

Alumni Bulletin

INDIANA UNIVERSITY
SCHOOL OF DENTISTRY

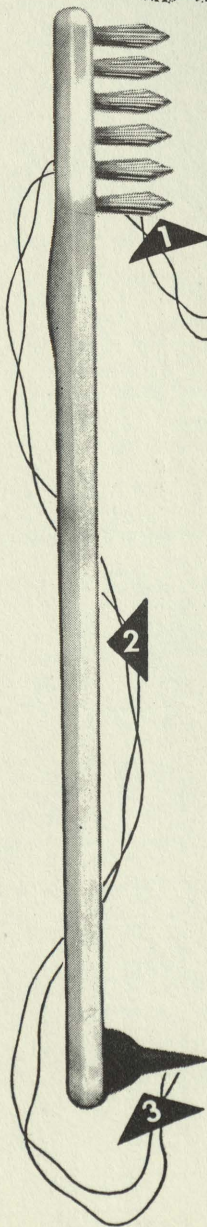
RESEARCH EDITION

JULY, 1953
INDIANAPOLIS, INDIANA

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Contents

Importance of Research to the Dental Teaching Program	4
Department of Oral Pathology	5
Department of Radiology	8
Division of Endodontics	10
Department of Pedodontia	10
Treatment of the Exposed Healthy Pulp	12
Biochemistry	14
Self-cured Resins—Evaluation	15
Dental Materials Department	18
Operating Procedures and the Tooth Pulp	22
A Case Report on a Mandibular Implant	24
Research in Periodontia	27
Crown and Bridge Department	28
Research in the Orthodontic Department	31
Library	34
Alumni Notes	40
Class and Fraternity Notes	47

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A free and non-profit bulletin issued by Indiana University School of Dentistry, Indianapolis, Indiana, for the purpose of keeping its alumni informed of the activities and progress of the school.

Importance of Research to the Dental Teaching Program

by Dean M. K. Hine

The primary objective of any dental teaching program is to train dental students, of course, but there are other important correlated objectives: advanced training for dental specialties, training of auxiliary dental personnel, service directly to the public and conducting an active research program.

It seems axiomatic that the faculty of every dental school should be animated by an active spirit of inquiry, constantly examining the material being taught and the methods of teaching being used. The routine prosecution of class, laboratory and clinical assignments can be deadening to the experienced teacher, particularly in these times of crowded curricula and overcrowded classes, but if the spirit of research permeates the faculty and then filters out to touch the dental students, the level of instruction is certain to improve.

At Indiana University School of Dentistry considerable emphasis has been placed upon research programs, and included in this issue are short reports of many of the research projects that have been carried on at Indiana. The direct results of much of this research have been gratifying. Other important benefits have occurred, however, in addition to the improved technics that have been developed and the new facts the research established for teachers to include in their courses. Research investigations result in developing a more critical attitude of the teacher, in stimulating dental teachers to further learning and to create the healthy viewpoint that dental science is progressing and improving. Also, the dental student who has had an opportunity to observe research in action is more apt to remember that dental science is not static and that if he wishes to keep up with dental

progress he must continue to study even after graduation.

Research projects which require the cooperation of the clinical and basic science teachers are good since it is as helpful for the clinician to be as aware of the advances made in the basic sciences as it is for the teacher bending over the microscope or the "hardness tester" to be cognizant of the problems of the clinical teacher. Cooperative research projects can result in an improved correlation of clinical and laboratory science teaching and tend to strengthen the teaching of both. Integration of clinical subjects and research in certain areas, such as dental materials and oral pathology, is particularly easy.

Also, a good research program can add considerable prestige to a dental school and personal recognition to the individuals involved. Every evaluation of a dental school or a dental teacher includes careful consideration of the quality and quantity of the research done in the school or by the individual. We readily admit that a man can be an effective teacher, yet never have done any original investigation, and that a dental school can educate undergraduate students satisfactorily and have no research program, but it is probable that such a teacher or such a school is not widely known, and that both will be better if some original scientific study is underway.

Dental research must be included in the program of every dental school that desires to keep improving its teaching program.

Sir Richard Livingston has said that the first task of education is "to inspire, and to give a sense of values and the power of distinguishing what is first rate from what is not" . . . and a research program helps fulfill this task.

Department of Oral Pathology

by William G. Shafer

1. A Study of the Effect of X ray Irradiation on the Salivary Glands.

This investigation, which was supported by a grant from the Indiana Division of the American Cancer Society, dealt with the effect of X-ray irradiation on the structure of the salivary glands. The clinical effects of therapeutic X-ray irradiation on the function of the salivary glands have been recognized for many years. It is a common finding in patients with intra-oral carcinoma, treated by X-ray irradiation, that a post-irradiation xerostomia or dry-mouth results. This xerostomia is more than a mere annoyance to the patient since the decrease of salivary flow results not only in the loss of such physical properties as the demulcent effect, the "flushing" action, and the "lubricating" action of the saliva on foods, but also in the probable loss of salivary enzymes and antibacterial substances.

Although in the past there have been a number of studies dealing with effects of irradiation on the teeth and jaws, little experimental work has been done in regard to the salivary glands. Since the value of any experimental study is dependent upon results obtained from a sufficiently large group of subjects treated in the same manner with all variables reduced to a minimum to secure data of significance, it is obvious that it would be impossible to carry out a controlled study on humans. Therefore, as the experimental animal, the albino rat was utilized since it could be maintained under ideal experimental conditions and the functions of the organs studied probably differ in little significant degree from the human. A total of 145 animals was studied in which the salivary glands had been irradiated by a standard 150 KV Westinghouse X-ray therapy machine. The animals were exposed to doses of irradiation varying from 480 r

to 3500 r administered in a single dose and from 4500 r to 8000 r administered in fractionated doses. After a suitable period of time, the animals were sacrificed and the salivary glands studied histologically with comparison to control untreated animals. The results of these studies indicated that: 1) the histologic alterations in structure were characterized by increasingly marked degrees of inflammation and degeneration of the glandular acini; 2) the most marked changes occurred in the parotid gland while the submaxillary gland was relatively refractory; 3) no alterations were noted which were not of a reversible nature. It was concluded from this study that, while there is considerable degenerative and inflammatory response in the salivary glands to X-ray irradiation, the histological alterations do not completely explain the physiological alterations. Therefore, new techniques must be devised in which the physiological activity of the individual cells including the nature of the intracellular enzyme systems can be studied histologically.

2. A Study of the Effect of Cortisone on the Healing of Extraction Wounds.

Since the adrenocorticotrophic hormone (ACTH) and cortisone have become available in sufficient quantities for their routine use in the treatment of patients suffering from a variety of diseases such as rheumatoid arthritis, rheumatic fever, disseminated lupus erythematosus, ulcerative colitis, asthma, chronic skin diseases, etc., extensive clinical and laboratory investigations have been carried out to study their mode of action as well as their side-effects. One of the phenomena noted in both treated humans and animals has been an inhibition of the growth of granulation tissue and a conse-

quent retardation of the healing of wounds. That this might be a very definite potential clinical problem to the dentist should be obvious in the consideration of the healing of extraction wounds.

