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President's Message

The year 1776, famous for the signing of America's Declaration of Idenpendence, is noteworthy also for another important publication, *An Inquiry into the Nature and Causes of the Wealth of Nations,* by Adam Smith, a Scotsman. In this book, for the first time, the principles of economics were elucidated scientifically. It was here Smith described the advantages arising from the division of labor. As an example he used the manufacture of pins and cited the increase in productivity that occurs when the fabrication of pins is divided into the separate tasks of drawing out the wire, straightening it, cutting it, pointing it, and so on for about eighteen different operations. It was the division of labor, coupled with the invention of machines and the development of substitutes for muscle power, that gave birth to the Industrial Revolution of the eighteenth century — a revolution the social and economic consequences of which have been enormous and, unfortunately, not all beneficial. It is a great tribute to Smith's foresight that he was able to predict some of the disadvantages of the division of labor, namely, overspecialization, the monotony of doing simple repetitive operations, and the tendency for the worker to acquire a narrow view of the overall purpose of his task.

Recently — within the last three decades — a marked departure in the course of industrialization has occurred. Advances in technology, generated by the continuing desire for greater efficiency and the need to reduce the costly labor component, have lead to the development of machines in which the detailed manual control has been replaced by automatic control. The introduction of automation has ushered in what is now known as the Second Industrial Revolution.

What has all this to do with dentistry? It suggests we should be looking to a new technology. For example, an automatically controlled milling device cemented to the teeth could be programmed to prepare several cavities simultaneously. A method such as this is our best hope for increased productivity. On the other hand, to reduce a particular operation, such as the placement of a silver amalgam operation, to its component parts and to have a dental assistant or a dental hygienist complete a part of the operation, such as the insertion of the amalgam, is economically unsound. It is overspecialization and is an attempt to apply the methods of the First Industrial Revolution in the Age of Automation.

Gregory E. Smith, D.D.S., M.S. Den.

Condenser selection for pure gold compaction

Pure gold restorations are the standard of excellence in Restorative Dentistry today. The success of compacted gold restorations depends, in part, on proper selection of condensers. Variously designed condensers are manufactured and differ from one another in size, shape, angulation of the shank, and type of serrations. The selection of condenser is usually based upon the personal preference of the dentist. This paper presents results of research designed to aid dentists in understanding factors which should influence their selection of condensers for pure gold compaction.

Literature Review

In 1895, Dr. G. V. Black described the flow of gold under stress, and discussed the use of smooth-faced and serrated condensers.[1] He felt that the size of the condenser point and the number of blows delivered were of prime importance in achieving density in compacted restorations. He found that a condenser nib so small that it would cut the gold instead of packing it was ineffective in compaction. In 1902, Dr. D. M. Cattell recommended a condenser with a convex face to wedge the gold in the cavity as the compacting blows were delivered.[2] He stated that a flat-faced plugger would not spread the mass properly. Black and Wedelstaedt advocated that condensers, regardless of size, be stepped no greater in distance than the diameter of the nib face.[3,4]

Dr. C. N. Johnson discussed orderly stepping in the compaction of non-cohesive gold.[5] He recommended a "broad-faced, deeply serrated condenser"so as neither to puncture nor to disintegrate the gold. This condenser was useful in producing a rough surface for subsequent attachment of cohesive

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gold. Dr. C. E. Woodbury recommended an optimum nib size of five-eighths of a millimeter.[6,7] He advocated the compaction of thick increments of gold with small condenser nibs, rather than thin increments with large nibs, because of the tendency of gold to bridge over voids when compacted with large nibs. Crystalline gold was thought to have a greater tendency to bridge than gold foil.[8] Woodbury, therefore, recommended careful attention to lines of force to achieve acceptable density in a restoration of crystalline gold.

Dr. H. A. True recommended large, medium and small round condensers of 1.2, 0.5, and 0.3 mm diameters, and a foot condenser measuring 0.4 mm x 0.8 mm.[9,10] Dr. W. I. Ferrier designed round, serrated condensers for compacting cohesive gold foil into Class II, III, and V cavities.[11] He also described cavity preparations for Class IV and pit and fissure restorations and recommended certain lines of force for compaction.[12] In 1946, Dr. G. D. Stibbs described the use of Ferrier condensers in the compaction of Class III gold foil restorations.[13] Dr. A. Jeffery modified some Ferrier condensers for his lingual approach Class III preparations.[14]

In 1966 Dr. C. H. Miller summarized the relationship between condenser nib diameter and the forces required for compaction of gold foil.[15] He stated that condenser nibs exceeding 1.0 mm in diameter should seldom be used for compaction of pure gold since the forces required for adequate removal of voids under large nibs could be harmful to the pulp. He recommended further that if large foot condensers were used, only the toe or heel should be applied to the gold at a given time. Dr. Miller also suggested that a greater compaction force was required for powdered gold and crystalline gold than for gold foil to achieve good compaction, since the powdered gold and crystalline forms had "a greater mass per unit volume than cohesive gold foil." Dr. Miller also discussed the use of serrated and nonserrated nibs and suggested that, due to uncontrolled skidding, nonserrated nibs were contraindicated.

Serrated nibs were recommended by Dr. J. Medina in 1969 for compaction of mat gold,[16] and serrated Loma Linda condensers were advocated by Dr. L. Baum in 1965 for hand pressure compaction of powdered gold.[17]

The compaction properties of direct-filling golds were summarized by J. T. Hodson in 1969.[18] Also in 1969, Dr. G. E. Smith, with Hodson and Stibbs, studied the compaction of cohesive foil and mat gold into retention holes and convenience points in Class III cavity preparations.[19,20] Further study by Smith revealed that condenser size and lines of force affected densification of gold in the specimens.[21] The information which follows is a summary of the results observed by Smith in the foregoing studies.

Materials and Methods

Four direct-filling golds were compacted into three types of dies with seventeen condensers and studied under the microscope.

Golds – Sheets of No. 4 gold foil* were cut into sections measuring 1/128th,

* Morgan, Hastings Company, Philadelphia, Pennsylvania

NUMBER	DESCRIPTION	NAME	FORMULA	NIB FACE
B-1 (B-21)	Straight	Ferrier #2	5.5	
B-2 (B-22)	Monangle, fine	Ferrier #7	4 - 8 - 6	
B-3 (B-23)	Monangle, small	Ferrier #4	5 - 4.5 - 7	
B-3S (B-23S)	Oblique monangle	Smith #1	5.5 - 4 - 6 - 25	
B-7 (B-27)	Parallelogram, hoe	Spratley	7.5 x 3.5 - 2.5 - 4	
B-8 (B-28)	Varney Foot	Varney #5	10 x 7.5 - 10 - 13	
none	Extra fine monangle	Experimental	2 - 8 - 6	
none	Triangular monangle	Experimental	3 x 3 x 3 - 8 - 6	
GF-20	Hand condenser	Loma Linda	None	
GF-21	Hand condenser	Loma Linda	None	
GF-22	Hand condenser	Loma Linda	None	

Figure 1. *Condenser formulae and nib face designs. Straight lines indicate bottom of V-shaped serrations. Solid shading depicts smooth-faced nibs.*

1/64th, and 1/32nd of a sheet, rolled into pellets by hand, and annealed by passing each increment through a pure ethyl alcohol flame immediately prior to compaction. Strips of mat gold* 2.5 mm x 1.2 mm were cut into increments measuring 1 mm in width, and annealed prior to compaction. A strip of Electraloy R. V.** measuring 0.8 mm x 4.1 mm was cut into 1.0 mm increments prior to compaction. Goldent*** pellets, sizes 4, 5, and 7 were compacted after annealing.

Dies – Three types of dies were used: a Class II type of preparation was cut into stainless steel, a Class I into plexiglass, and an internal point angle was cut into dentin in an extracted tooth.

The Class II type of cavity preparation was cut into a 1.0 mm-thick stainless steel plate. The preparation was designed so as to have acute, right, and obtuse internal point and line angles when clamped between two pieces of glass. The internal walls of the die were smooth and flat. The stainless steel die was designed to fit under the dissecting binocular microscope**** for direct observation of the movement of gold during compaction. Compacted specimens were photographed through the microscope.

Class I preparations were cut into the edge of plexiglass blocks and designed so that one wall was missing in the completed 2.0 mm-square preparations. A stainless steel plate was clamped against each preparation to form the

* Williams Gold and Refining Company, Buffalo, New York
** Provided by courtesy of Williams Gold and Refining Company, Buffalo, N.Y.
*** Provided by courtesy of Morgan, Hastings Company, Philadelphia, Pennsylvania
**** American Optical Instrument Company, Scientific Instrument Division, Buffalo, New York

missing wall. After compaction, the plate was removed; the specimens were etched and photographed on the metallograph.*

Triangular preparations with internal angles were cut into the dentin on one side of extracted teeth. Either convenience points or retentive holes were cut at the point angle. The convenience points were cut with a 4/0 end-cutting inverted-cone bur to a depth of 0.4-1.4 mm. Retentive holes were cut with a 3/0 round bur or a 27-gauge twist drill to a depth of 0.9-1.8 mm. Gold specimens compacted into the dentin were sectioned vertically, ground through 4/0 paper and polished on nylon cloth with wet alumina for microscopic study with the metallograph.

