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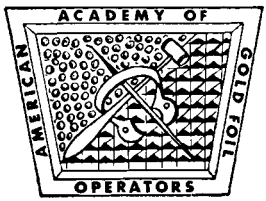
AMERICAN ACADEMY OF GOLD FOIL OPERATORS



Vol. VII September, 1964 No. 2

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Annual Meeting
PROGRAM

UNIVERSITY OF CALIFORNIA
SCHOOL OF DENTISTRY

San Francisco Medical Center, Third and Parnassus Avenue,
San Francisco, California

Friday, November 6, 1964

8:30 a.m. **Registration** — Auditorium Lobby, Second Floor, Science Building, University of California Medical Center

9:00 a.m. **Opening Ceremonies**

Call to Order ..... Dr. Arne F. Romnes, President
Invocation ..... Dr. Ralph A. Boelsche
Greetings ..... Dr. Robert W. Rule, Jr., Assistant Dean
Remarks ..... Dr. José E. Medina, Program Chairman

Essay Program

9:15 a.m. "Clinical Significance of *In Vitro* Testing Methods"
Dr. Ralph W. Phillips, Indianapolis, Indiana

10:15 a.m. "Academy Research Activities During 1964"
Dr. George M. Hollenback, Encino, California

10:45 a.m. "Conservative Class II Restorations"
Dr. Bruce B. Smith, Seattle, Washington

11:30 a.m. "A Philosophy of Service Through Dentistry"
Dr. Gerald D. Stibbs, Seattle, Washington

12:30 p.m. Question and Answer Period

12:45 p.m. **Luncheon** — Guy S. Millberry Union

1:45 - 5:00 p.m. **Chair Clinics** — Sixth Floor, Dental Clinic

Class II Restoration
Dr. Robert E. Hampson, Jr., Seattle, Washington

Class III Restorations

Dr. Robert J. Aylen, Puyallup, Washington
Dr. Gordon T. Ballantyne, Portland, Oregon
Dr. Earle D. Eshelman, Salem, Oregon
Dr. M. Leonard Lewis, Mount Vernon, Washington
Dr. Clifford H. Miller, Chicago, Illinois
Dr. Roland K. Miller, Redlands, California
Dr. Kenneth E. Murchie, Vancouver, British Columbia, Canada
Dr. Patrick F. O'Brien, Portland, Oregon
Dr. Melvin F. Rugg, Kent, Washington
Dr. Jack G. Seymour, Fresno, California
Dr. Ralph G. Stenberg, Lynnwood, Washington

Class V Restorations

Dr. Carl L. Boyles, Houston, Texas
Dr. F. J. Brown, Genoa, Nebraska
Dr. Herbert A. Carpenter, Grand Rapids, Michigan
Dr. John Cook, Lynden, Washington
Dr. Stephen F. Dale, Tulsa, Oklahoma
Dr. Bill K. Forbus, Dumas, Texas
Dr. W. T. Logan, Borger, Texas
Dr. Lewis J. Marchand, Gainesville, Florida
Dr. Homer J. Shurtz, Seattle, Washington
Dr. Johan E. Wold, Salem, Oregon

"Doctor and Assistant – A Working Team"

Presented by members of the John C. Metcalf Gold Foil Seminar – Dr. James P. Vernetti, Director

Dr. William Monroe	Miss K. McClintock
Dr. Earl A. Neuru	Miss T. Luna
Dr. David E. Snyder	Mrs. D. Kopelke

Table Clinics – Reception Room Adjoining Sixth Floor Clinic

"Invisible Class III Gold Foil Restorations"
Dr. Alexander Jeffery, Sun City, California

"Armamentarium and Technic of Placement of the Rubber Dam,"
Dr. Michael J. Murray, Omaha, Nebraska

6:30 p.m. **Social Hour** – Continental Ballroom IV, The San Francisco Hilton, Mason and O'Farrel Streets

7:30 p.m. **Dinner** – Continental Ballroom IV

Current Studies on the Physical Properties of the Various Forms of Pure Gold *

JEAN TURNBAUGH HODSON, M.S.

ALTHOUGH RESEARCH ON DENTAL MATERIALS produces meaningful information, the transfer of scientific findings to the clinical situation is often difficult. Without minimizing the importance of collecting numbers for impartial analysis, it is possible to present observations in terms that are more applicable to the practice of clinical dentistry. In recent studies on gold foil and mat gold, special techniques of microscopy were developed for observing the internal structure of compacted specimens. The information revealed by the microscope proved to be useful to practicing dentists, whose training in observation and excellence uniquely qualified them to interpret good microscopic evidence which, after all, was merely an extension of what was seen under the dental loupes.

In this report, photographs taken through the metallurgical microscope were used as the basis for discussing the compaction properties

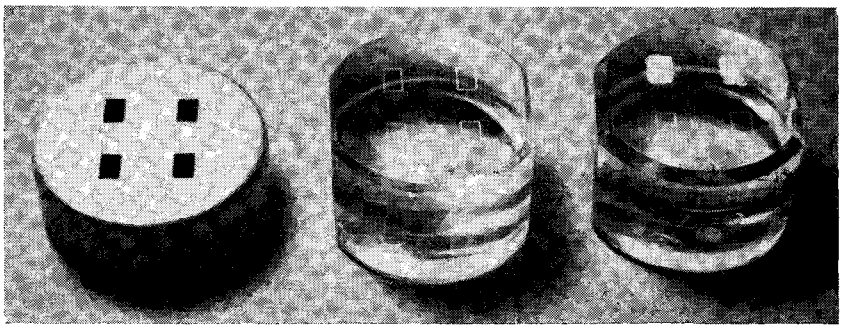

Figure 1. Metal template and plastic mounts with scribed cavity outlines. The right hand mount contains two compacted specimens. The cavity dimensions were 3.5 mm. long by 2 mm. wide. The plastic mounts were one inch in diameter and approximately ⅜ inch in height.

*Presented at the annual meeting of the American Academy of Gold Foil Operators in Baltimore, Maryland, October 11, 1963.