Since no experimental investigations had been carried out on the particular problem, it was felt worth-while to determine whether ACTH and cortisone could alter the healing process following tooth extraction. It was obviously impossible to utilize humans in this study nor would it have been desirable from a strictly scientific point of view since so many individual factors, such as age, diet, individual resistance to infection, etc., could influence the healing time that the pure effects of the cortisone therapy might be obscured. It became necessary to turn to the experimental animal which has been shown to exhibit essentially the same healing phenomena as the human. Dogs would have been preferable but, since it was desired to study the healing process serially, thus requiring over 50 animals, this was economically unfeasible. Therefore, it was decided to use the rat.

The maxillary right first molars of 65 anaesthized rats, of the same age and sex and maintained on the same diet under identical experimental conditions, were extracted. One-half of the animals were injected with cortisone daily and were sacrificed in groups such that the healing of the extraction wounds could be studied histologically in both control and cortisone-treated animals 2, 4, 5, 7, 10, 14 and 21 days following extraction.

The results have shown no evidence of retardation of the healing process until the 10th post-extraction day. At this time, lack of maturation of granulation tissue as well as lack of re-epithelialization was found. By the 21st day, incomplete re-epithelialization was still prominent as well as incomplete sequestration and residual inflammation.

Although it is realized that great care

must be taken in attempting to translate the results of animal studies into terms of the human, this study does indicate that at least the possibility exists that cortisone treated patients may exhibit delayed healing of extraction wounds.

3. A Study of the Relationships between Dental Caries and the Endocrine System

An extensive research program conducted jointly with Dr. Joseph C. Muhler of the Department of Chemistry, Bloomington, has been underway for the past year dealing with the relationships existing between experimental dental caries, the endocrine system, the salivary glands, and fluoride metabolism. This program has been generously supported by grants from the Medical Research and Development Board, Office of the Surgeon General, Department of the Army, and gifts of material from the Schering Corporation, Bloomfield, New Jersey, and Mattox and Moore, Indianapolis, Indiana.

These studies, which are of a purely basic nature, were initiated after: 1) careful evaluation of a number of reports in the French, Japanese, German, Czechoslovakian and English literature which suggested a relationship between the incidence of experimental dental caries as well as the structure of the salivary glands and the endocrine system, particularly the sex hormones; 2) the finding of a consistent difference in the incidence of experimental caries between male and female animals; and 3) the finding of a difference in fluoride metabolism between male and female animals.

In these investigations approximately 1000 animals have been used to study:

- 1) dental caries incidence
- 2) fluoride, calcium and phosphorus content of long bones
- 3) histologic structure of salivary glands, thyroid, parathyroid, adrenal, uterus, testis, pancreas, prostate, long bone and jaw.

The procedures utilized have been:

- 1) castration
- 2) desalivation
- 3) hypophysectomy
- 4) adrenalectomy
- 5) injection of:
 - a) estradiol
 - b) diethylstilbesterol
 - c) testosterone
 - d) methylandrostenediol
 - e) cortisone
 - f) insulin

The results are so voluminous that it would be impossible to even sketchily summarize them, here. However, among other things, the data do indicate that: 1) castration of an animal will alter its incidence of dental caries; 2) castration will alter the histologic structure of the salivary glands, and consequently their physiological activity; 3) injection of the male and female sex hormones studied will alter the incidence of experimental dental caries as well as produce changes in the structure of the salivary glands; and 4) surgical removal of the salivary glands produces alterations in the structure of the uteri and adrenal glands as well as a very marked increase in the incidence of dental caries.

Many of the results have been so unexpected and startling that a complete re-evaluation of the dental caries process, and the function of the salivary glands may become necessary. These studies are now being continued with a more diversified investigation of the entire endocrine system as it relates to oral structures.

4. A Study of the Incidence of Occurrence of "Dens in Dente."

A clinical project has been completed in which it was sought to determine the incidence of "dens in dente" by radiographic examination alone. The "dens in dente" is a developmental anomaly which is thought to be due to invagination of a portion of the surface of a tooth before it

has calcified. Its clinical significance lies in the fact that, unless recognized and prophylactically treated, food impaction in the depth of the invagination occurs with early penetration of the pulp by caries. Innumerable teeth have been lost because this condition, which can be remedied, has gone unrecognized and untreated.

In the routine examination of 2,452 full mouth radiographs of patients in the School of Dentistry, 31 cases of "dens in dente" were found or an incidence of 1.3%. It was of interest to note that every case affected the maxillary lateral incisor and in over one-half of the cases, the condition was bilateral. It should be stressed that this condition, usually associated with the lingual pit area, must be recognized before or soon after eruption of the affected tooth, and be treated early if the tooth is to be retained.

5. A Study of the Production of Salivary Gland Tumors by Carcinogenic Agents.

A study has been initiated in an attempt to produce tumors of the salivary glands of animals by the implantation of a carcinogenic agent: methylcholanthrene. In other parts of the body, it has been shown that the application of this compound results in the production of carcinoma and sarcoma of the tissues treated.

This study was designed in an attempt to elucidate the origin of the so-called "mixed tumors of salivary gland" and also to note what effect the male and female sex hormones have on the development of these tumors. Since the investigation has been under way for only a relatively short period of time, it is not possible to state what success will result.

Some of the projects which have been described are completed while others are still in progress. As is the case in many experimental studies, the results of one investigation merely opens new avenues,

(Continued on page 50)

Department of Radiology

by L. B. Spear

The problem in studying the temporomandibular joint radiographically has been the fact that satisfactory angles are difficult to obtain and to duplicate accurately. In October, 1951, the Department of Radiodontics constructed a cephalostat for making temporomandibular joint exposures, making it possible to standardize the position of the patient's head and to duplicate those angles at a future date.

This cephalostat was first used with the patient in a sitting position, but since this position proved too awkward and uncomfortable for the patient, a reclining position is now used. Fig. 2 shows the cephalostat. Briefly, the principle is as follows:

Two exposures are made of each side, one opened and one closed, both positions on the same film. For the left side, the patient, in a reclining position, places the ear plug (a) in his left external auditory meatus and the platform with the other

ear plug (b) is lowered into the right external auditory meatus. The calibrated nose bar (c) is then placed on the nasion and a reading is taken, thus standardizing the head position of that particular patient. The cone of the X-ray machine is lowered into the projecting tube on the movable platform (d) controlling the angulation and position of the central ray. An exposure is made in closed position, only half the film being used, and on the other half of the film another exposure is made with the mouth held open with a mouth prop. Fig. 1 shows a temporomandibular joint radiograph made with the cephalostat. These positions can be duplicated at any future time.