Condensers – The condensers evaluated in this study are shown in Figure 1. For purposes of discussion they are grouped into three categories: small, medium, and large. Small condensers are those with a nib diameter of 0.4 mm or less. Medium-sized condensers are those having a nib diameter of 0.5-0.55 mm. Condensers having a nib diameter greater than 0.55 mm are classified as large, and these include the Spratley parallelogram hoe condenser, the Varney foot condenser and the Loma Linda hand condensers. Serrations were removed from one set of the condensers so that results of compaction with smooth-faced nibs could be evaluated.

Compaction forces were applied with hand pressure, hand malleting, pneumatic** and Electromallet*** techniques.

Results

All golds moved three directions under impact: They were compressed directly beneath the nib faces, moved laterally under impact, and curled up around the shank of each nib. Throughout the study hand malleting and pneumatic compaction produced the greatest densification of gold foil, mat gold and Goldent. Compaction was observed to be effective under nibs to a depth no greater than 0.3 mm regardless of the nib design. No significant differences in the compaction properties were observed between mat gold and Electraloy R. V. with any of the condensers tested.

Small Nibs – The serrated 0.4 mm fine monangle condenser (Ferrier No. 7) readily reached the internal features of the die. Compaction into angles required that careful attention be given to lines of force, particularly when large pellets were compacted. Difficulty was encountered in producing a dense mass in acute line and point angles with large increments and it was only with a 45-degree line of force that the gold could be driven into sharp internal angles. However, since this nib readily fit into sharp angles, it compacted small increments of gold well into acute line and point angles by taking advantage of the compression of gold directly under the nib face. Condensers larger than 0.4 mm engaged the walls of line angles of less than 90 degrees before compacting the gold properly.

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*** McShirley Products, 6535 San Fernando Road, Glendale, California

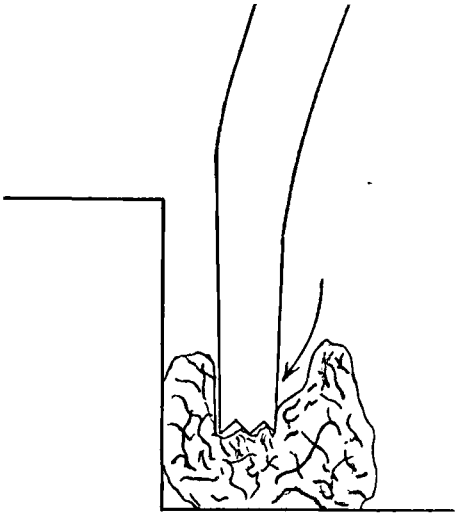

Figure 2. *Compaction of a large gold foil pellet with the 0.4 mm monangle condenser. Nib face buried into pellet upon initial impact.*

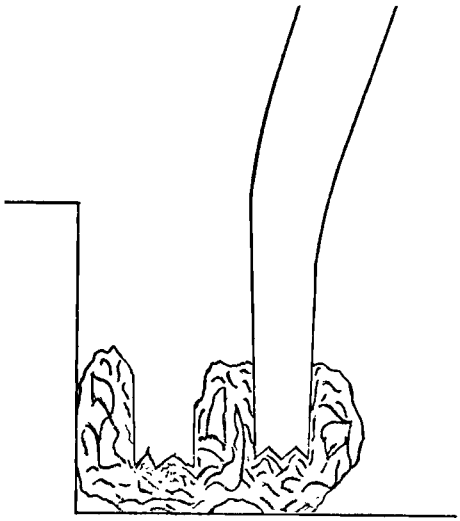

Figure 3. *Stepping of 0.4 mm monangle condenser on large pellet of gold foil. Orderly stepping is difficult and pillars of uncompacted gold remain between steps.*

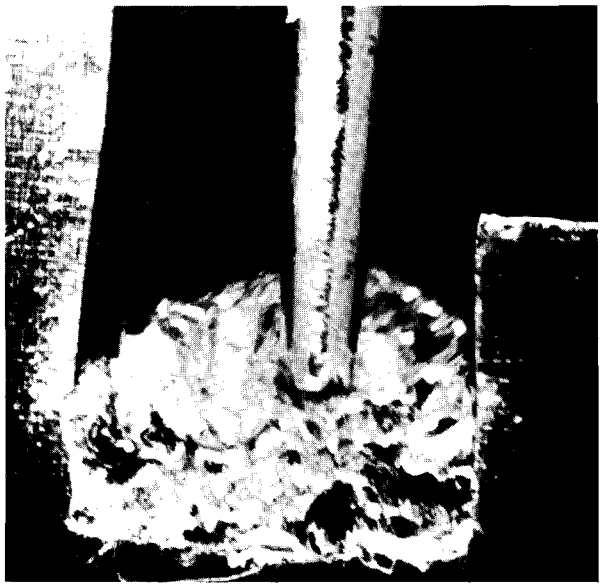

Figure 4. *Two large 1/32 gold foil pellets compacted into stainless steel die with 0.4 mm condenser nib. Dark areas on surface of gold indicate lateral movement against glass window. Light areas left of condenser, were burnished by condenser penetration into pellets.*

The small condenser was most effective in compacting small pellets or increments of gold. The serrations on the nib prevented lateral skidding so that with each blow the nib buried itself deeper into the pellet. However, the nib readily reached to the depth of small pellets and movement stopped. When large pellets were compacted with the small nib it buried itself into the gold on the first blow to a depth greater than the diameter of the nib face (Fig. 2). Upon subsequent stepping of the condenser, the nib either slid back into the original hole made in the gold by the first step or buried itself a short distance away from the first hole, thus producing a rough surface with two holes punched into the compacted gold (Fig. 3). Pillars of uncompacted gold remained between the holes. On subsequent stepping of the nib in an attempt to compact the remaining gold, the nib slipped back into one of the original holes, thus making uniform compaction difficult, if not impossible (Fig. 4). Attempts to compact with this condenser at an angle of less than 45 degrees to a wall produced burnished surfaces and torn folds, and frequently loosened the gold already placed.

The 0.4 mm condenser was effective in compacting gold into points and holes placed in the cavity preparations for convenience or retentive form, because the diameter of the shank was small enough to permit the condenser nib to deliver impact to gold at the bottom of shallow holes (Fig. 5). However, points or holes of a depth greater than 0.5 mm were difficult to fill because the condenser shanks would bind at the opening of the holes and prevent the nibs from reaching the bottom (Fig. 6).

Medium Nibs – The 0.55 mm straight condenser was the Ferrier No. 2 (University of Washington No. B-1), which is similar to the Woodbury No. 2. This condenser was efficient in compacting gold because of the straight shank and because the nib face is perpendicular to the handle and line of force. The condenser exhibited little tendency to skid laterally and was readily stepped over the gold. The diameter of the nib face, however, prevented effective compaction into internal line and point angles except for some lateral movement of gold into the angles. When directed at 45 degrees to a line angle of less than 90 degrees, the condenser hit against the walls forming the angle before the impact was delivered to the depth of the gold.

Gold foil was compacted into line angles of 90 degrees or more with the 0.55 mm straight condenser. Good compaction was evident when the line of force was directed at 90 degrees to one of the walls forming the angle. The nib settled into the gold on the first two blows and the folds of the foil were compressed below the nib. When the condenser was placed along one wall, and the force was directed perpendicular to the adjacent wall, lateral movement of the gold was sufficient to drive the foil into the line angle. Under hand malleting, pneumatic and Electromallet compaction, sufficient lateral movement of the gold occurred to wedge aside the stainless steel or glass plates which were clamped over the cavity. Stepping the 0.55 mm straight condenser in an orderly fashion along a line angle was difficult because of the size of the condenser. However, this condenser was effective in building up a bulk of material in the central portion of a cavity.

Figure 5. *Two 1/64 gold foil pellets compacted with 0.4 mm condenser into convenience pit cut with 0.4 mm end cutting bur. Some porosity is evident in this dense specimen. Longitudinal scratches resulted from metallurgical polishing.*

Figure 6. *Porous gold resulted from ineffective compaction with the 0.5 mm nib into this convenience pit cut with the 0.4 mm bur. Gold failed to penetrate to the bottom of the pit at the lower right. Large and small voids are evident throughout the mass.*

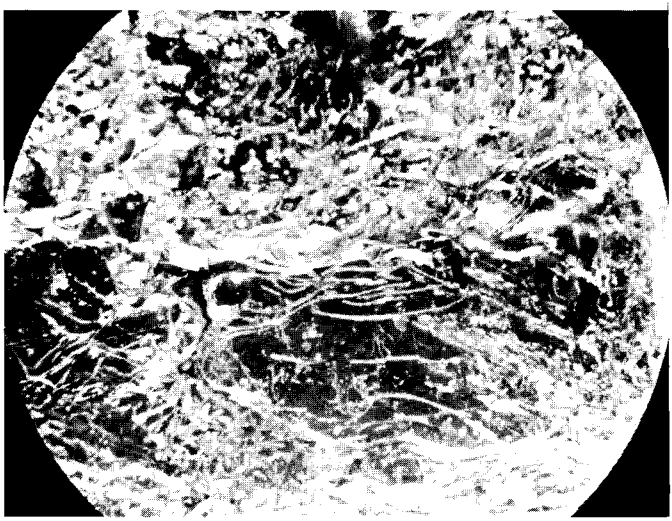

Figure 7. *Typical gold foil specimen at high magnification. Dark areas indicate lateral movement of the gold against the window. Folds of gold are light horizontal lines in the center of the specimen. Careful spreading of pellets minimized large voids. The area shown is approximately 0.3 mm in diameter on the specimen.*