Mrs. Hodson is an Associate Professor of Oral Anatomy and Ceramics at the University of Washington, Seattle, where she was educated. She is a member of the International Association for Dental Research, the Dental Materials Group, and the American Ceramic Society. She is also a member of a number of honorary societies including Phi Beta Kappa, Sigma Xi, Keramos, the engineering society, and Sigma Phi Alpha, the dental hygiene society. Mrs. Hodson was born in Kansas and raised in Colorado and Washington State.

of gold foil, mat gold and granular gold. The findings presented here were part of a continuing study that is being conducted with Dr. Gerald D. Stibbs for the purpose of obtaining a critical evaluation of the properties of pure gold dental restorations.[1] In the past, such excellent restorations were assumed to have the density of solid gold and, without closer observation, this was a natural assumption, based on the cohesiveness of annealed gold foil pellets. Although good restorations are achieved routinely by careful operators, less satisfactory results are noted when the conditions are unfavorable, or the operator is less skilled. The difficulty of the technique and the potential possibility for failure continue to stimulate the search for more information on the properties of pure gold.[2,3]

Materials: Gold foil*, mat gold** and pellets of granular gold*** were examined in the manufactured form, and after compaction into clear plastic† mounts. (Fig. 1). Outlines for cavities to be cut by hand with dental instruments were scribed on the mounts with the aid of a metal template. The finished specimens measured approximately 3.5 mm. long by 2 mm. wide. The depth usually was 1 mm., but it was increased to 1.5 mm. in some specimens to provide greater flexibility for experimenting with the condenser.

Methods: The 57 compacted specimens were made by six dentists who were trained in gold foil procedures. Although the cavity sizes and techniques of insertion varied somewhat according to individual methods of operation, the design and fabrication of all the specimens were based on techniques of producing the Class V gold foil restoration. The cavities were overfilled to varying degrees during compaction, and the specimens were delivered in this condition by the operators. For the sake of uniformity from this point on, all the specimens were treated and examined by one individual. To obtain a quantitative basis for comparing the densities of the compacted specimens, Vickers hardness measurements†† were taken with the diamond pyramid indenter and a load of 500 grams. The results showed a much greater extent of porosity than had been expected, so the internal structure was then examined under the microscope.

Gold Foil: The size of the indentations revealed varying densities in the 25 gold foil specimens. Small, uniform marks indicated good density and good compaction in the harder specimens (Fig. 2), and the best density was produced when the 0.5 mm. condenser point was used with very systematic stepping under moderate and well controlled force. Regardless of technique, however, minor porosities were observed in the polished surface of all the specimens. The soft specimens contained

*Morgan, Hastings & Co., Philadelphia, Pennsylvania.
**William's Gold Refining Co., Buffalo, New York.
***Goldent, Morgan, Hastings & Co., Philadelphia, Pennsylvania.
†Lucite, Du Pont de Nemours and Co., Wilmington, Delaware.
††Kentron Micro-Hardness Tester, Kent Cliff Laboratories, Peekskill, New York.

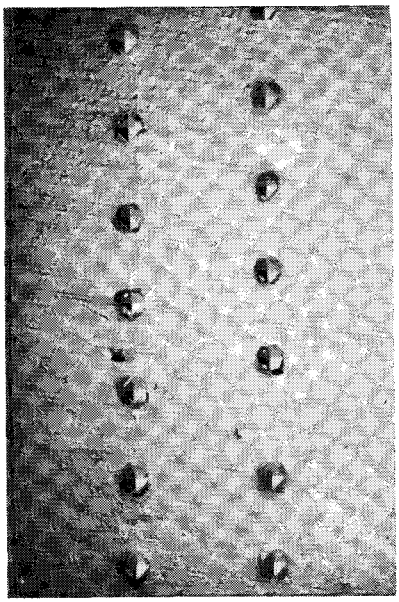

Figure 2. Diamond pyramid hardness marks in a well compacted gold foil specimen. Because of optical illusion, the diamond pyramid imprints appear to stand out from the surface, rather than to recede as they actually do. The unburnished surface contained polishing streaks and slight pitting. (Mag. X30).

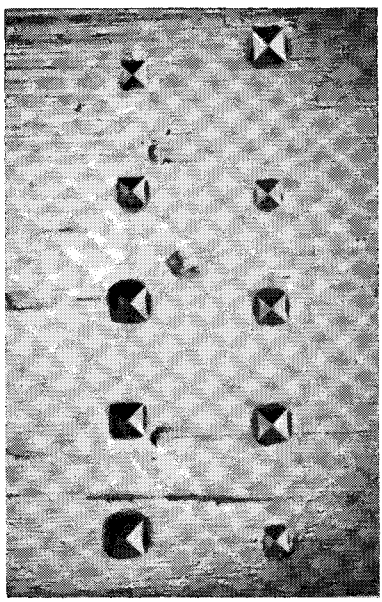

Figure 3. Hardness marks in a soft specimen. With the same load of 500 grams, the diamond pyramid impressions were larger and the polishing streaks and surface porosities were more pronounced than in the hard specimens. (Mag. X30).

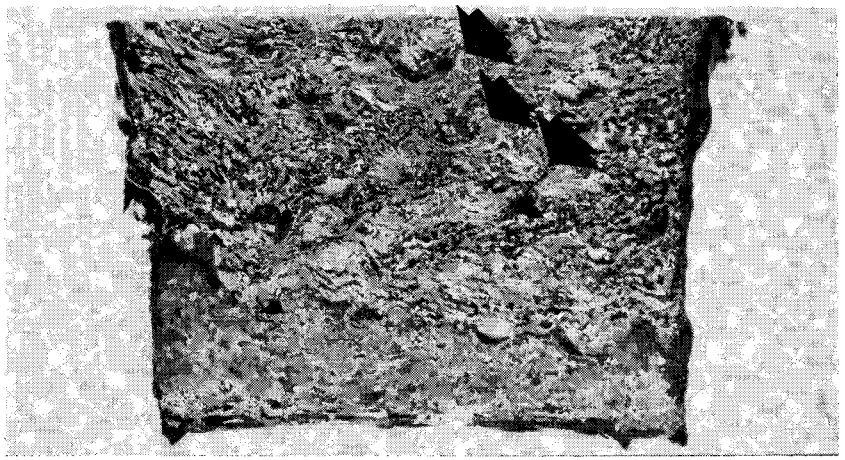

Figure 6. Cross section view of a hard gold foil specimen with a mat gold base at the bottom. The arrows point toward three concave condenser imprints in successive layers that indicated the thickness of the gold foil pellets after compaction. The aqua regia roughened the plastic and gold along pulpal and axial walls, but the polished cavosurface remained smooth because it was protected from the acid during etching. (Mag. X40).

were filled with soft foil from the bottom of overlying pellets because the condenser had failed to compress the foil through the full thickness of the layers. The densest gold in most specimens was found just under the polished surface that corresponded to the cavosurface of a dental restoration (Fig. 7).