Since it is desirable to study the temporomandibular joint in rest position as well as in opened and closed positions, it is felt that if the patient were in an upright

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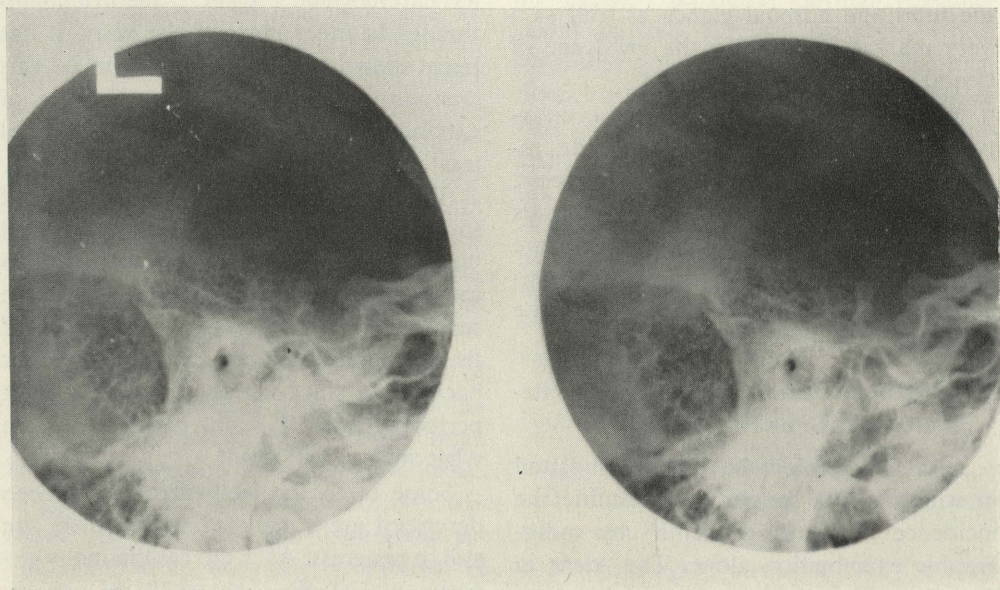


FIG. 1. Left—exposure made in closed position. Right—exposure in open position.

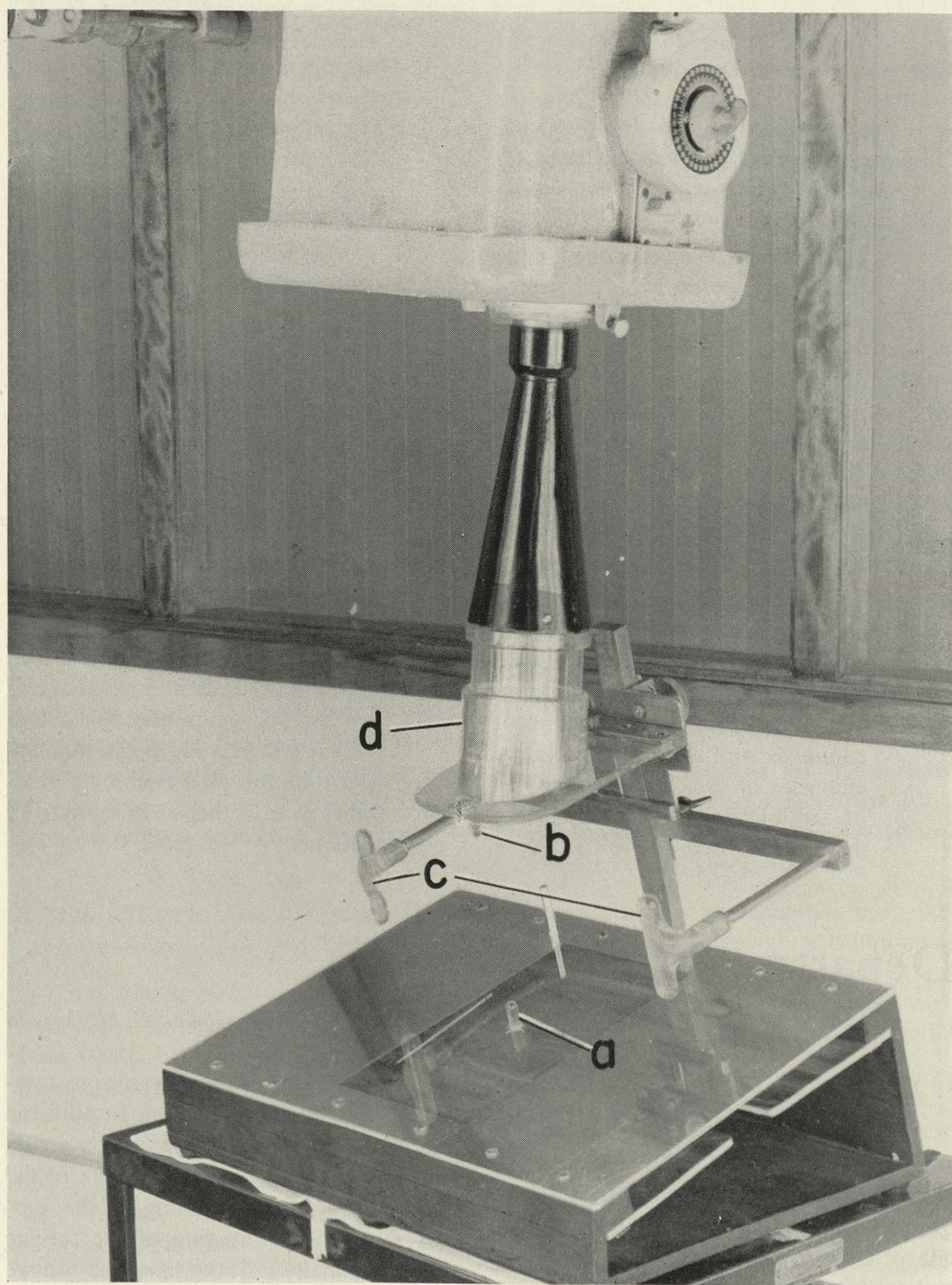


FIG. 2. a and b—ear plugs. c—nose bar that is placed on nasion. d—tube on moveable platform used for positioning tube of machine.

Division of Endodontics

by Harry J. Healey

Current research projects.

1. Accumulation of statistical data concerning apical periodontal tissue repair following conservative endodontic therapy.

Evidence is being obtained as to the progress of apical periodontal healing as a result of conservative endodontic therapy in order to determine the need or lack of need for surgical intervention in many types of diagnoses.

2. A study of the effectiveness of poly-antibiotic therapy in endodontic procedures.

The efficacy of the use of antibiotics in combination in overcoming the activity of gram positive and gram negative organisms and fungi in septic root canals as well as the comparative efficacies of various combinations of antibiotics in accomplishing the same is being investigated.

3. Determination of microbial flora in the various clinical types of necrotic pulps.

This project is being conducted with the valued cooperation of the Department of Microbiology of the School of Medicine. Clinical specimens taken from root canals containing necrotic pulps are supplied to the Department of Microbiology for thorough identification of microbic content. An adequate chart for recording of all clinical conditions including radiographic findings and a corresponding chart for the recording of the results of the many tests for microbic content are utilized for each case in order to accumulate the data. It is felt that a more definite knowledge as to necrotic pulp microbial flora will result in a more rational application of pharmacologic remedies to gain asepsis in septic root canals.

Department of Pedodontia

by Ralph E. McDonald

1. Human Saliva: A Study of the Rate of Flow and Viscosity and its Relationship to Dental Caries

It has long been realized that there is considerable individual variation in the rate of flow of saliva. A slight reduction in the rate of flow usually is not associated with any changes of the oral structures. On the other hand a marked reduction in salivary flow or a complete absence of saliva (xerostomia) is invariably accompanied by an increase in dental caries

ranging from greater than average to rampant or uncontrollable caries. In addition patients with a dry mouth experience dry, cracked lips fissuring at the corners of the mouth, redness and burning of the mucous membranes, crusting of the tongue and occasionally parathesia of the tongue or mucous membranes.