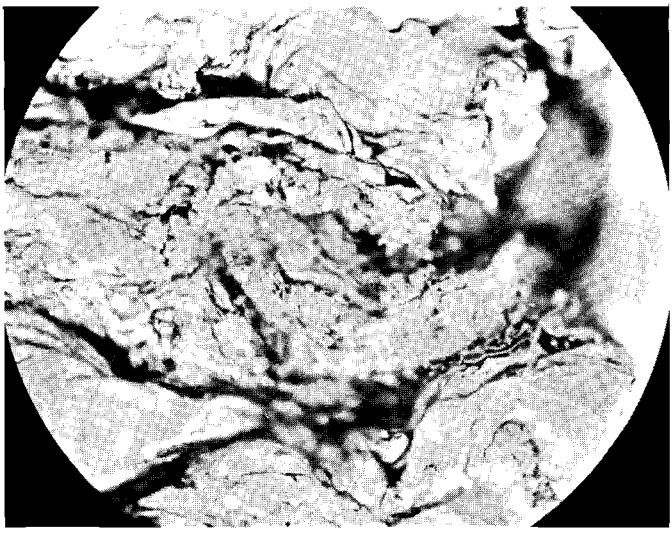

Figure 8. *Poorly compacted gold foil at high magnification. Large void spaces are evident between two medium sized pellets. Gold pellets were not spread out prior to impact. The area shown is approximately 0.3 mm in diameter on the specimen.*

It was necessary that increments be carefully spread out under the nib face with hand pressure before impact was delivered. The larger the pellet, the more important was the spreading of the increment over the surface of previously compacted gold. Failure to spread out pellets under the nib resulted in porous gold in all cases.

The 0.5 mm monangle serrated condenser was the Ferrier No. 4. This condenser produced densely compacted gold in all specimens. However, due to the nib size, difficulty was encountered in compacting the gold densely into internal line and point angles. The diameter of this nib prevented effective compaction into angles of less than 90 degrees. For trial compaction of gold into internal cavity angles, the nib face was directed approximately 45 degrees to that wall so as to take maximum advantage of the lateral movement of gold under the condenser and some advantage of the compression of the gold at the leading edge of the nib face. This condenser was effective in the compaction of all golds studied when medium or large increments were spread out carefully in the cavity prior to compaction to avoid development of large voids between and within increments (Figs. 7 and 8).

The oblique-faced 0.50 mm x 0.55 mm monangle condenser was the Smith No. 1 (University of Washington No. B3S). The nib face was cut obliquely to the shank and perpendicular to the line of force and long axis of the handle (Fig. 9).

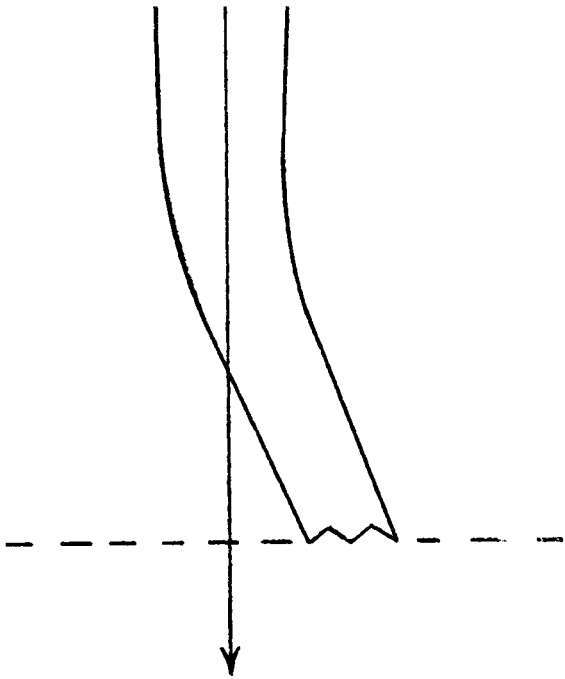

Figure 9. *Diagram of 0.5 x 0.55 mm oblique-faced, serrated monangle condenser. Arrow indicates lines of force, parallel with long axis of handle and perpendicular to the nib face.*

Direct compaction beneath the nib, lateral movement of the gold and curling up of the gold around the nib shank were observed as blows were delivered to this condenser. Because the face of the nib was perpendicular to the line of force, the entire face of the nib was effective in compaction. This condenser was the most effective monangle tested in the compaction of medium and large increments to build up a bulk of gold in each cavity preparation; however, voids were effectively removed only if the pellets were carefully spread out prior to impact. Gold foil was compacted densely into right and obtuse line and point angles. Dense gold was observed on cavity walls and within the center of the mass. Orderly stepping was better controlled with the serrated oblique-faced nib than with the conventional monangle condensers because the oblique-faced nib did not skid on the gold when directed perpendicular to the cavity base.

Gold foil was densely compacted into acute line angles with a line of force perpendicular to the cavity base. A 45-degree line of force was ineffective in these angles because of the large size of the nib face. The condenser was ineffective in producing dense gold at acute point angles with any line of force because of the large nib diameter. The serrations on the oblique-faced monangle nib were not as deep as those on some other condensers. These serrations were observed to tear the folds of gold during compaction, but did not dislodge the mass. Lateral slipping of this nib under impact was observed when the line of force was directed at an angle of 45 degrees or less to the cavity base. The slipping produced a slightly burnished surface on the gold. This condenser effectively compacted all golds tested, but it is not designed to fit conveniently into retentive features or sharp angles, and its use in fine cavity details cannot be recommended.

Large Nibs – The large condensers included the Spratley serrated parallelogram condenser, the Varney No. 5 foot condenser and the Loma Linda hand condensers. The large size of these nibs prevented access to the sharp angles of the cavities and made stepping difficult within the confines of the preparations. The Spratley condenser was more effective than the Varney foot in compacting gold into the center of a cavity preparation to build up the mass, because of its smaller size. Some have recommended the use of the toe of the Varney foot nib to drive gold into retentive angles in Class V cavity preparations. However, the toe proved to be too large to drive the gold into any line angle of less than 90 degrees and was of no value in the point angle compaction of any of the golds tested.

Goldent specimens were well compacted by heavy hand pressure in the center of the mass with the Loma Linda condensers. However, the nib size of the Loma Linda condensers made access to internal cavity angles difficult and considerable porosity was evident in these areas. Careful spreading of Goldent pellets was necessary for effective compaction (Fig. 10).

Serrations – Smooth-faced nibs were less effective in compaction than their serrated counterparts. They penetrated deeply into pellets, which made stepping difficult, and they slid laterally under impact, which produced burnished

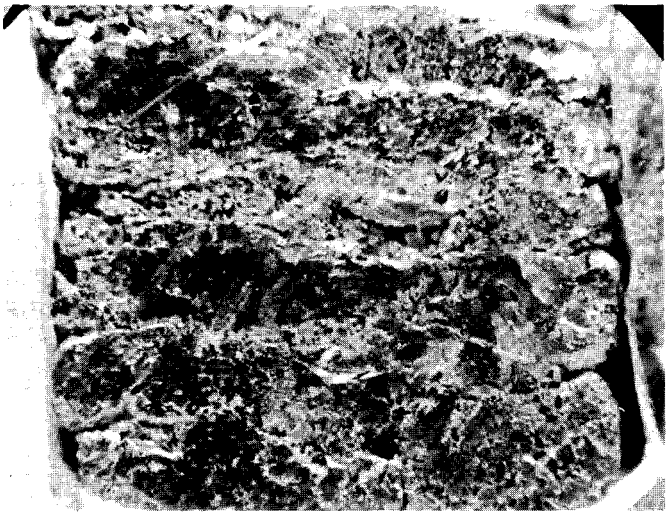

Figure 10. *Poorly compacted Goldent specimen. Large pellets were not carefully spread out prior to compaction with the pneumatic condenser and a 0.5 mm serrated nib. Layering and a network of porosity are visible. Size of specimen is 2.3 x 2.0 mm.*

surfaces on the gold and rendered attachment of subsequent increments difficult.

Discussion

Many factors are involved in condenser selection for pure gold compaction. On the basis of the results reported here, the following recommendations are made:

Small condenser nibs are advocated for compacting gold into cavity angles, points, or holes with small increments of gold. Larger increments of gold selected for rapid building of bulk of gold in a cavity preparation are best compacted with medium-sized condenser nibs. Gold must be spread out before impact, to minimize porosity.[22]

Straight condensers are the most easily stepped and they allow the best control of lines of force. Monangle condensers with the nib face cut obliquely to the shank are preferred over the standard monangle design, to minimize slipping during compaction and to obtain maximum effective impact from the nib face. Large condenser nibs can be recommended only for confirmation of compaction on the surface of a restoration prior to burnishing.

Lines of force for compaction should be selected according to nib design and cavity design. Lines of force are not influenced by the type of gold or the source of impact. When considering lines of force, the dentist ought to decide whether the compaction desired will be the result of compression below the condenser face or lateral movement of the gold into the cavity.

Conclusions

Conclusions made from the information provided have practical application to clinical operative dentistry.