The convoluted folds of gold foil pellets contained the same type of porosity found in the compacted specimens. Because of the possibility

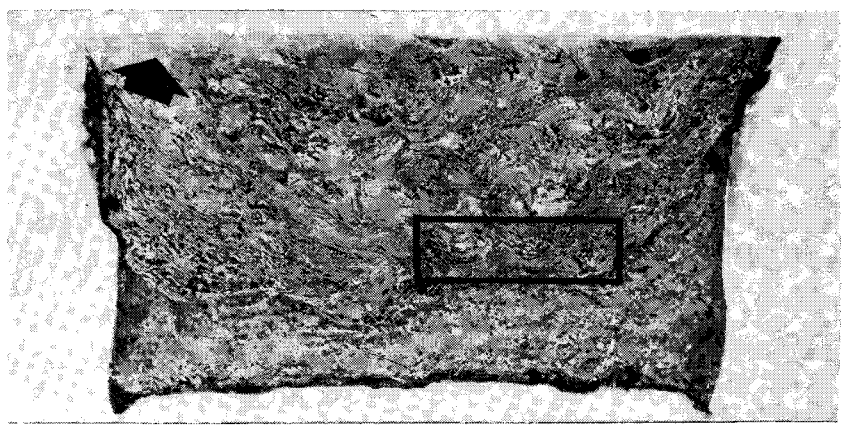

Figure 7. Cross section of another mat based gold foil specimen. This specimen was less hard than Fig. 6, although the retention of loose foil in the condenser imprints gave the appearance of greater density. The arrow points toward dense gold at the cavosurface. Three of the foil filled imprints are located in the rectangle. (Mag. X40).

for enclosing the voids completely within a welded envelope of cohesive sheet foil, this might be called a "closed" type of porosity in contrast to the more continuous "open" type that surrounded the tiny dendritic crystals of mat gold. (Fig. 8) The difference in shape, length, width, and thickness of the two golds was the primary cause of the internal differences found in the compacted specimens.

Mat Gold: After compaction, the mat gold specimens resembled the gold foil specimens in grinding and polishing characteristics. The hardness indentations revealed the same type of uneven density in the soft specimens and gave equal hardness for the well compacted specimens.

When etched with aqua regia, the cavosurface contained areas of dense gold surrounded by broken crystals of mat gold. (Fig. 9) The dense gold showed the crevice-forming effect of the condenser, and the uncompacted portions were like the hand placed mat gold base in the gold foil specimens.

The cross section view of another specimen (Fig. 10) revealed similar crescent-shaped condenser indentations in dense layers of gold. As in the foil, the depth of compaction was less than the thickness of the increment. The plastic was severely etched by aqua regia retained in the interstitial spaces. Once again, the densest gold was located just beneath the polished surface.

Granular Gold: Identical features were found in the granular gold. In compacted specimens, the internal structure had characteristics similar to both the mat gold and the gold foil. Although the manufacture of the pellets changed from an earlier form of cylinders of granular gold wrapped in gold foil to pellets that had the appearance of being hand rolled, both forms were very much alike after compaction. The new pellets were oblong in shape and had more layers of foil wrappings.

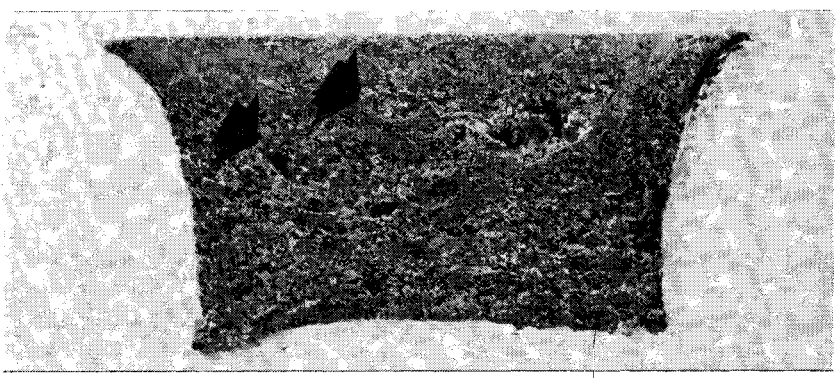

Figure 10. Cross section of another mat gold specimen. The arrows indicate two layers of compaction. The plastic was badly attacked along the pulpal and axial walls by the aqua regia. (Mag. X40).

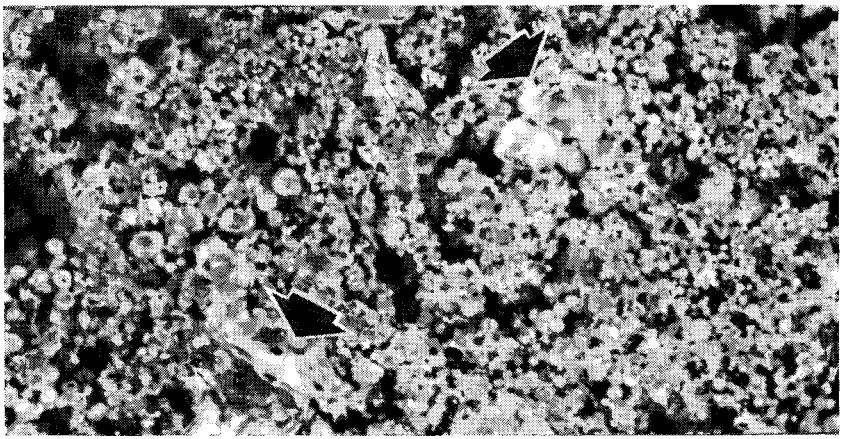

Figure 11. Granular gold. The tiny spherical granules were comparable in size to the thickness of the crystals of mat gold. The two arrows point toward minute fragments of foil wrapping. (Mag. X300).