This study was undertaken to determine whether a relationship existed between the salivary flow and the incidence of dental caries. Paraffin-stimulated saliva

samples were obtained from 250 patients between the ages of 7 and 48 years and recorded in cc. per 15 minutes. Since both thick ropy and thin watery saliva have been blamed for an increase in dental caries, the viscosity was measured from whole, fresh saliva by means of an Ostwald pipette suspended in a constant temperature bath.

The 9 to 12 year age group was the most homogenous and contained the greatest number of patients so their records were carefully reviewed. There was found to be a statistically significant inverse correlation between the DMF rate and the salivary flow.

An analysis of the records of the entire group demonstrated a definite direct statistically significant degree of correlation between the viscosity of the saliva and the number of DMF teeth.

The results of this study gave additional information to the complicated obscure picture of the dental caries process. In the past it has been difficult to explain the nature of many of these factors which seem to influence the caries process. The findings emphasize the importance of a normal flow of saliva of low viscosity to act as a natural protective mechanism.

2. The Effect of Antihistaminic Drugs on Salivary Flow and Viscosity

Antihistaminics have been found to have action similar to atropine and a parasympathetic blocking effect in addition to their detoxifying power against histamine. The effect of minimal effective doses of benadryl, pyribenzamine, chlor-trimeton, and thephorin was observed on the salivary flow and viscosity of 7 adults. After each individual's normal salivary flow and viscosity had been determined, the reaction to each drug was observed over a 5 day period. Benadryl, pyribenzamine and chlor-trimeton depressed the salivary flow in all of the subjects. Chlor-trimeton exhibited the greatest depressant action, a

25 per cent reduction in flow for the group of subjects. Benadryl and pyribenzamine each brought about an average 20 per cent reduction in flow for the group. Greatest reduction in flow for any one individual on a given day was 54 per cent for chlor-trimeton and 50 per cent for pyribenzamine. Benadryl caused the greatest average increase in viscosity, 8.7 per cent, with some subjects showing as much as a 33 percent increase. A different reaction to minimal effective doses of thephorin was noted. The salivary flow was increased an average of 14 per cent in the group, with individual increase as high as 36 per cent. Thephorin reduced salivary viscosity in all but one case; the greatest reduction observed was 15 per cent. Since some of the antihistaminics have been shown to depress salivary flow and increase viscosity, it is possible that prolonged use of the drugs may depress salivary action and increase the viscosity to the extent that an increase in dental caries as well as other oral manifestations may be noted.

3. The Effectiveness of Commonly Used Methods to Determine Early Changes in the Pulp of Deciduous Teeth with Deep Caries

Many failures in deciduous pulp therapy such as pulp capping and pulpotomy apparently have been due to early degenerative changes in the pulp which were overlooked or could not be detected at the time of the operation.

A study has been undertaken, with the cooperation of the Department of Oral Pathology, to determine the value of the commonly used clinical aids to detect early inflammatory and degenerative changes in the pulp due to dental caries.

An X ray was taken of a number of deciduous teeth with suspected carious exposures. From the examination of the X ray it was possible to estimate the

(Continued on page 50)

The Treatment of the Exposed Healthy Pulp

by S. S. Patterson and G. Van Huysen

If the dentist had his choice he would probably stay as far away from pulp exposure as he possibly could. However, when patients bring in their cavities for treatment the dentist has no choice in the matter for many times these cavities are very deep and close, even to the point of exposure of that vital organ. The operative clinic here at the dental school is of course no exception for it has had its share of these close ones. In a teaching institution where research and investigation should go hand in hand with clinical activities constant effort is being expended to determine better treatment methods. As a result of this effort this study consists of a three year survey conducted to determine the effect of capping procedures on the healthy exposed pulp.

During this period 568 teeth that were exposed in the adult clinic of the Department of Operative Dentistry were treated. It was possible to get post-operative verification on 56 of these teeth. These verifications of the treated teeth consisted of roentgenologic examination, electric stimulation and some histologic sections described below. These examinations showed that there were five failures and 55 successful treatments in the 56 teeth observed and the 4 teeth described below. In other words 92 per cent of the cases of treated pulps from which post-operative data could be obtained responded successfully to the pulp capping procedures used.

In addition to the clinical cases mentioned above four experimental teeth were also exposed and capped. The first 3 exposures were made in three non-carious premolar teeth of a 14 year old female whose teeth were to be extracted for or-

thodontic reasons. In the first tooth a pulp exposure was produced with a number 35 inverted cone bur, and the opening was covered with a calcium hydroxide paste. Figure 1 shows the results of healing two months after treatment. This histologic section shows a bridge of secondary dentine covering the exposed area. There is no microscopical evidence of inflammation in this treated tooth pulp. There was no clinical evidence of pulpitis.

A second tooth in the same individual was exposed with the airbrasive technic and it healed in a somewhat similar manner. A third tooth in the 14 year old female was exposed with a number 35 inverted cone bur and covered with a sterile piece of gold plate. Histologic examination revealed that an incomplete dentinal bridge had formed but the pulpal tissue remained healthy and functional. The fourth tooth examined histologically was that of a 43 year old male. This tooth was exposed with a bur and covered with calcium hydroxide paste. No attempt on the part of the pulp to bridge the gap could be demonstrated but histologically and clinically the pulp remained healthy.

On all the other 564 teeth treated for a pulp exposure, the dressing of choice was calcium hydroxide. The armamentarium necessary to perform this operation is illustrated in the composite of Figure 2. A brief description of the technic used in capping an exposed pulp is as follows: first, irrigate until bleeding stops the exposed area and surrounding tooth structure with a 4% solution of chloradene or a normal saline solution; second, cover the exposed pulp with a calcium hydroxide paste; third, protect the dress-

