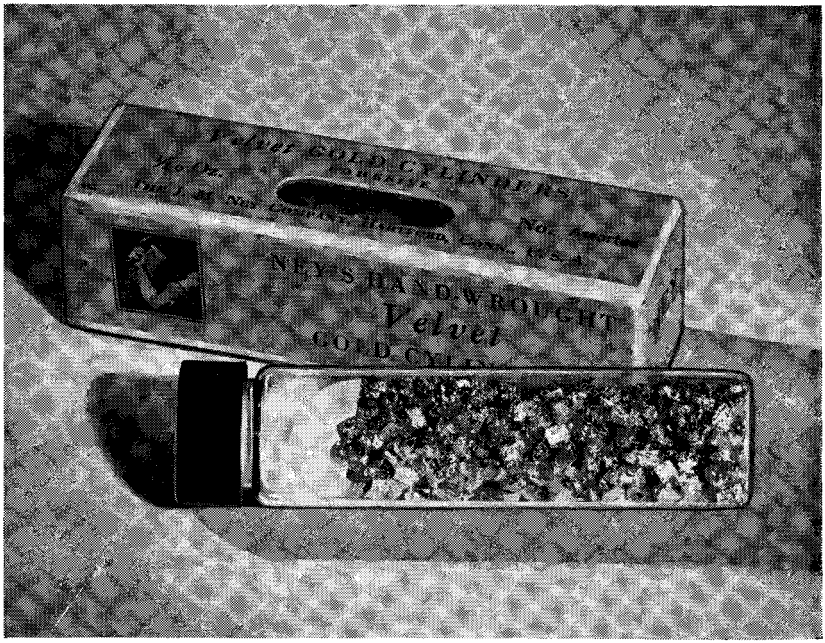

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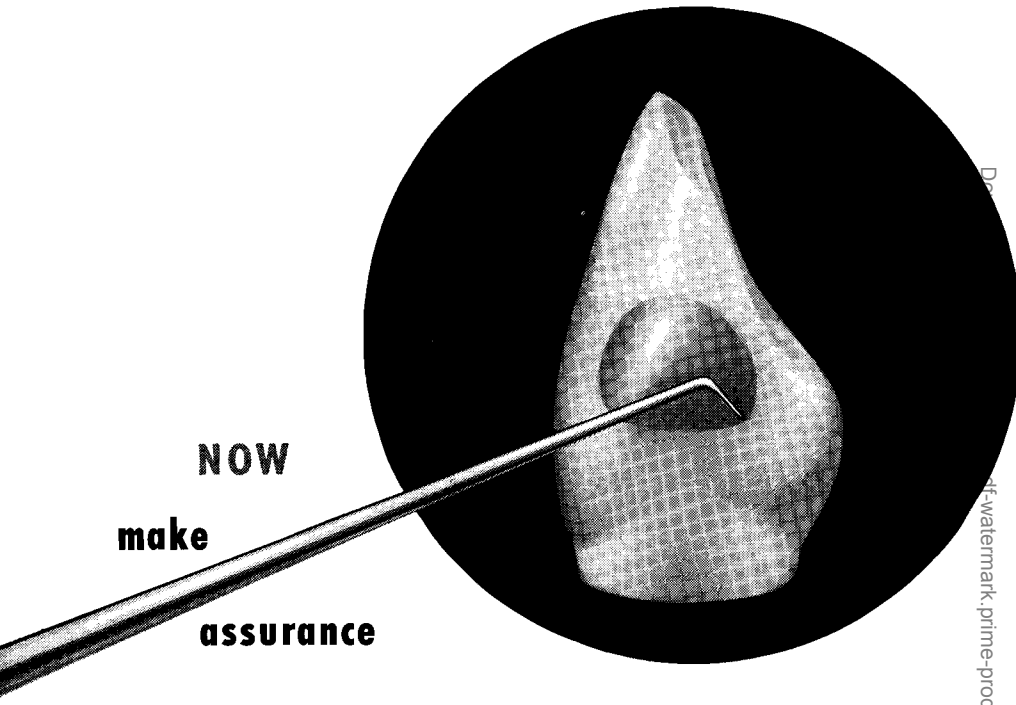

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