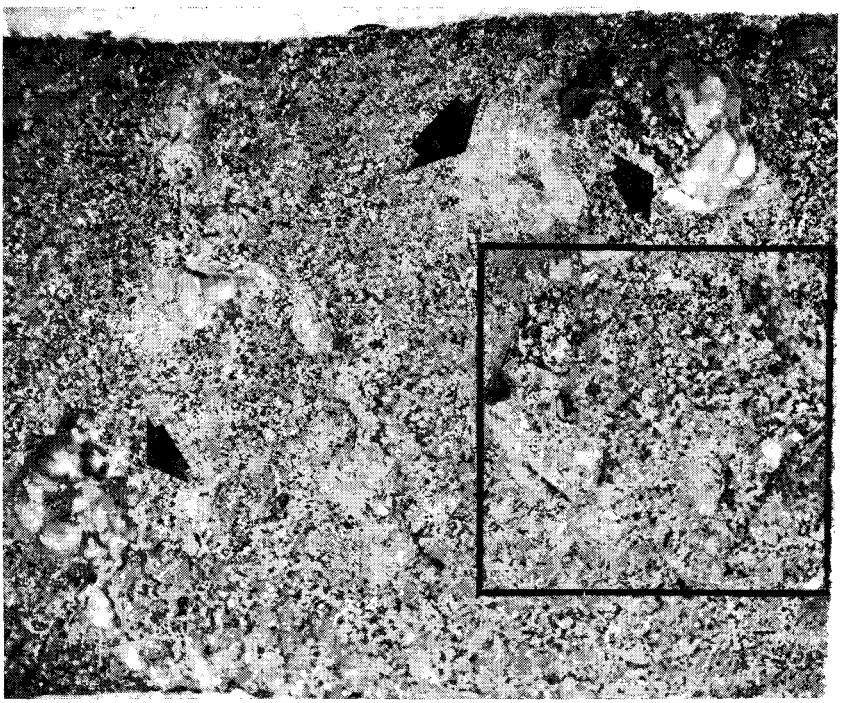

Figure 12. Etched cavosurface of a compacted specimen made with the cylindrical type of pellets. The large arrow indicates dense compaction. The two smaller arrows point toward uncompacted foil wrappings at the bottom of cavities from which loose granules were lost during etching. The circumscribed area contains the rounded outline of a single pellet. (Mag. X40).

The slightly clumped granules were packed loosely inside the foil. (Fig. 11)

Although much pitting was noticed in polishing the specimens made from the cylindrical type of pellets, the measured hardness was comparable to the average specimens of gold foil and mat gold. When the specimens were etched for cavosurface examination (Fig. 12), the interior was found to be partitioned into areas of different densities, according to the level of compaction exposed in the individual pellets by the grinding and polishing. The location of dense areas indicated that most of the compaction occurred at the top surfaces of pellets. Loose granules and reticular porosity of the mat gold type characterized the deeper portions. Another specimen was used for the cross section view. (Fig. 13) It contained the usual layering of compaction and, again, the condenser penetration was less than the thickness of the increment.

A third specimen made from the newer type of pellets by another operator, contained similar structures (Fig. 14), but more uniform compaction and the use of smaller pellets gave a closer spacing of the dense layers. The thickest layer of compacted gold was found in the burnished cavosurface of this specimen.

Discussion: The nature of the porosity from the different golds was a factor that could be important in selecting materials for specific clinical purposes. The granules were small in size, but the foil wrappings necessary for ease in handling resulted in the granular gold being applied in large increments. In cross section, it was seen that the force of welding did not penetrate through the full depth of the pellets, and most particles were only loosely massed together. Whether or not this is a disadvantage in the bottom of a cavity remains to be determined, but, seemingly, it should and could be avoided at the cavosurface of a restoration by carefully keeping the pellets below the margin and forming the outer surface with gold foil, as has been suggested for mat gold restorations.[4] In specimens completely formed from granular

Fig. 13. Cross section of another granular gold specimen. The light areas show condenser imprints in compacted foil and granules. (Mag. X40).

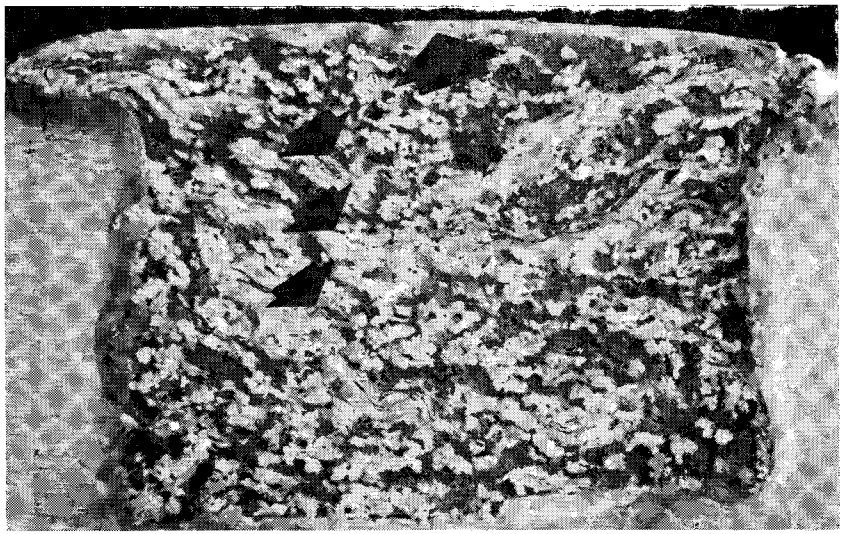

Figure 14. Cross section of an unpolished specimen compacted from the hand rolled type of pellet. The large arrow indicates the burnished cavosurface layer. The small arrows show successive layers of compaction in welded granules and foil. Granules were lost from the dark areas. The plastic was badly attacked by the acid along the pulpal and axial walls. (Mag. X42).

gold, the disked and polished surface cut through the pellets at different levels, leaving zones of hardness and porosity. These were masked during the finishing operation by the smeared surface "skin" created by the polishing, but as the thin polished layer was gradually removed, the initial porosity of the uncompacted sections was seen as "pitting" in the surface of the specimen.

The porosity of the mat gold specimens was similar to the granular gold, but the interlocking dendritic shape of the particles provided greater ease in handling. Nevertheless, the welding depth of 0.1 mm. or less under the face of the condenser failed to penetrate fully through the mass of the mat gold layers.

Gold foil provided the greatest control over the size of the increments by the convenience with which it could be formed into different sized pellets. Although the convolutions tended to produce the occasional, larger, single void than in the other materials, the continuous nature of the sheets of foil seemed to offer greater resistance to penetration by aqua regia. The closed type of porosity and the demonstrated possibility of achieving good density seemed to give the gold foil an advantage over the other golds, but the quality of compaction depended strictly on the operator's manipulative technique in handling the materials. The achievement of dense specimens required the use of cohesive pellets and small condenser point. The very meth-

odical compaction technique of back stepping one-half the diameter of the condenser point produced the finest specimens.

Summary: From a metallurgical point of view, the physical properties of all the materials were those of pure gold. The different physical aspects of the compacted specimens depended on the methods of compaction and the difference in size and shape of the original particles and pellets. Studies thus far have shown that, with present techniques, porosity is inherent in any compacted pure gold restoration. This conclusion is based on microscopic observations of the hardness and internal structure of specimens compacted in various ways. Where density is concerned, the evidence shows that it is not the materials alone but, more importantly, it is the skill of the operator that determines the excellence of the restoration.

REFERENCES

1. Hodson, J. T. and Stibbs, G. D. Structural Density of Compacted Gold Foil and Mat Gold, *J. D. Res.*, 41:339-344, 1962.
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3. Hodson, J. T. Structure and Properties of Gold Foil and Mat Gold, *J. D. Res.*, 42:575-582, 1963.
4. Koser, J. R. and Ingraham, R. Mat Gold Foil With a Veneer Cohesive Gold Foil Surface for Class V Restorations, *J.A.D.A.*, 52:714-727, 1956.