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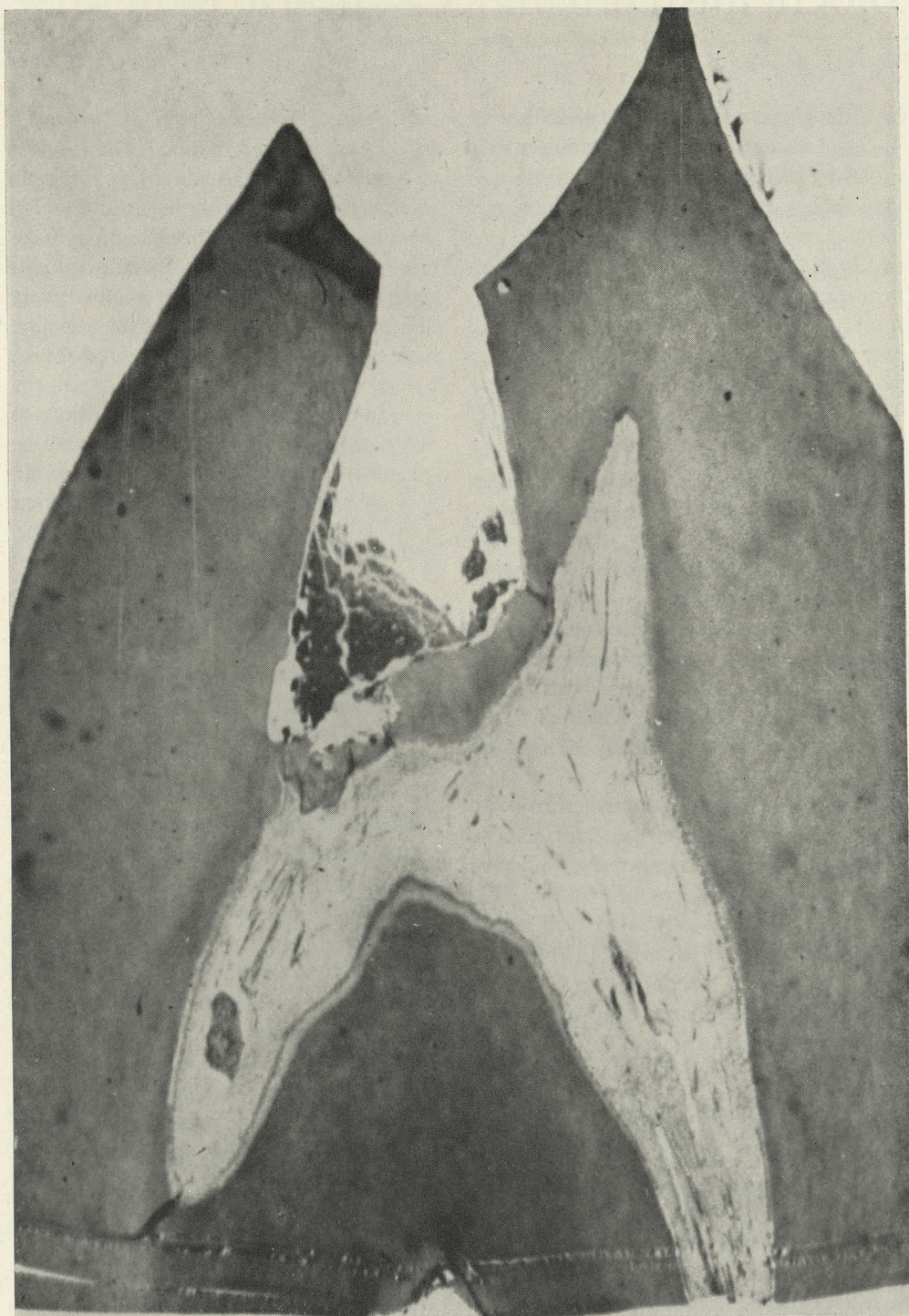


FIG. 1. Premolar tooth of a 14 year old girl. The pulp was exposed with a bur and capped immediately with $\text{Ca}(\text{OH})_2$. Tooth extracted two months after capping.

Biochemistry

by Joseph C. Muhler

1. Clinical investigation of evaluation of caries experience is young children and young college students.

This study is being conducted in order to learn more about recording caries experience in young children and means of evaluating this caries susceptibility, as well as caries progression. In the study program there are 1300 children, ages 6 to 15 years, and 500 freshmen University students. This study will provide such information as degree of caries affliction, which teeth are most frequently found carious, the degree of dental attention in respect to restorations, extractions, and so forth, as well as provide basic information on how a more suitable caries recording method could be devised. The degree of oral hygiene in these students is being critically evaluated.

2. A study is being conducted to investigate the metabolism of fluorine, its storage in hard and soft tissues, and its excretion in the feces and urine. The purpose of this study is to feed small concentrations of fluorine (1.0 to 2.0 micrograms F per milliliter) in the water and measure the rate of storage and excretion in relation to sex of the animal, previous contact with fluorides, age of the animal, and so forth. An important consideration is the availability of the fluorine in the food and water. All these studies are attempting to provide more fundamental information concerning the role of fluorine in its ability to reduce human caries experience as a communal fluoridizing agent.

3. The essentiality of fluorine.

Through the cooperation of the

Army, the essentiality of fluorine is being studied. Good progress has already been made to provide an adequate diet for the rat that contains less than 0.1 microgram F per gram of diet. The difficulty of this task is enormous, for almost every source of food contains the element, and purification of every food source is necessary. This study is of the utmost importance to nutrition as well as to dentistry, for if it can be demonstrated that animals do not thrive as well on fluorine-free diets as they do on fluorine-rich diets, then a real step forward in demonstrating the necessity of having the element in the diet has been made.

4. An extensive investigation is being conducted to determine the effect of various chemical compounds on reducing caries experience in rats. A careful correlation is being made between caries experience, fluorine metabolism, calcification and their effect on calcium and phosphorus metabolism. The obvious importance of this study is to find an anti-carogenic agent superior to any now available and yet remaining non-toxic to the organism. Good progress has been made already in this project, for at least three new compounds are now available that appear from all evidences available to be far superior to the commonly-used sodium fluoride.
5. A study is being conducted in which a new technique for evaluating anti-carious agents on whole tooth sections is used. The importance of such a procedure is to approach the effect of the clinical picture more closely than if one

(Continued on page 51)

Self-cured Resin—Evaluation

by D. A. Boyd

Self-curing resin used as a restorative has now been used experimentally for over four years and has been used clinically for better than three years. As yet, insufficient scientifically sound data have been obtained from the laboratory and clinic to make positive or dogmatic statements regarding the use of this material. However, sufficient time has passed that some valuable experience has been gained in using the resin and from such experience certain general ideas or concepts are taking form which should help in bringing about a better understanding as well as better use of this material.

Cavity Preparation

A fundamentally sound cavity preparation is recognized as one of the most important criterion for a successful restoration regardless of the restorative used. This same concept is applicable to preparations in which resins are to be placed. Because of the limited physical properties possessed by the resins it cannot be over-emphasized that the principles of adequate extension, resistance and retention form, and proper preparation and finish of enamel walls are of paramount importance when resins are used.

A. Extension into immune areas. Because the resins do not appear to possess any inhibitory action to the carious process as is claimed for silicates and amalgam, the cavity walls of resin preparations should be extended to protected or self-cleansing areas.

B. Resistance and retention form. Inasmuch as the resins have a very low modulus of elasticity as well as a low hardness index, it is imperative that these qualities of the preparation not be slighted. Cavity walls, bases, floors, etc.

should be parallel and perpendicular to the basic loads and stresses to which the restoration and remaining tooth structure may be subjected so that such forces may be favorably dissipated. Also the enamel cavity walls should be properly flared so that there will be a maximum of resin at the margins. Because of the low modulus of elasticity of resins, feather edge or thin areas of resin doom such areas to almost 100 per cent failure.

Retention should be as bulky and heavy as is consistent with the resistance of the remaining tooth structure and the conservation of pulp integrity. This is again because of the low modulus of elasticity and low hardness of the resins.

C. Preparation and finish of enamel walls. The enamel walls of the preparation should be made up of full length enamel rods with dentinal support so that there will be no chance of fracturing away of incomplete or unsupported enamel around the restoration during insertion, finish or subsequent function.

Selection and Application of Resin

The selection or choice of resin as a restorative has many complicated and conflicting concepts at stake and in general hinges upon the operators and at times the patient's understanding of some of the factors involved.

An appreciation or evaluation of the physical properties of resins should assist the operator in reaching certain conclusions concerning the use of resin in various situations. A short concise review of these general properties or qualities should aid in clarifying some of the conflicting ideas or concepts regarding rapid curing resins.

A. The auto resins have almost no solubility in the fluids of the mouth and therefore maintain their form or volume much better than soluble cements.

B. Resins have a low modulus of elasticity and as a result are easily deformed when subjected to heavy load or stress.

C. Resins have a hardness index one tenth that of enamel and are therefore subject to wear or abrasion when subjected to conditions producing such a phenomenon.