1. For all compaction where access permits, except into convenience points or acute angles, a lightly serrated straight condenser with a nib diameter of 0.55 mm or less should be selected.
2. The proper line of force for the straight condenser is 90 degrees to axial walls. A 45-degree line of force is recommended when covering the cavosurface.
3. A condenser with a nib diameter of 0.4 mm or less should be used for compaction into convenience points. A smooth-faced nib may be used here to prevent dislodging the initial pellets.
4. Cavity retentive forms are best filled by compacting with a serrated condenser having a nib diameter of 0.4 mm or less.
5. Where access precludes the use of a straight condenser, serrated, oblique-faced monangle condensers should be used for building the bulk of gold.
6. Regardless of the type of gold or condenser employed, each increment must be carefully spread out in the cavity prior to compaction in order to achieve a dense restoration.
7. Large condensers should be restricted to "after-condensing" on the surface of the restoration prior to burnishing.
8. Manufacturers should be encouraged to produce condensers with shallow serrations which will promote good compaction without burnishing or tearing gold.

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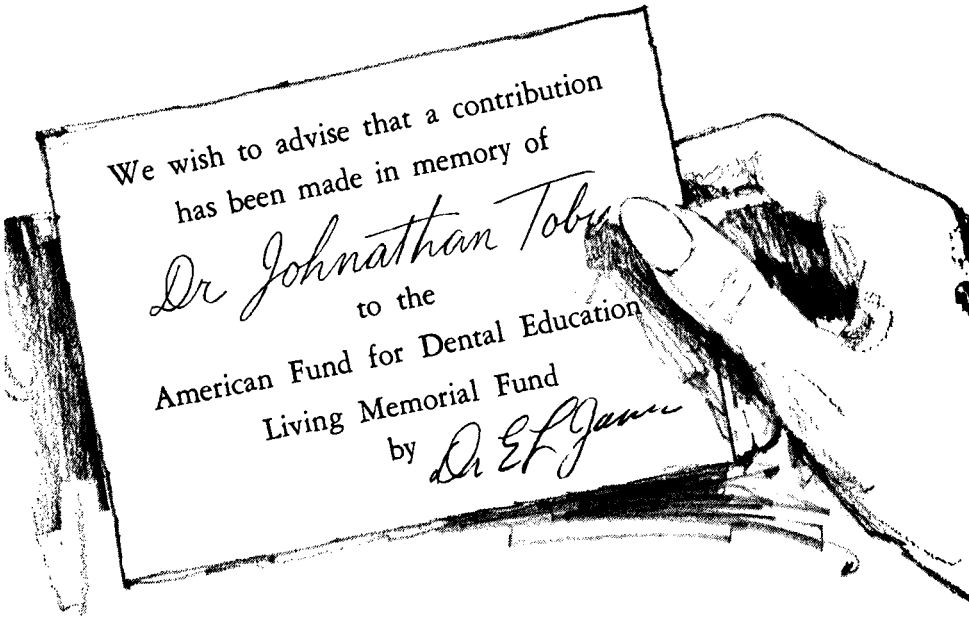

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David A. Grainger, D.D.S.

What are you operative dentistry and why are they saying all those nasty things about you?

The choice of a title for a keynote address is a difficult one. Rumblings of discontent had been conveyed to me about the poor future for Operative Dentistry and the poor quality of restorations experienced at State Board examinations. I love Operative Dentistry and all this talk bothered me. At the time I began to write the address I saw the movie, "Who are you Harry Kellerman and why are you saying those terrible things about me?" and I knew I had found my title. There is no symbolism and it is not intended to offend. I hope it has achieved its real purpose to provide a challenge for the organization of the Academy of Operative Dentistry. – The Author

A short two months ago the American Dental Association published its report on policies with respect to dentistry in national health programs.[1] It is a comprehensive report, full of detail, condensed, and succinctly written. It stresses the priorities of childhood and youth, describes emergency care and the delivery of services, talks of education, training, licensure, payment mechanisms and funding, and recommends preventive procedures and dental health education as the first steps in a national dental health program.

It is evident that the talk, the hustle and bustle of the past decade, has been focused upon the leaders and the organization of the dental profession. Strategies have been developed, written, proposed, modified, and tentatively approved. These are strategies designed to renovate inadequate delivery of national dental health care. To be successful such strategies must be supported by significant organized effort that considers attention to detail coupled with staying power.

At a meeting of the American Society of Oral Surgeons,[2] the Chairman of the House Ways and Means Committee, Representative Wilbur Mills, the

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This was the keynote address of the organizational meeting of the Academy of Operative Dentistry, Chicago, Illinois, February 12, 1972.

Arkansas Democrat said, "The bill we approve (associated with national health insurance) may not divide up the patients the same way the health professions have." Perhaps we have made a mistake, Mills said, in so deliberately and arbitrarily separating dentistry from the rest of medicine.

The National Institute of Dental Research[3] published a plan in December 1970 that speaks of the crisis in the delivery and cost of health care. It is evident, states this document in describing the National Caries Program for Prevention, that "despite continuous improvements in the treatment and control, the major problems of tooth decay and periodontal disease cannot be adequately overcome with corrective measures." This program is funded and has set a goal to have means capable of preventing dental caries within a decade. This disease process affects 98% of the population and annually costs the people of this country who receive care approximately two billion dollars. The National Caries Program is designed to support laboratory research, clinical studies, and field trials in the use of fluorides, and to investigate the efficacy of sealants, sugar substitutes, dietary additives, trace elements, mechanical cleansing of tooth surfaces, prevention of bacterial adhesion and inhibition of their growth, as well as immunological processes.

It is into this political and scientific environment, then, that we are today giving birth to the Academy of Operative Dentistry.

In his book *Future Shock,*[4] Alvin Toffler speaks of the last 50,000 years of man's existence in terms of lifetimes, each lifetime existing for approximately sixty-two years. Toffler has made the observation that "the overwhelming majority of all the material goods we use in daily life today have been developed within the present, this 800th, lifetime." When this lifetime began, in the year 1908, a gentle, dedicated man published *A Work on Operative Dentistry in Two Volumes.*[5] That man gave birth to a discipline that became the mainstay of all that exists in dentistry today. Greene Vardiman Black, the "Father of Modern Dentistry," was that man.

Volume I of that work was called *Pathology of the Hard Tissues of the Teeth – Oral Diagnosis.* As one turns the yellowed pages of that printing, one is pleased to notice extensive descriptions about the investing tissues of the teeth, the gingivae, the periodontal membrane, cementosis, saliva, dental pulp — its disease and treatment — calculus, limited surgery, systemic disorders, and mouth hygiene. The reader continues with Volume II and explores the intricate detail of carious classification, cavity preparation, and all that was to be known at that time about dental materials. It is an interesting exercise to read and know the mind of a man who wrote at the beginning of this century — a century that is almost into its final quarter — and to know that the years between have seen the birth of countless disciplines that once were inseparable from operative dentistry.

Greene Vardiman Black was born in 1836 and began the practice of dentistry at 21 years of age. When Charles Darwin published his work *On the Origin of Species by Means of Natural Selection* in 1859, it made its mark, for it showed the world that science is nothing more than finding the real facts. Black became absorbed in this concept and from that time on developed his innate skills of collecting and transmitting information. He became Professor of

Pathology at the Missouri Dental College in 1870 and continued as Professor of Pathology in all the dental schools with which he was ever associated. Black has been described as the original pathologist of the dental profession, who set the pace while others followed.

"The year 1908 will always stand out as the monumental year of Greene V. Black's career. He had grown so in stature and reputation that many dentists took all he said and wrote at face value even after he, himself, was changing or discarding previously accepted positions. Such is the way of the truly scientific mind. Few men live to round out their life's work as did Dr. Black. While it had been a labor of love which had been satisfying to him it had meant much drudgery, many disappointments, frequent reversal of his preconceived 'notions.' His had been a hard, grinding, exacting life. He had been his own teacher, his own taskmaster throughout. He was a hard, harsh, unrelenting teacher of himself. All these things are no doubt the lot of every man who has that inner drive to accomplishment. While much of such a life journey is made through a dense forest with only an encouraging streak of bright light here and there, these bright streaks increase in frequency until finally diligence and patience are rewarded with a breakthrough into a bright and glorious day. The publication of his *Operative Dentistry* was such a day."[6]

What has happened to Operative Dentistry since that time? Perhaps it is important to begin with a few statistics about the past 60 years. Acceleration associated with the rate of change in society that has and is taking place around us means a 6.5% per year increase in urban population. This single, stark statistic means a doubling of the earth's *urban* population within 11 years. In the period of time since G. V. Black published his *Operative Dentistry*, more than 60% has been slashed from the time needed to translate a major scientific discovery into a useful technological form. On a worldwide basis, scientific and technical literature is now being published at a rate of 60 million pages a year.[4] It is no wonder then that, in its effort to cope with this accelerative thrust, Operative Dentistry burst its seams from internal, intellectual pressures.