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Nominees For Academy Offices

The Nominating Committee has submitted the names of the following members for offices during the 1964-1965 term:

Dr. Alexander W. Jeffery—*President-Elect*
Dr. Ralph J. Werner—*Councillor*
Dr. H. William Gilmore—*Secretary-Treasurer*

The balloting will take place at the Annual Meeting in San Francisco.

Inconspicuous Class III Gold Foil Technic

CLIFFORD H. MILLER, D.D.S.

GOLD FOIL HAS LONG BEEN KNOWN to the dental profession as a material which possesses the qualities which are most desirable for a permanent restoration. Black[1] listed these qualities as being: "(1) indestructibility in the fluids of the mouth, (2) adaptability to the walls of cavities, (3) freedom from shrinkage or expansion after having been placed in cavities in the teeth, (4) resistance to attrition, and (5) sustaining power against the force of mastication." In spite of this, gold foil has not been widely used by private practitioners because, until recently, it has been lacking in those qualities which Black considered of secondary importance as a restorative material, namely: "(1) color, or appearance, (2) low thermal conductivity, and (3) convenience of manipulation."

Now, through the efforts of the American Academy of Gold Foil Operators, whose membership is made up of practicing dentists, educators, and researchers, there have been developed refined instruments and instrumentation which enable the operator to place a gold foil restoration that will satisfy not only the primary but also the secondary qualities of an ideal restorative material. It is now possible, by utilizing the advancements developed in gold foil technics, to prepare and restore proximal carious lesions in the anterior teeth which are esthetic to the degree of being invisible to the untrained observer.

Cavity Preparation: The cavity preparation described here is patterned after that advocated by Jeffery[2] but has been modified in labial extension and instrumentation. The instruments utilized in its fabrication are of the Jeffery and Ferrier design.

A rubber dam is applied and it is recommended that the dark, extra heavy gauge material be used since this affords good contrast, and retraction of the interseptal tissue. A sufficient number of teeth to the mesial and distal of the involved tooth are included for visibility and convenience of instrumentation.

In most instances the separator is neither necessary nor recommended during the cavity preparation since adequate access may be achieved through the lingual embrasure of the involved tooth and,

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Dr. Miller was born and raised in Chicago, Illinois. He graduated from Northwestern University Dental School in 1957 where he is presently an Assistant Professor of Operative Dentistry. He is an active member of the American Academy of Gold Foil Operators and the American Dental Association. He is also active in the G. V. Black Gold Foil Study Club. In his spare time he enjoys hunting and fishing.

frequently, the bows of the separator interfere with instrumentation. A small Wedelstaedt (10-15-3), or binangle chisel (12-6-6), is used to break away the undermined or unsupported enamel just lingual to the carious lesion, thereby gaining access to the cavity. The preparation is then cut to closely approximate the final outline form using a 33½ inverted cone bur in the straight handpiece. In order to accomplish this easily, it is recommended that the operator stand behind the patient and utilize the palm-thumb grasp with indirect vision. The bur is inserted into the cavity via the previously formed access area and, using a labio-lingual sweeping motion, the gingival extension and lingual outline form are obtained. The lingual is extended out to the marginal ridge area of the tooth and the gingival wall meets it at a sharp, acute, angle.

In order to assure extension for prevention and adequate access for finishing, the labial wall must be extended beyond the contact and into the labial embrasure. This can be accomplished readily from the labial by using a narrow bladed Wedelstaedt chisel (10-15-3) (Fig. 1). The chisel is placed flat against the adjacent tooth and then rotated into the labial embrasure so that the labial outline can be formed in a harmonious relationship to the contour of the tooth. This is very important from an esthetic standpoint as suggested by True.[3] If necessary, the thumb nail can be utilized at this point to wedge the teeth slightly and secure better access. Obtaining the labial outline form in this manner will assure maximum esthetics and yet satisfy all of Black's rules of extension for prevention.[4]

The internal form of the preparation is achieved by the systematic use of six hand instruments. These are:

1. Jeffery #5 (9-7-23-16-L)
2. Jeffery #6 (9-7-23-16-R)
3. Jeffery #7 (9-7-23-16)
4. Jeffery #8, 9 (6-80-2-2-R & L)

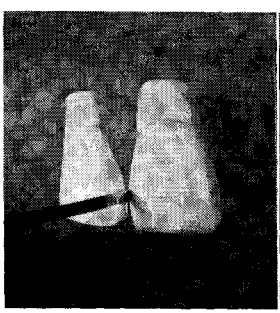

Figure 1. A Wedelstaedt chisel (10-15-3) is used to establish the labial outline form.

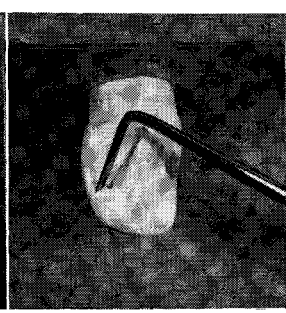

Figure 2. The angle of the Jeffery #6 forms the gingival, labial, and incisal bevels.

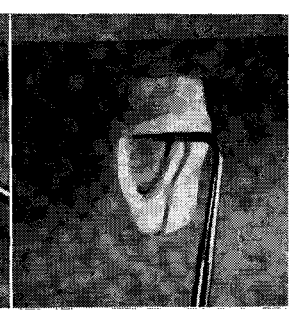

Figure 3. The Jeffery #7 hatchet smooths and defines the labial and gingival walls.

5. Ferrier #25 (4½-1½-25)
6. Jeffery #10 (3-2-32)

The Jeffery instruments #5 and #6 are very much like gingival margin trimmers in that their function is either to form a cavo-surface bevel, or to accentuate the internal line angles of the preparation and, depending whether the lesion is on the mesial or distal surfaces of the tooth, the instruments can be used interchangeably.

The gingival bevel, incisal bevel, and labial flare are achieved first by using either the Jeffery #5 or #6 (Fig. 2). This is accomplished by pushing the instrument across the gingival wall and pulling it down the labial wall, thus obtaining a sharp, well defined labio-gingival angle. By drawing the instrument up the labial wall and around the incisal, the incisal bevel can be established. The labial wall and gingival wall can be smoothed and sharpened by the use of the Jeffery #7 in the same manner as described above (Fig. 3). The labio-axial and gingivo-axial line angles are accentuated in similar manner by the use of the Jeffery #5 or #6 which acts as a reverse margin trimmer (Fig. 4).

The Ferrier #25 is used with the palm thumb grasp to smooth the axial wall, deepen it as it approaches the incisal, and to sharpen the inciso-axial line angle, thereby enabling the operator to place the incisal retention form in the proper position (Fig. 5).