D. Resins have a low thermal conductivity which makes them a good insulation medium where such a material is desired or indicated.

E. Resins have a high thermal expansion which might be a problem in producing excessive marginal percolation where the tooth and restoration are subjected to extreme temperature changes for long periods of time.

F. If the resins are improperly applied and adapted to the cavity the property of contraction due to or of polymerization can be a definite and serious problem. Such contraction is believed by many observers to be responsible for the poor apposition of the resin to the enamel wall, producing an unsatisfactory restoration. This contraction of polymerization may range from 1.6 per cent to as much as 2 plus per cent and if it were not compensated for by certain phenomena would no doubt preclude a consideration of the resins as a restorative.

"Pressure" or Bulk Techniques

Pressure application of the resins in the cavity to make or form the restoration has been advocated by many clinicians as the most practical and efficient method of fabrication of restorations. The basis for this technic is the forcing by pressure excess resin into the cavity to take up the space, or fill in the void, created during polymerization. Such a technic however

fails to recognize the fact that, even with our most exact and complicated technics, so long as resin is plastic or fluid, the excess is squeezed outside of the cavity as flash and as such cannot and is not forced into the cavity. Actually the pressure is exerted on the edges of the cavity and not upon the resin of the restoration. Apparently the reason for good to fair adaptation of the resin with the "pressure" or bulk application is the fact that the material is "locked" along the cavity walls and in the retention by the formation of mechanically locked bits of resin in the almost microscopic roughened crevices undercuts that exist on the walls of the preparation. Such "mechanical locks" hold the resin in close apposition to the cavity walls and margins causing or allowing the contraction of polymerization to take place in the unconfined portions of the mass of material. Such a phenomenon accounts for the adaptation that has been obtained with "pressure" technics and not the pressure as was thought by many clinicians.

Non-Pressure Techniques

The basis for these technics or methods of application is that of addition of resin to already applied portions, the principle being that the subsequent additions fill up the areas of contraction that have occurred in the previous applications. Also it is thought that inasmuch as the non-pressure technics use either monomer application or very thin fluid mixes of resin, such applications facilitate the formation of "mechanical locks" which give excellent application and adaptation of the resin to the cavity walls and margins.

The two most popular non-pressure technics are the so-called "brush" or "beading" technic and the "flow" technic. The beading method is that of placing monomer in the cavity and then carrying a small "bead" of the polymer on the tip of the brush (00 sable) to the monomer wet cavity; the bead is then touched to the

monomer which forms a thin mix that is carried out and over the surfaces of the cavity already wetted or covered by the monomer. This procedure is continued in ten second intervals until the cavity is filled to slight excess at which time the surface of the restoration is covered with foil or heavy oil to stop surface evaporation. The restoration is finished at a later sitting.

In the flow technic a thin mix of resin is made and is carried on the brush (00 sable) into the cavity, touched to the base and allowed to flow out into the retention until the cavity is one third filled. At two minute intervals a second and third mix, a bit thicker but still fluid enough to adapt and control, are flowed into the cavity. Number two mix should fill the cavity about $\frac{3}{4}$ full and number three mix is used to cover and seal the margins as well as to "hump" a slight excess over margins and in the center of the restoration. The restoration is immediately covered with an agent to prevent evaporation and is finished at a later sitting.

The non-pressure technics go under the following names or terms; brush, bead, flow, equalizing, neutralizing, compensating and increment or stratifying or layering. The principle is that addition of resin by beading or flowing small amounts or layers of resin into the cavity neutralizes or compensates shrinkage that has occurred in previous applications.

Restorations produced by these technics appear to have superior adaptation but usually have a higher discoloration index which is thought to be due to the presence of a high amount of tertiary amine due to the use of large amounts of monomer which contains this chemical agent. It has been observed that the "bead type restoration" has a slightly granular or mottled appearance when compared to flow or bulk pack restorations.

Pulpal Response or Reaction

Practitioners who have used resins as

restoratives have been concerned about the possible irritation of the dentinal tubules and the dental pulp from the resins and its chemical constituents.

Results from experimental laboratory investigations are nearly all consistent in their finding that the auto resins are relatively non-irritating. Work by Zander, Zeelig, Van Huysen and others all are of this opinion. This no doubt is due to the fact that the monomer polymerizes rapidly and after such reaction is relatively inert chemically. Also the fact that the material has a very low thermal conductivity reduces any possible thermal irritation.

Clinical findings, however, have not been as consistent as the laboratory and there are opinions both pro and con regarding post-operative irritation.

Observation and sampling of the records on over 10,000 resin restorations at Indiana University School of Dentistry clinic lead to the following conclusions regarding post-operative complaint.

- A. Properly placed resin restorations have one of the lowest indices of post-operative complaint and subsequent pulpal reaction.
- B. All deep cavities should have an inert liner such as calcium hydroxide covered with an oxyphosphate of zinc cement base.
- C. Many complaints are due to exposure of the recession line of the pulp horn or other exposures in which restorations have been placed without adequate protection or allowing repair and healing to occur.
- D. Loose resin restorations are very irritating to the end of the dentinal tubule and in turn the pulp. However, this same statement may be made regarding any restorative material. Proper adaptation and sealing technics when using resins should eliminate this source of complaint and failure. The

(Continued on page 52)

Dental Materials Department

by Ralph W. Phillips

A summary of the various major current research projects in the department of dental materials is given below. Some of these investigations are supported in part by research grants from the U. S. Air Force, Department of the Army and two commercial companies. In addition to these specific problems, it is necessary to evaluate continually new products and techniques as they are introduced. This routine testing, oftentimes involving limited research, is required if the department is to be progressive and of aid to the practicing dentist. A dental materials laboratory in a dental school is one source of unbiased information which should be made available upon request.

1. "Adhesiveness of dental cement."

Resinous materials are being widely advocated as a substitute for zinc phosphate cements in the cementation of gold castings. Two arguments presented for their use is their low solubility and greater adhesiveness to tooth structure. The low solubility of acrylic resins is well recognized; however there is no evidence in the literature whether they do actually adhere to the tooth surface. In fact there has been no satisfactory test for "so-called" adhesion developed. Thus the purpose of this research has been to develop an accurate test for the adherence (probably more a mechanical locking rather than true adhesion) of these materials to tooth structure and to compare the relative merits, from this standpoint, of zinc phosphate and resin cements.

In figure 1 can be seen the testing method which has been perfected to measure adhesion. A metal post, comparable to a gold inlay, is cemented onto a prepared dentin surface. The thickness of the cement layer is carefully controlled.

The entire assembly is now placed in a tensile testing machine and the number of pounds required to break the cement bond is recorded.