As creative, innovative men explored ideas and discovered new knowledge, their worlds became unmanageable and generally unacceptable to the contemporary man of each decade. These individuals who faced the enormous size, the vastness and lethargy of either their cities, their businesses, their governments, or their careers found a frustration that was more than their spirits could bear. For some it led to apathy, a withdrawal, then a rigidity "supported by solid citizens who strove to be virtuous but disliked change."[7] It is unfortunate that the pursuit and excitement of discovery often sets the stage for that familiar confrontation "between people that demand change and institutions that resist it."[7] Others moved on. They took with them the excitement, the pleasures, the fun, and built new organizations and disciplines. In so doing, their worlds became a little more refined, a little more sophisticated, and new specialties were born. For us, these specialties conceived in Operative Dentistry and born in Operative Dentistry are found maturing in spheres of their own.

Operative Dentistry has had a difficult time as these specialties developed. The loss of active men diluted the innovative effort and resulted in little change in the *status quo.* Interesting and determined men have used the discipline as a way station — a place to try out their ideas before moving on to more prestigious areas of endeavor. Some of those who remained within the framework have, at times, been guilty of a failure to see the rapidity with which the world around them was moving. Change, roaring through society, widened the gap between what was believed to be and what really was.[4]

But this is growth — spawned by the activities of constructive dissenters. We, who are part of the original organization, must not be trapped so that we begin to identify dissent with disloyalty. We should think long and hard about the role our most determined young men should play. Gardner,[7] in his descriptions of change maintains that "the most impenetrable defense is deafness — information is the lifeblood of effective dissent. Every serious critic will sooner or later find himself fighting the battle of information." We must not let this happen in Operative Dentistry.

But that is the past — of greater importance will be answers to two vital questions: what *will* happen to Operative Dentistry in the lifetimes ahead and, what *will* be the role played by this Academy?

Men of action have a thorough grasp of both the present *and the future.* They understand the concept of transience as the rate at which relationships and things turn over and have the capacity to relate this concept to most, if not all, of their life styles. They understand that as the rate of change in society accelerates it influences all actions and that strong, durable ties with people or tasks may become prisons. They understand that a career goal must be replaced by "serial career" goals; that is, a number of goals, essentially similar, to permit a man to develop his job in terms of a trajectory type which is an overall pattern of his work life. Bennis[4] has said that these men "seemingly derive their rewards from inward standards of excellence, from their professional societies, and from the intrinsic satisfaction of their task. In fact, they are committed to the task, not the job; to their standards, not their boss . . . They are not good 'company men'; they are uncommitted except to the challenging environment where they can 'play with problems'." Many agree with such a life but those who do not must accept the fact that it exists.

Toffler sees the world, and all in it, shifting from the traditional system of *bureaucracy* to that of an *ad-hocracy* where everything, changing so fast, will force the formation of temporary groups to solve specific short-term problems.

This kinetic concept will permeate the entire society from government and business through institutions and associations to schools and families. Those of us who are today part of large organizations know that most successful solutions to the ever-increasing number of crises are achieved in this way. A gradual collapse of bureaucracy and hierarchy means that crucial decisions change from up and down to sideways so that there is a massive shift from vertical to lateral communication systems.

It is important, as we establish this Academy, to consider the roles that active and creative men will play both in Operative Dentistry and other specialties. The modern world is in love with specialization and what we need now is a leadership which can move beyond a special field to deal with problems of the total oral condition. It must be accepted and tolerated that many good men and vital men do not fit neatly into a chain-of-command system and simply can't wait for their expert advice to be approved at a higher level. Administrators for these men will necessarily function as coordinators between individuals as well as transient groups of such men to achieve communications across, rather than within, groups. Skills in human interaction will become as vital to the success of a task as the specialist training itself. Men and women will require skills that permit them to make critical judgements, so that they can "weave their way through novel environments, and be quick to spot new relationships in the rapidly changing reality."[4] It is the tough-minded who will survive, for it is not easy to discard the results of one's efforts time and time again because of the whims of an ever-accelerating society.

Society designed standardization and permanence as a necessity in the days of primitive technology, but automation, by contrast, has provided an endless, blinding, mind-numbing diversity so that we are confronted with overchoice in everything we do. It is this very diversity which has ignited the bitter conflicts in education — and all the academies, colleges, associations, and societies are a very real part of the educational process. Old and new dentists will have to be taught how to cope; how to anticipate the directions and rate of change; how to accept role versatility; how to discard old ideas and how and when to replace them. New education must teach the individual how to classify information, how to change categories when necessary, how to reclassify, how to move from the concrete to the abstract and back, how to look at problems from a new direction — how to teach himself. "Tomorrow's illiterate will not be the man who can't read. He will be the man who has not learned how to learn."[4] Learning requires energy, and relearning requires even more. Dental education must shift into the future tense. Toffler[4] has said, "nothing should be included in a required curriculum unless it can be strongly justified in terms of the future. If this means scrapping a substantial part of the formal curriculum so be it."

This will not be an easy task, for it implies that we must cease thinking about what dentistry "is" and begin thinking about what it is "becoming." This shift in focus suggests a whole array of new approaches to adaptation by groups as well as individuals.

One must base the development of a group such as this Academy on the future to avoid missing the problems and their solutions altogether. In thinking about the future it is better to err on the side of daring than on the side of caution.[4] In Operative Dentistry that future will see the carious process controlled to a degree that will shatter today's concepts of treatment. That future will force us into the skilled management of paraprofessionals who will be performing a variety of tasks with new restorative materials destined to change forever our thoughts on cavity preparation. We will be thrust

into a way of life that takes the carious process and its present static therapy and turns it into a dynamic, functioning, physiologic unit of the oral cavity. This means that cavity preparation and its restoration is but a bare beginning, to be related to the periodontist's understanding of the investing tissues, the pathologist's understanding of the carious process and the pulp, and the gnathologist's understanding of occlusion.

This makes sense in our time because the members of this Academy are geographically divorced in an age of diversity that makes it increasingly difficult to agree on detail. Never will California be Maine, nor Maine, Texas. Let us spend the future agreeing on concepts and far-reaching educational goals rather than on intricate details. We must learn to grow from our geographical differences by giving some cohesion to what amounts to a pluralistic philosophy. That builds strength. No group, no man holds a monopoly of insight into tomorrow. We are all needed, all the time, to develop the future. Dentistry is now in need of men with a different kind of expertise that can be provided by this Academy. Toffler[4] calls them "multispecialists" as distinct from rigid "monospecialists". These are "men who know one field deeply, but who can cross over into another as well."[4] The creation of the Academy of General Dentistry nurtured such a possibility — a group of men who might provide a multispecialist role. But this was asking too much of a group of dedicated men who could and can superbly coordinate a myriad of monospecialties but could not, by virtue of their roles, know any one to a depth which made them multispecialists; broad ranging men, yes; with depth and crossover, no.

Leadership today involves many special problems. Anonymity is one. The real leaders, the men who make things happen, are rarely placed on a pedestal, rarely in the public or professional eye. These are the men who must be given the opportunities, the encouragement, and the support, and are the men to whom all must listen. To these men, change is so rapid that values and hypotheses are tested constantly in the doing, a form of testing that is both imprecise and relentless. You can't vote yourself into the company of great men or great dentists — you must earn that place — and a system in which to learn how only moves if it is pushed, and what is generally needed is not a mild push but a solid jolt.[7]

So a need for the last building block still exists — something for the future to fill the void which has been created by a concentration of the specialties at the expense of their original source. Operative Dentistry created dentistry and lost itself in the process. We are faced with an Operative Dentistry that has grown tired, tired from the loss of excitement, from the loss of prestige, from the loss of dignity and even the loss of pride. This is no indictment against those who toiled within its structure, year after year, to further its aims and goals. Thank God for those men, for without them we would not have the opportunity today to meet the challenge of building something once again. The specialties are strong, they have forgotten their humble beginnings and now flex muscles in both the public and private sectors to the benefit of all that is dentistry.

To walk with them, Operative Dentistry must look at its fundamentals

in the light of the future. Operative Dentistry must accept the challenge of a restorative and biologic multispecialty. Cavity preparation and restoration *is* only a beginning. Expertise must cross over into a deep understanding of the occlusion, the pulp, the periodontium, biomaterials, nutrition, histochemistry, and microbiology so that we can manage this array of scientific information in the clinical practice of operative dentistry. The discipline of Operative Dentistry must shrug off its apathy, recognize its worth and dominate once more the direction that dentistry must take. Let us move Greene Vardiman Black into the next lifetime, give him back his energy in an environment that demands a forward look at this, our world of mouths and teeth and tissues. We are skilled in producing skeptics, but not very good at producing individuals who can create their own framework for values. The first step towards the reconstruction of professional values is the rediscovery of values in one's own tradition.[7] G. V. Black gave us that tradition one lifetime ago.

Dentistry, all dentistry, needs a common purpose, a binding principle, some instrumentality for insuring that common goals and excellence are in fact accomplished. What is more logical than Operative Dentistry? . . . What then are you Operative Dentistry? *You* are the multispecialty of the future . . . the hub of the wheel . . . this . . . Academy.

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Paul H. Loflin, D.D.S.

Protection of lingual soft tissue when using a cervical rubber dam clamp

One problem in the placement of cervical retractors or clamps, such as the Ferrier 212,* is the impingement of the lingual arm on soft tissue. Protection of the gingival tissue is not always successful even if the 212 clamp is modified according to Brass.[1] Modeling compound and section of cotton roll have been used to shield the area.