The incisal retention is achieved by using the Jeffery #10 and is cut primarily at the expense of the incisal and labial aspects of the preparation (Fig. 6). The incisal retention should be so placed that it is directed towards the opposite incisal one-third of the tooth, thereby retaining maximum dentinal support for the angle, and still not endangering the pulpal horn.

The lingual wall should meet the axial wall at an obtuse angle in the incisal two-thirds of the preparation to afford adequate dentinal support for the lingual plate of enamel. In the gingival one-third of

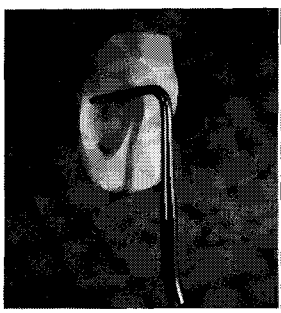

Figure 4. The labial and gingival-axial line angles are accentuated with the point of the Jeffery #5.

Figure 5. The Ferrier #25 smooths the axial wall and begins the incisal retention.

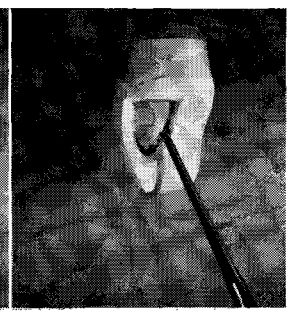

Figure 6. The Jeffery #10 establishes the incisal retention to afford a strong mechanical lock for the restoration.

the lingual wall, the preparation is in the cingulum area where adequate bulk of dentin is present to allow a sharp, retentive, undercut at the linguo-axio-gingival point angle (Fig. 7). This is prepared by using the bayonet angle former (Jeffery #8, 9).

The final step in the cavity preparation is the placement of a labio-axio-gingival convenience point to facilitate condensation and retention of the first few pieces of gold foil. This is done with a 33¼ inverted cone bur and is cut primarily at the expense of the gingival, being directed slightly labially, and cut to the depth of the head of the bur (Fig. 8). This type of convenience point affords independent retention for the first pieces of gold foil and therefore eliminates the need for a holding instrument.

In order to remove any chips or defects in the lingual wall from instrumentation, the wall is planed once again with the Wedelstaedt chisel (10-15-3) and the preparation lightly polished with a sandpaper strip to smooth and finish the cavo-surface margins.

Upon completion of the cavity preparation, a separator is carefully applied and stabilized with compound. The separator is used during the condensation procedure for three reasons:

1. It stabilizes the tooth and helps to distribute the forces of condensation to the entire anterior segment of the dentition.
2. By placing tension on the periodontal membrane fibers, the tooth offers more rigid resistance to condensation, thus affording the opportunity for a well condensed gold foil restoration.
3. A suitable contact may be established.

All of the above may be accomplished by using a maximum of .2 mm separation.

Condensation Technic: Small pieces of gold foil are used throughout the condensation procedure for ease of placement and to assure ade-

Figure 7. The linguo-gingival retention form is made with the point of an angle former.

Figure 8. The labial-axial-gingival convenience point is cut primarily at the expense of the gingival with a 33¼ inverted cone bur.

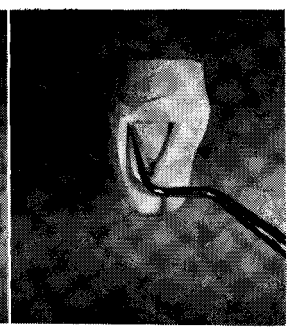

Figure 9. The first piece of gold foil is condensed into the labial convenience point with a Ferrier #10 hand condenser.

quate condensation. It is felt that the size 1/64 pellets are most suitable.

A small amount of gold foil is placed on an annealer, either electric, gas, or alcohol, and annealed for a period of five minutes to drive off the volatile impurities, thereby rendering the foil cohesive. Only a few pieces of foil should be placed on the annealer at a given time, since prolonged annealing causes the foil to become hard and more difficult to handle.

The first pellet of foil is carried to the preparation with the Ferrier #10 hand condenser and condensed into the labio-axio-gingival convenience point (Fig. 9). Two or three more pieces of gold are condensed by hand into this angle and then the foil is gradually built across the axio-gingival line angle and condensed into the linguo-axio-gingival point angle. In order to assure the proper direction of force in condensing the foil into the lingual retention form, the Ferrier #8 hand condenser is recommended (Fig. 10). Throughout this procedure hand pressure is used and the direction of force is in the long axis of the tooth.

There are several acceptable instruments available for condensing the bulk of the restoration, namely the pneumatic mallet, the electromallet, or hand malleting, but for convenience of description only the electromallet will be discussed here. When the foil has been bridged from the labial to the lingual-axio-gingival point angles, it is recondensed with an electromallet using a "lugging" effect with a very low frequency and high intensity. The remainder of the foil is condensed using an intermediate frequency and intensity. A small round condenser point (#1 or #2) can be used for the majority of this procedure.

Gold foil is systematically added, completely covering the gingival bevel and linguo-gingival point angle. As the preparation is gradually filled, excess is allowed to cover the labial margin, and the labial side of the preparation is kept slightly in advance of the lingual. Throughout this procedure the access is from the lingual, and the

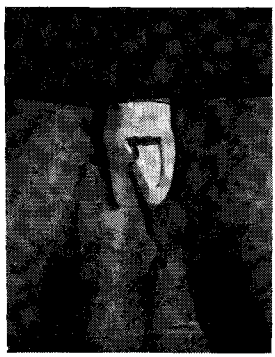

Figure 10. The Ferrier #8 bayonet hand condenser assures the proper direction of force when condensing gold foil into the lingual retention form.

direction of force is in the long axis of the tooth. Care must be taken to apply the wedging principle and systematically step the condenser point.

When the preparation is approximately two-thirds restored, a small bar of foil is built up the labio-axial line angle to the incisal retention form and then the foil is condensed into the incisal retention. The #8 contra-angle condenser point in the electromallet is very helpful here.

When the incisal retention is completely filled, the foil is banked against the labial and around the incisal flare again using the #8 condenser point. This is commonly referred to as "making the turn." The remainder of the preparation is then completed from the lingual, being sure to condense sufficient gold foil to reproduce the lingual marginal ridge.

The final step in condensation is to re-condense the labial margin over which an excess of gold foil has previously been placed. This is accomplished with a #20 foot condenser in the straight handpiece of the electromallet. The entire restoration is then completely "after-condensed" using a high frequency and low intensity.