It has been found that on a dry surface certain special formulae of resin cement require approximately ten times as much force to break the seal at the metal-dentin interface as popular brands of zinc-phosphate cement. The film thickness of the cement can also be made to compare favorably with zinc phosphate. However, when the tooth surface is wet or when the cemented specimen is stored in water, the cement loses much of its adhesive qualities. This problem is of great clinical

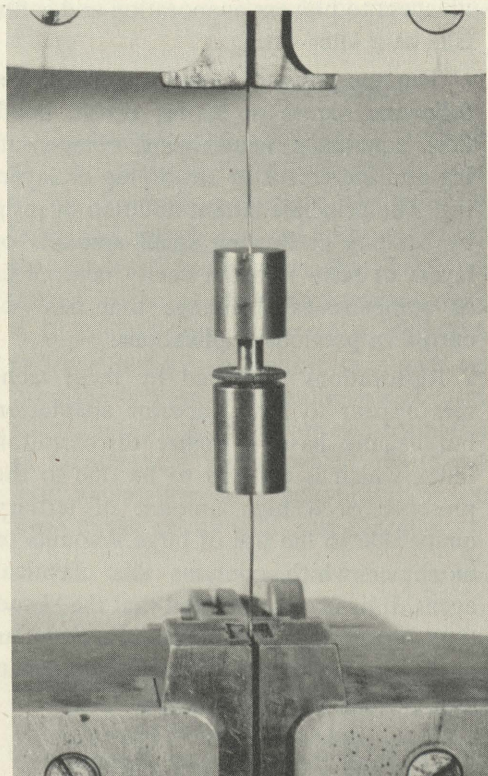


FIG. 1. Device used for measuring adhesion.

significance since it is possible that, with time, there will be a seepage of saliva around the margins and thus a loss in the strength of bonding. This is particularly important with the resins due to their high coefficient of expansion when subjected to temperature changes. Research is now under way to study further the effect of moisture and temperature change. Realizing that it is often impossible to duplicate oral conditions in the laboratory, an extensive clinical evaluation is now in progress through the cooperation of the Crown and Bridge Department. Large numbers of gold restorations are being cemented with resin cements and a careful record kept of each case. Observations through the next few years will indicate whether these materials will maintain their adhesive qualities under actual clinical conditions.

2. "Thermal and electrical conductivity of dental cement." One of the recognized problems associated with restorative dentistry is the thermal and electrical conductivity of the various materials em-

ployed. Related to this problem, of course, is the presence of galvanic currents in the mouth due to cells produced from metallic restorations although the clinical significance of these currents is as yet unknown. The use of certain materials for cement bases under gold and amalgam restorations has long been advocated to provide an insulating barrier against thermal and electrical injury to the pulp. However, no research has been done to determine the actual insulating properties of these materials. Thus this research is being conducted to establish basic units of cement resistance and the effect of manipulative variables upon this resistance.

This investigation has required the development of specialized cells, circuits and instrumentation. Accurate measuring methods have been established and checked to known standards. Some of the instrumentation, with test cells, for the electrical conductivity phase can be seen in figure 2.

Results to date indicate that, at least when in a dry condition, zinc phosphate cement is an effective insulator against

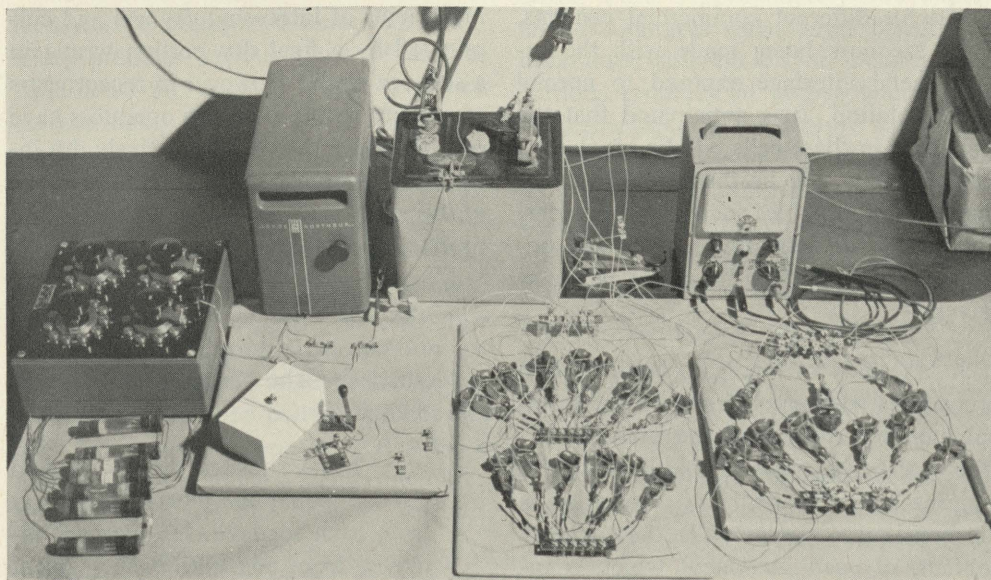


FIG. 2. Cement being tested for electrical conductivity.

MERCURY CONTENT

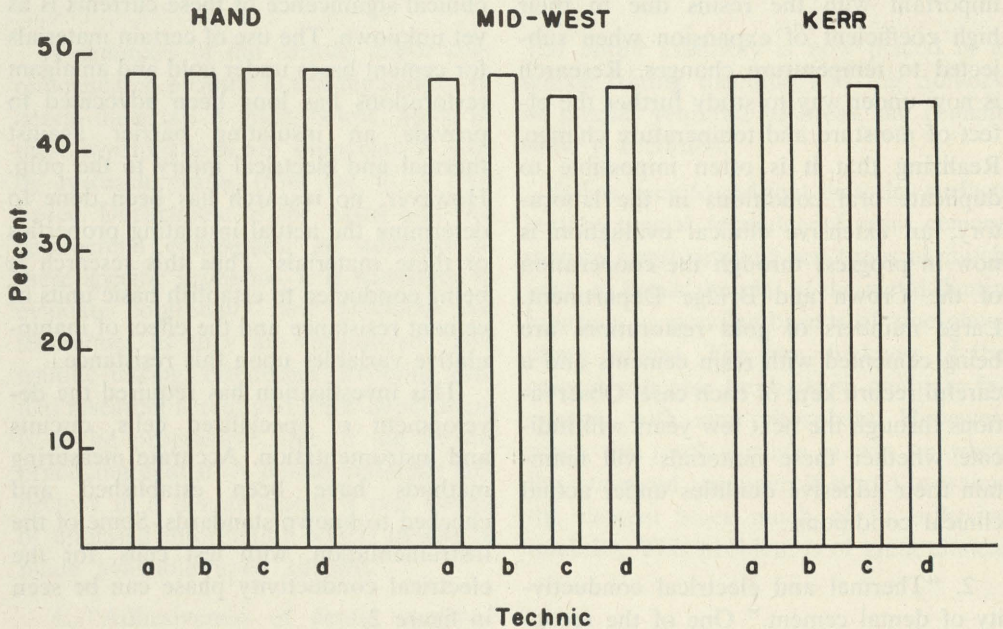


FIG. 3. Residual mercury with various procedures.

electrical and thermal shock. The resistance increases with aging of the cement and there is some difference in values obtained for different commercial cements. Tests are now being made with the cement-metal interface exposed to normal saline solution. It is anticipated that the resistance in these cells will be much less. Further study will be made to determine the effect of variables such as the powder-liquid ratio and to measure the actual conductivity of the restorative materials themselves.

3. "A study of amalgam condensation procedures with emphasis upon the residual mercury content of the increments." One of the controversial questions still remaining with the amalgam restoration is the consistency, or actually the mercury content, of each increment which is inserted into the cavity preparation during

the condensation procedure. The most common method is one which employs a somewhat wet initial portion, followed by increments of increasing dryness and culminated by a final dry portion wrung in a squeeze cloth.² However in recent years some outstanding amalgam operators have recommended the use of relatively dry increments throughout.³ Thus the purpose of this study is to determine which technic produces better physical properties.