Technique

A simple method of protecting this soft tissue is the use of a modified rubber stopper from an anesthetic carpule (Figure 1). A rectangular cut, 13 or 14 millimeters deep, is made in the stopper and the lingual arm of the clamp is inserted into it. This allows the stopper to be firmly secured to the metal arm. A concave cut is made in the opposite end of the stopper to allow it to adapt to the lingual contour of the tooth.

Some difficulty was experienced in cutting the rubber. A slowly rotated straight handpiece No. 701 bur is adequate to make the rectangular cut for the clamp arm. A heatless stone (Figure 2) was found to be most efficient in making the concave depression in the stopper. Various types and colors of stoppers, used by different manufacturers, were tested and the white rubber ones in 3% Carbocaine** carpules produced the smoothest cut surface. This technique cannot be used in all cases. Rotated or crowded teeth may not allow sufficient space for the stopper and overall reduction in the size of the stopper is occasionally necessary to allow easy placement of the clamp.

Some advantages of this technique are:

1. Local anesthesia of the maxillary lingual gingival tissues is usually unnecessary when this type of protection is used with the Ferrier 212 retractor. The patient is spared the discomfort of a palatal injection.

2. The stoppers can be prepared in advance by an assistant and stored for future use.

3. Better stabilization of the clamp is obtained with the stopper on the

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** Cook-Waite Laboratories, 90 Park Ave., New York, N.Y.

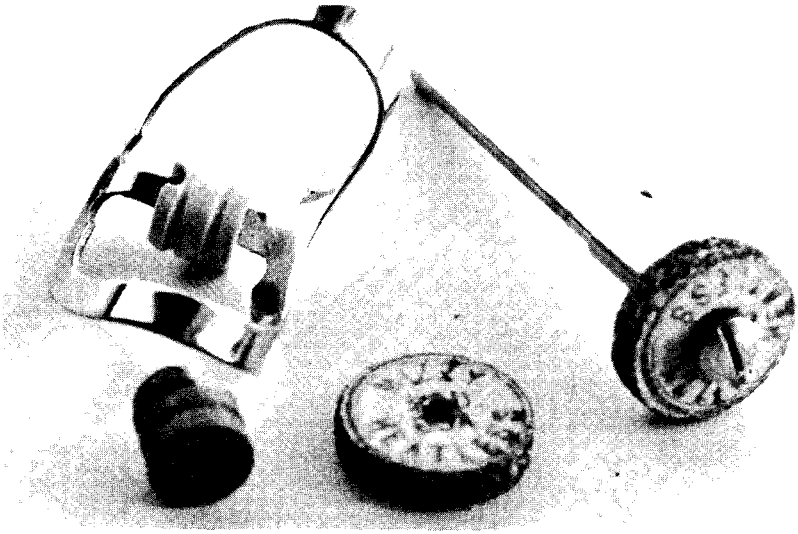

Fig. 1. *Ferrier 212 clamp in place on maxillary bicuspid showing stopper in position to protect lingual soft tissue.*

Fig. 2. *Rubber stopper with lingual arm inerted in rectangular cut. Heatless stone used to cut concave depression to accommodate lingual contour of tooth.*

lingual arm. It is sometimes even unnecessary to hold the clamp in position with rubber dam clamp instruments while it is secured with compound.

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George M. Hollenback Operative Dentistry Seminar Celebrates Tenth Anniversary

The George M. Hollenback Operative Dentistry Seminar, a study club founded in April 1962, marked its first decade during a three day session at the West Virginia University Medical Center which included a Continuing Education course in gold foil restorations at the School of Dentistry.

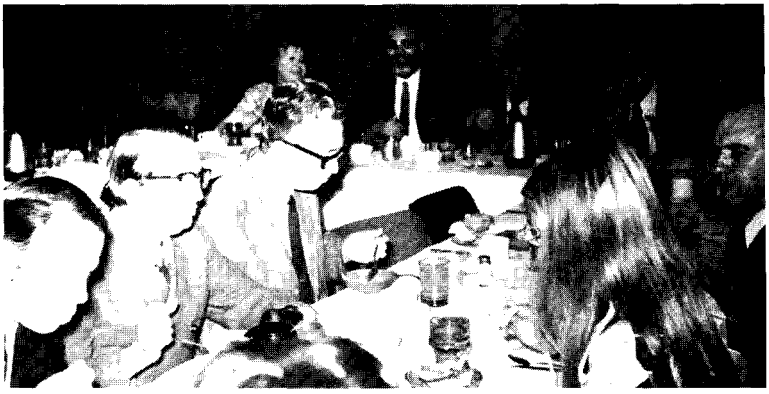
Dr. Jose E. Medina, Dean of the College of Dentistry, University of Florida, and Director of the Seminar since its inception, conducted a series of lectures and clinical operations during the one day session devoted to assisting third and fourth year clinical students with gold foil procedures.

To climax the activities, a banquet was held at the Holiday Inn. Dr. Robert E. Bricker, Past President of the Seminar, acted as Master of Ceremonies. Highlights of the evening were the conferring of active memberships on Dr. W. H. Harris and Dr. Leo F. Fleckenstein. Life Memberships were awarded by Dr. Medina to Drs. Robert E. Bricker, D. E. Neil, James E. Newman and Paul H. Loflin. Dr. Medina was invested as an Honorary Life Member.

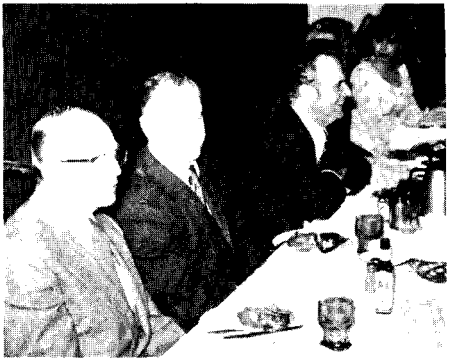
Invited guests from the West Virginia University School of Dentistry were: W. Robert Biddington, Dean, School of Dentistry, Robert E. Sausen, Chairman, Department of Operative Dentistry and John L. Campbell, Director, Continuing Education. Other honored guests were Clarence C. Cottrill, Past President, West Virginia Dental Association; Robert M. Wild, President West Virginia Board of Dental Examiners; Edwin Warfield, Editor, "The Journal," and members of families, including Mrs. Jo Bricker, Mrs. Gene Neil, Miss Mavis Neil and Miss Jo Anne Loflin. Others attending were: Dr. Bruce Forbes, New Martinsville, Dr. Robert B. Bridgeman, Past President, West Virginia Dental Association, Dr. Edmund G. Vanden Bosche, Chairman, Department of Operative Dentistry, University of Maryland, and Dr. Glenn Virket, Leesburg.

Clinical operations at West Virginia University, Dental School. Dr. William H. Harris explains a point to student operators.

Members of the George M. Hollenback Operative Dentistry Seminar assisting students during clinical session. Dr Leo Fleckenstein observing operative procedure.



Members and guests attending banquet. At the head table: Mrs. Bricker, Dr. Bricker, Dr. Medina and Dean Biddington. Others, left to right are: Dr. Fleckenstein, Dr. Vanden Bosche, Dr. Forbes and Dr. Cottrill.



Reading left to right: Dr. Robert M. Wild, Robert E. Sausen, D. C. C. Cottrill.

Dr. Robert E. Bricker introduces guests at banquet, noting first decade of George M. Hollenback Seminar.

David E. Snyder, D.D.S.

Comparison of various maxillary Class III direct gold cavity designs

The dental patient should receive treatment that is customized to his needs, not that which is of standardized nature. Just as we deplore wholesale extraction and replacement with full dentures for the patient with moderately severe dental problems, we should also deplore using the same design of class III cavity for each patient. Most dental schools and many operators closely follow one philosophy of cavity design for every patient. There are many Class III direct gold designs, each with its own particular features, to solve the problems of esthetics, convenience, extension for prevention, retention, and resistance. Different golds and instruments have been designed for particular situations.

The cavity may need to be extended only enough to open the contacts in ideal patients. Many designs have been created to support this conservative approach. These minimal extensions are not indicated for every patient. The caries susceptible patient will require very generous extension. The important point is that the patient should have what is best for him in the indicated situation rather than a more easily placed restoration.

Esthetic considerations should also vary from patient to patient. The long lipped patient who does not show the maxillary interproximal areas is obviously no problem, while the pretty young woman with a generous smile creates an entirely different situation.

Some preparations do not fit well into the bulk and contours of certain teeth. The thin blade-like tooth or a bulky conical tooth may require different preparations. The position of the decay may also be a determinant. The typical location of caries is just lingual and gingival to the contact point, but often the caries is atypically placed toward the labial or incisal. When a carious tooth is being diagnosed and the correct cavity design is being

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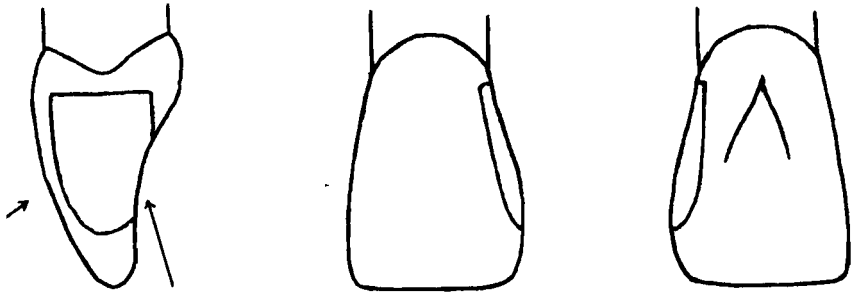

Fig. 1 —*Ferrier and Woodbury Preparations – labial access with some slight additional inciso-lingual access.*

selected a valuable aid is to break into the carious area with a small chisel or hoe. This gives an indication of where the destruction already has occurred and the effect the rotation or position of the tooth may have.