Finishing: All accessible areas of the restoration are thoroughly burnished, using a beavertail or ball-type burnisher, and the interproximal and contact area is burnished with a strip of .0015-.002 inch matrix band material.

Gold knives and files are used to carefully remove all marginal excess, and various grit strips covered with cocoa butter are used to establish the proper contour. The excess is removed from the lingual and the marginal ridge contour established by using a large discoid-type knife with the palm thumb grasp, being careful to reproduce the proper marginal ridge anatomy. The separator is allowed to remain during the finishing procedures.

It is possible to achieve a satisfactory finish through the use of graded grit strips, but occasionally it is desirable to use pumice and tin oxide for a high luster, particularly on the lingual aspect of the tooth.

A restoration placed in the above described manner, when well condensed, contoured, and finished will provide the patient with a permanent, esthetic restoration.

Summary: 1. Gold foil closely approaches the requirements of an ideal restorative material.

2. Current technics and materials afford the opportunity of doing an esthetic restoration in the proximal surfaces of anterior teeth using gold foil in a manner which is practical for the average practitioner.

ACKNOWLEDGMENT

Special credit should be given to Dr. Paul T. Dawson for his contribution to the development of this technic.

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* * * * *

Dr. Ferrier Honored

As a part of their annual meeting on May 15, the Associated Gold Foil Study Clubs of Washington and British Columbia honored Dr. Walden I. Ferrier, who has been the Director of the organization since its founding in 1930.

A bronze bust of Dr. Ferrier, sculptured by Steven Zakian of Inglewood, California, was presented by Dr. Cecil Feasel, President of the Associated Study Clubs, to the University of Washington School of

Dr. Ferrier Honored — The Associated Gold Foil Study Clubs of Washington and British Columbia presented a bust of Dr. Walden I. Ferrier to the University of Washington School of Dentistry, in May, honoring him for his contributions over a fifty-year period to the progress of gold foil study groups and postgraduate study. From left are Dr. Cecil H. Feasel, who made the presentation, Dr. Ferrier and Dean Maurice J. Hickey of the University of Washington School of Dentistry.

Dentistry. The bust is intended as a reminder to new generations of dentists of the great contributions Dr. Ferrier made to the technic of saving teeth with gold foil restorations, and to dental instrumentation, as well as the inspiration he gave to study clubs and postgraduate dental education over a 50-year period of service.

Dr. Ferrier, 78 years old, an Honorary Member of the American Academy of Gold Foil Operators and now retired from active practice, was present for the ceremony, as were dental faculty, students, members of the Associated Clubs and many other friends of Dr. Ferrier. Dr. George Hollenback, a lifetime friend, and one of the prime movers in this recognition to Dr. Ferrier, came from his home in California for the occasion.

In making the presentation, Dr. Feasel said, "It is my firm belief that the hundreds of dentists participating in postgraduate studies in all areas of dentistry, through the medium of study clubs, were actuated as a result of Dr. Ferrier, his associates and students. When finesse, skill, exactness, ease and convenience can be demonstrated and taught in one package, then the desire to learn can be insatiable. Such was the influence of Dr. Ferrier."

Dr. Ralph Plummer, one of the Academy's past presidents unveiled the bust, the inscription on the plaque of which reads:

Walden I. Ferrier, D.M.D., F.A.C.D.
Dentist—Teacher—Leader

> His leadership in restorative dentistry, his refinement of gold foil technic and his guidance in study club activity are evident in the higher standards of dentistry which have resulted from his teaching and inspiration.

Dr. George Ellsperman, another of our past presidents, read the response for Dr. Ferrier, who recently underwent a laryngectomy.

Dean Maurice J. Hickey, in accepting the bust for the University said:

"*The greatest honor that can accrue to a man is the formal recognition of his contribution to the welfare of society. The recognition of a man's efforts assumes far greater significance when the earned honors are bestowed during his lifetime. Much is lost when the significance of a life's work must wait the passage of time to be recognized and acknowledged by a subsequent generation.*

"*The dental profession owes a debt of gratitude to Dr. Ferrier and today's ceremonies are due recognition of that fact. We have heard the reasons why Dr. Ferrier's name will be recorded in history as one of the great men in dentistry. There must, however, be equal emphasis on an aspect of Dr. Ferrier's life work that is of vital importance to those of us concerned with dental education. Teaching students the*

science of dentistry requires far more than repeated demonstrations of technic. The student must grasp the importance of attention to details, scrupulous care in operating technic, and above all a concept of his responsibility for the health care of his patients. Teaching our students Dr. Ferrier's concept of operative dentistry must necessarily indoctrinate them with the self-discipline that is required before one can recognize and accept his professional responsibility.

"My acceptance of this bust is acknowledgment by the University of Washington not only of Dr. Ferrier's contribution to the practice of dentistry but his equally important contribution to dental education.

"The presence of this bust in the library will give generations of students an opportunity to see the face of one of the great men of dentistry. The presence of this bust in the library offers our students an even greater opportunity, because it will serve to remind them, and the faculty, that the ideals of dentistry are a trust passed on to us by Dr. Ferrier and others like him who dedicate their lives to the advancement of our profession. It is the responsibility of those of us within the University and in the dental profession to take all possible steps to insure that we do not fail the trust placed in our hands."

* * * * *

providing other advantages in its use. Other preventive measures include the placement of wedges prior to proximal preparations, the lubrication of the dam when using polishing discs, reducing sharp cavity margins prior to the application, and dressing ragged contacts with lightening strips. When the dam is torn during the application, the cause should be corrected, and a fresh dam applied. However, if a small tear occurs during the operation it can often be corrected by patching with adhesive tape, placing a cotton roll beneath the hole, or covering with a new piece of dam directly over the torn one as suggested by Dr. Lloyd Jacobson in a recent issue of the Journal. If in the judgment of the operator these would not be successful, it is much better to replace the dam rather than jeopardize or fighting the procedure to its completion.