With all these factors in mind, let us examine some of the many preparations available to the operator. This writer will try to analyze these various preparations in view of the aims of their designers and in which cases they are indicated. The following will be covered:

Ferrier	Loma Linda
Woodbury	Adolescent
Jeffery	Seymour
True	Ingraham
True Distal of Cuspid	Inciso-lingual Access

Loma Linda Alternate Design

The arrows on the drawings show the direction of access from which the cutting instruments are introduced and the direction of condensation forces.

The Ferrier[1] and Woodbury[2] preparations (Fig. 1) are rather similar. The internal portions differ in that Ferrier developed more definite dentine walls on the labial and lingual at slightly obtuse angles to the axial wall and enamel walls with more of a flare determined by the direction of the enamel rods. Also, the retention tends to be rather minimal. The Woodbury preparation is basically a concavity with more definite labio-gingivo-axial and linguo-gingivo-axial retention points. The outline form and access are similar and the differences that are thought to be great may be only the interpretations given by certain disciples. These are standard labial approach cavities. The labial access is supplemented by a slight extra inciso-lingual access to reach the linguo-gingival area. These types are surprisingly esthetic for distal cavities. The designers tried to design labial outlines to blend with the natural contour of the proximal lobes of the teeth. The show of gold on some mesial cavities is, unfortunately, one of the principle reasons for the bad reputation of anterior gold foils. In thin teeth the incisal half of the lingual wall is very weak, particularly in the Ferrier preparation. The Ferrier designed instruments are best for keeping these preparations minimal in size. The Ferrier or Woodbury preparation is indicated in thick or medium thick teeth where

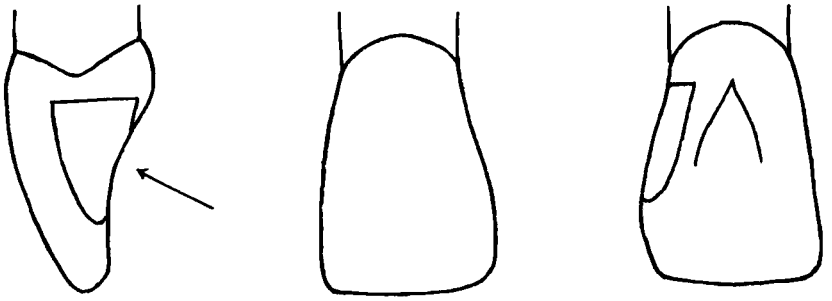

Fig. 2 — *Jeffery Preparation – lingual access.*

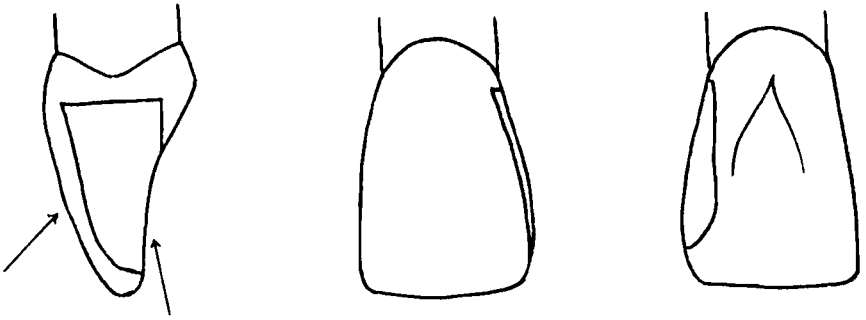

Fig. 3 — *True Preparation – labial and linguo-incisal access.*

the labial show of gold is not objectionable and where the decay location is fairly typical.

The Jeffery[3] preparation (Fig. 2) was designed to be almost completely invisible from the labial view. The completely lingual access requires special cutting and condensing instruments. The double-bowed separator rather than the single-bowed is preferable, because the former, with proper torque and reinforcing compound, can force the operated tooth slightly lingually for better access. The Jeffery preparation is extremely conservative for tooth substance. Obviously, the labial and incisal extensions are minimal. The Jeffery preparation is indicated where maximum esthetics is demanded, where this minimal extension is likely to succeed, and where the decay is in the typical location, just lingual and gingival to the contact point.

The True Inconspicuous [4 5 6] preparation (Fig. 3) was designed to have a visible labial outline yet be quite inconspicuous. Dr. True carried the principles of previous foil esthetics one step further by creating a labial outline which duplicates the normal outline of the tooth so that it harmonizes. Most other preparations have a straight line or a curve not found in the natural tooth. To avoid opening the labial just for convenience, considerable inciso-lingual access is used. This is achieved by making a generous curve at the inciso-lingual outline. The only special cutting instrument is the bayonet angle former. Dr. True also designed the single bow non-interfering separator.

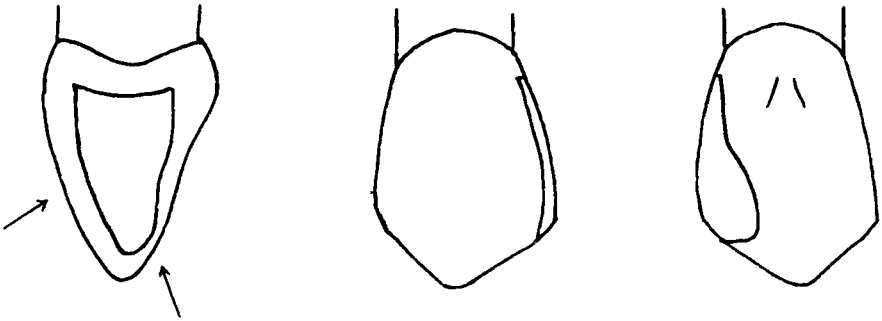

Fig. 4 — *True Distal of Cuspid preparation – labial and linguo-incisal access.*

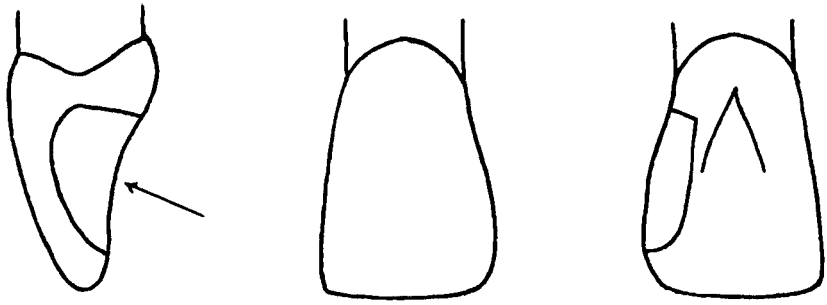

Fig. 5 — *Loma Linda Preparation – lingual access.*

Ideally, this separator is placed with the bow over the operated tooth for cutting and condensing and reversed with the bow over the approximating tooth when using the abrasive strips. The True preparation is indicated in many teeth where the destruction already affects the labial and where every effort must be made to achieve an inconspicuous outline. It can be used also in cases where the caries is close to the incisal.

The True inconspicuous-type Class III distal of upper cuspids[6] preparation (Fig. 4) is particularly indicated for the thick conically shaped tooth. The inciso-lingual curve creates a step that has a pulpal wall similar to the occlusal portion of a class II. Many short, thick cuspids have little incisal substance left for retention in other class III designs. Conversely, the thin, blade-like cuspid does not lend itself to this preparation, and would be better with a design that maintains the incisal corner of the tooth.

The Loma Linda [7] [8] preparation (Fig. 5) was designed to make the class III a much simpler and speedier procedure with a preparation designed for powdered gold pellets. This is a lingual access preparation in which there is no lingual wall. Some of the Jeffery cutting instruments are used for the preparation and some specially designed condensing instruments are used for condensing with hand pressure. This preparation is indicated for teeth where the destruction is toward the lingual and where the slightly sloping gingival outline can include the linguo-gingival area susceptible to decay.

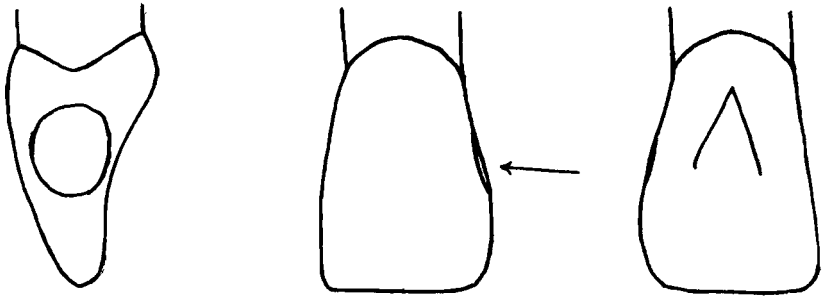

Fig. 6 — *Adolescent Preparation – proximal access.*

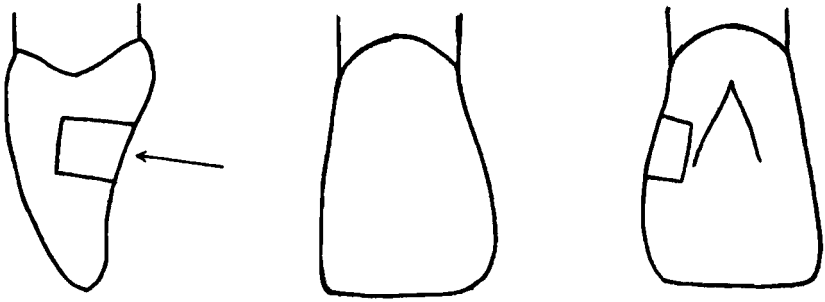

Fig. 7 — *Ingraham Preparation – lingual access.*

Some old silicates that have failed can be replaced with this restoration if the original filling was placed from the lingual. If the caries is toward the labial, this preparation is probably contra-indicated, since the labial outline is usually very unesthetic.