* * * * *

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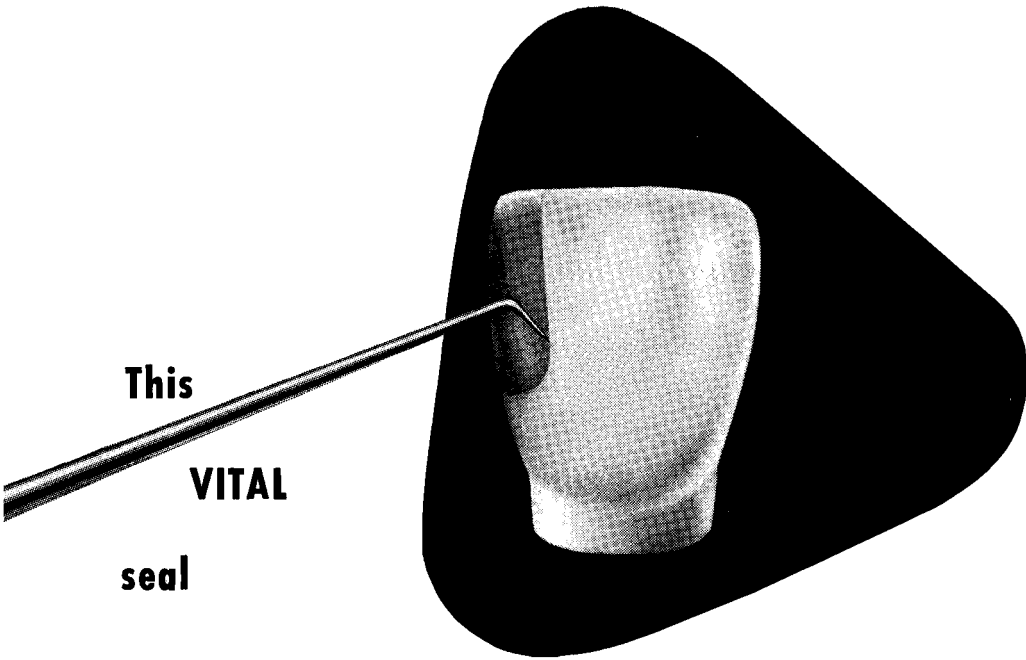

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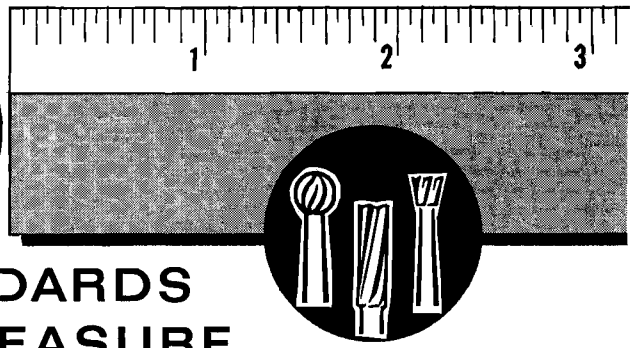

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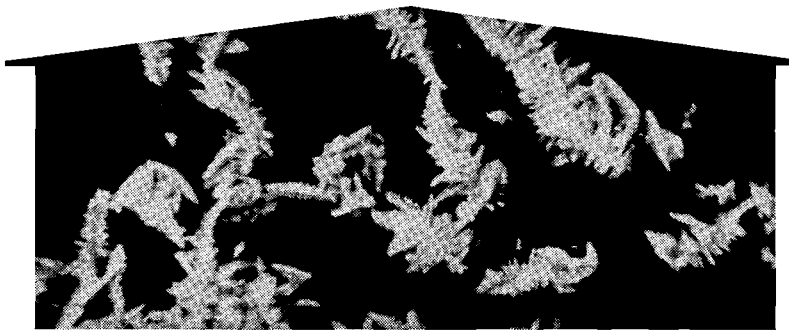

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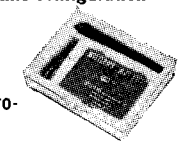

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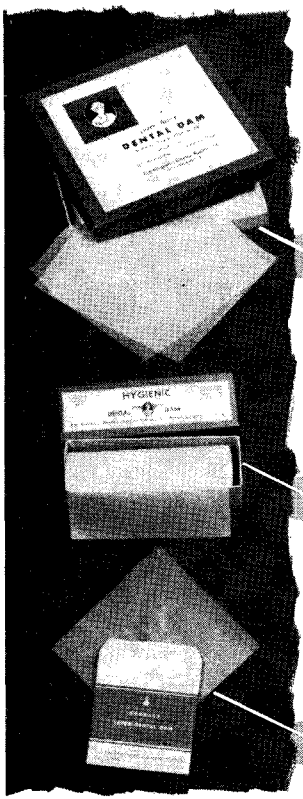

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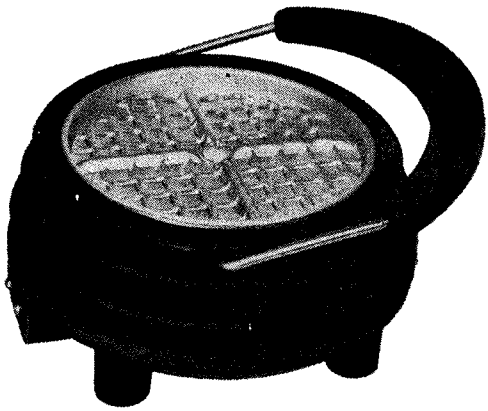

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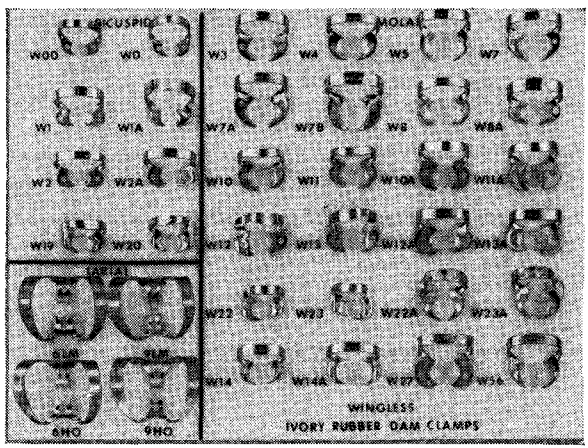

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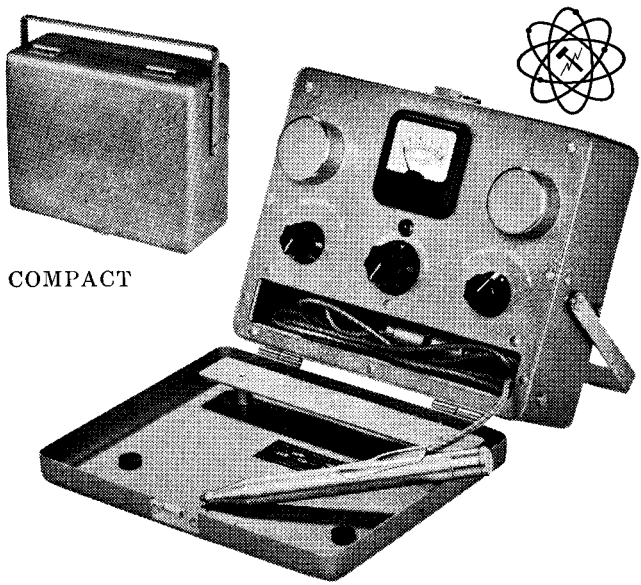

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