The adolescent class III[9] preparation (Fig. 6) is the only class III with very minimal convenience form. The outline is very simple and the access is obtained by having good separation or no approximating surface. In the young patient, separation of 1.0 to 1.5 mm is possible if the periodontal membrane is thick and the teeth have not erupted into tight contact. In the older patient, the access is usually obtained by a missing approximating tooth or a missing approximating restoration. This is certainly the preparation of choice if it is possible to use it. Not only is it conservative of tooth substance, but of all preparations described in this paper it is the easiest to cut and restore. This preparation may be oriented toward the labial or toward the lingual.

The Ingraham labio-invisible class III[10] preparation (Fig. 7) is a lingual access preparation that is a small rectangle at the contact area. Some of the Jeffery instruments are used to cut the cavity and the contra-angle mechanical condenser is used to condense it. The gingival extension is the most conservative of all these types presented. It is indicated in only the cleanest of mouths and perhaps only in teeth with high bulbous contacts that do not tend to have caries very close to the cervix of the crown.

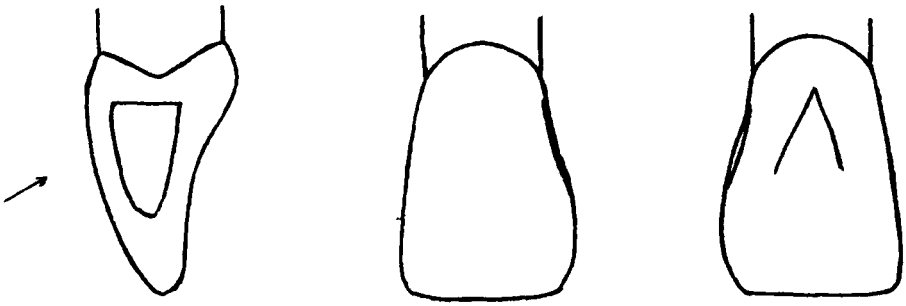

Fig. 8 — *Seymour Preparation – labial access.*

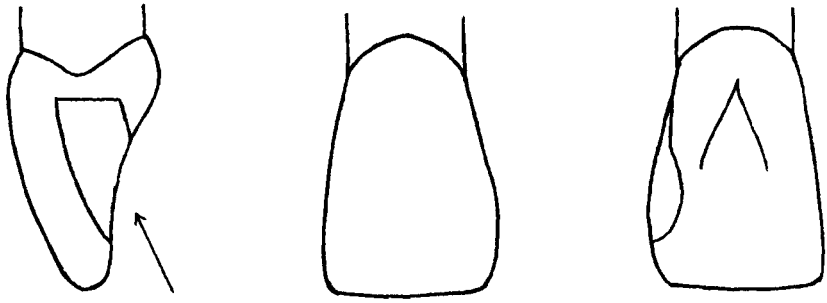

Fig. 9 — *Inciso-Lingual Access Preparation – inciso-lingual access.*

Dr. Jack Seymour has designed a preparation [11] (Fig. 8) that is a labial access preparation with the same conservatism of the Jeffery preparation. By the use of separation, slight labial movement of the operated tooth, and fine instruments, the labial access is a minimal esthetic problem. This preparation is indicated in the clean mouth that can use minimal extension and where the decay is slightly toward the labial rather than toward the lingual.

The next two preparations are indicated in many cases where maximum esthetics and minimum destruction for convenience are desired. They are both lingual access preparations that can be invisible, or nearly so. The gingival outlines are perpendicular to the long axis of the tooth, well below the contact area, therefore including the area most susceptible to decay just lingual and gingival to the contact. Because the access is more from the incisal than lingual, the instrumentation is not as complicated or difficult as the Jeffery or Ingraham preparations.

The inciso-lingual class III preparation (Fig. 9) as described by Bell and Grainger[12] is almost as small and slot-like as the Ingraham. It frequently may be cut with only a Wedelstaedt chisel, small hoe, regular angle former, and incisal retention hatchet. Most of the condensation can be done with simple monangle condensers. This preparation is particularly indicated in those cases where the incisal half of the marginal ridge is rather weak and would be undermined by labial access preparations and where caries is just lingual and just gingival to the contact point. Many of these carious lesions can be diagnosed by transillumination. The dark shadow of the caries shows

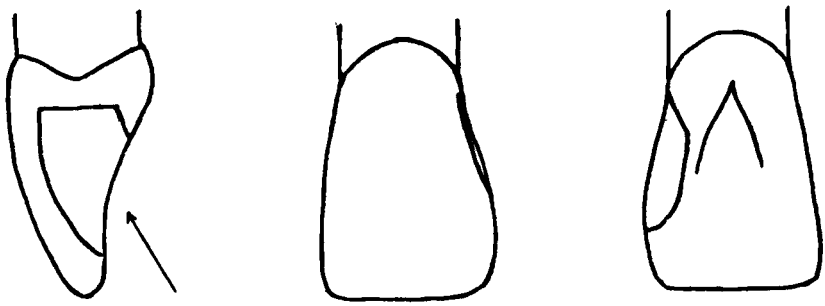

Fig. 10 — *Loma Linda Alternate Design Preparation – lingual access.*

through the marginal ridge and it is quite easy to break down the undermined enamel with a small chisel or with a small round bur.

The Loma Linda alternate design (Fig. 10) is similar to the preceding preparation but quite a bit bulkier. There is a flat gingival outline perpendicular to the long axis and a short lingual wall to distinguish it from the previously described Loma Linda. The bulk of tooth at the cingulum provides for the short lingual wall. This was an early design by Schnepper and Baum.[13] This preparation is frequently indicated when an old conservative silicate is replaced with direct gold.

Summary:

Several cass III preparations are presented as options of treatment. If the most logical one is selected for the case rather than just using some arbitrary standard preparation, the patient is given selective and individual care. Breaking into the carious area with a small instrument or small round bur to explore the extent of the decay is a valuable aid in selecting the best preparation.

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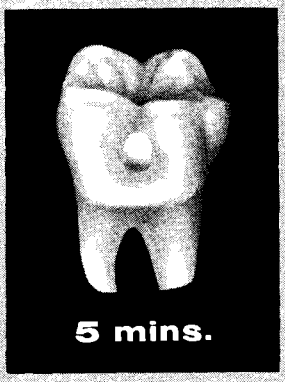

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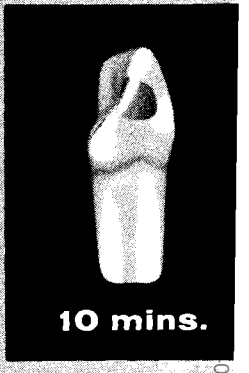

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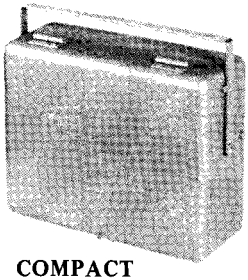

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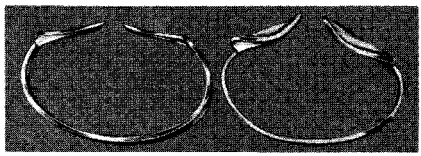

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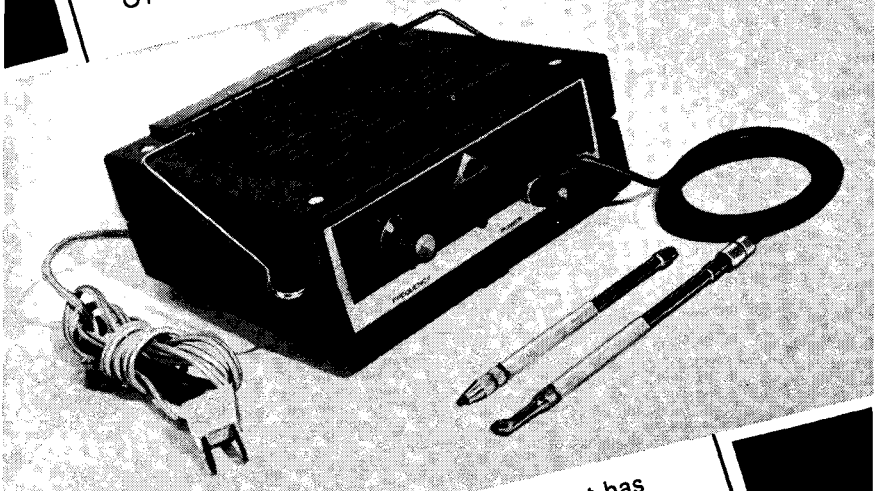

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