Four methods of condensing, all in wide use, have been employed.

Method a—The "increasing dryness" technic

Method b—A squeeze cloth is used to remove equal amounts of mercury from each segment. No mercury removed from mix until each segment was prepared for condensing.

Method c—Mercury expressed from entire mass with squeeze cloth immediately after mixing. During condensation the remaining portion of the mix was softened by assistant, mulling in rubber dam.

Method d—Same as c but amalgam not mulled.

Tests for one and twenty-four hour compressive strengths, flow, dimensional change and residual mercury content have been made on 385 separate specimens. Hand condensation and two mechanical devices have been used with all four technics.

On the basis of work thus far, little difference can be seen in the four methods. An example is the average residual mercury contents shown in figure 3; the differences here are within experimental error. It appears that if a fundamentally sound technic for removing mercury from the individual increments (not using portions too wet or so dry that excess mercury cannot be worked to the surface during packing) is accompanied by a carefully standardized condensation procedure, it makes little difference which technic is employed during the packing.

4. "Solubility of enamel as related to its surface condition." Commercial dentifrices produce various types of surface conditions on enamel. Some products leave a highly polished, relatively smooth surface while others tend to scratch or abrade the enamel. This study was designed to determine whether a rough surface might be more soluble than a highly polished one. A technique has been perfected for measuring the solubility (Ca and P removed during decalcification) on the same area of the intact tooth surface. These areas are then polished or abraded and the solubility measured. Results to date have not shown a significant difference between the two types of surfaces.

5. "Comparison of the accuracy of various technics used in preparation of

working dies for the hydrocolloid procedure." There is much argument concerning the relative merits of various technics used in preparation of the stone working dies in the hydrocolloid or alginate procedure for indirect inlays. Such methods as use of dowell pins, parallators for lining the dowell pins, metal strips inserted into the impression, sawed models, etc., all have advocates. All of these procedures have been studied, using a series of four critical cavity preparations made in porcelain teeth. A three tooth bridge is included. Master castings prepared on these models serve as the control.

When the hydrocolloid is carefully handled and the individual technics are standardized, little difference can be detected. The solid model, sawed, naturally produced ideal results. Use of thin metal strips, carefully inserted, was of comparable accuracy. If the individual dies are poured for the critical preparations, while they are being trimmed and lubricated the impression should be stored in two per cent potassium sulphate solution.

6. "Dimensional stability of self-cured and heat-cured denture base materials." This research is being conducted by Dr. D. A. Cole. Approximately 400 experimental dentures have been constructed upon three different critical metal models. Various commercial auto-polymers have been employed as the denture base and as a relining or rebasing material. These are to be compared with heat-cured denture bases. The dentures have been stored for two years in water at 98° F. The distortion is being measured by means of a micrometer microscope. The study has also included the effect of variables such as thickness, different curing methods, etc.

Observations at this time do not indicate the self-cured resins to be more stable than heat-cured materials. In general the

(Continued on page 53)

Operative Procedures and the Tooth Pulp

by G. Van Huysen and D. A. Boyd

The function of the field of operative dentistry is the restoration of tooth tissue usually lost because of dental caries. Thousands of such teeth have been and are being successfully restored by dentists who have every right to be proud of their skill and the quality of their tools and materials. In spite of this skill and perfection of filling materials there are still instances when filling operations are followed by unusual sensitivity of the tooth and in some instances actual death of the pulp. The dental profession has been trying for many years to determine the cause of such difficulties and thereby affect a remedy for these undesirable though infrequent happenings. Schroff¹ wrote, "It is fundamental of all such operations that they should leave the tooth and the patient in at least as good a state as that in which we found them."

This problem, the effect of operative procedures upon the tooth, has been apparent to the dental profession for many years. Many clinicians have of course given reasons why pulps occasionally show evidence of untoward changes following the placement of restorations. About a dozen different research people have studied the problem during the past 20 or more years. Most of the research has considered the problem from the standpoint of the effect of the filling material upon the pulp while most of the clinicians have been sure that it is certain types of filling materials which produce the pulp damage. A few workers have considered the effect of cavity depth upon the pulp.^{2, 3} It has even been assumed that the expansion of filling materials might break through thin cavity floors to cause pulp injury. There has been some consid-

eration also of the effect upon the pulp of heat generated during cavity preparation.⁴ In the early days Black⁵ believed that the pulp was sometimes injured from heat produced during the polishing of the filling and also the heat of food and drink conducted to the pulp through the filling particularly those fillings composed of metal. Orban⁶ and others have shown that there are pulpal recession lines which may be inadvertently opened during cavity preparation.

Silicate cement fillings have in the past been held accountable for pulp injury.⁷ Lately acrylic filling materials have also been blamed for pulp injury.¹ It is of course possible that enough irritating orthophosphoric acid from the silicate cement or monomer from the resin filling material may be absorbed by the pulp through thin layers of cavity floor dentin from the semisolid filling as it is placed in the tooth. This has not yet been established and since not all teeth so treated are followed by evidence of pulp injury other factors besides chemical injury should be considered when pulps are hurt during cutting and filling operations. Until the effect upon the pulp of all variables has been more carefully checked it would be unscientific to assume which condition or material is responsible.

Minute Pulp Exposures

It should for instance be remembered that pulp deaths under silicate, acrylic resin or for that matter, as they occasionally do, under other types of filling materials occur in the teeth of youngsters whose pulps are usually large. Such pulp injury could come about through minute exposures of these large pulps. This seems

more likely when it is remembered that most pulp injuries occur under proximal fillings, that is, in situations where the dentin is relatively thin and more liable to exposure.

The tooth pulp is of course injured when exposed to mechanical, chemical, thermal or bacterial trauma⁸ and there can be no question when one or more of these factors are obvious. There are instances however where pulp injury occurs when the dentist can see no exposure to admit instruments, chemicals, bacteria or irritating filling materials. These injuries described as closed pulpitis⁸ have been attributed to bacteria entering the pulp via the blood stream. A critical study made in this laboratory of several of these cases has shown that these unexplained pulp injuries have occurred because of minute exposures. It has been learned that even though no actual pulp exposure was seen with the naked eye it was there microscopically. An opening invisible to the eye can admit a lot of bacteria. It has also been noted that it is not necessary that these small exposures bleed or cause the patient pain when they occur. These exposed and injured pulps may also remain symptom free for a long time even though the pulp degenerates completely. Much of the clinical opinion concerning the injurious effect of filling materials on the pulp has assumed that the material was penetrating enough to diffuse through a thin layer of dentin or that bacteria have entered the pulp through the blood stream. A complete critical examination of these cases makes it seem more logical that pulp injuries occur because of a direct assault on this organ.

Research at Indiana University

Most of the research in the past has assumed that the agent or agents in restorative procedures gain access through a thickness of dentin to involve the pulp. A critical study of several clinical cases

mentioned above and some research just finished at Indiana University in which human and dogs teeth have been used makes it difficult to accept this explanation. Using both the steel bur and the airbrasive technics cavities of different depths were placed in teeth and filled with silicate cements, oxyphosphate of zinc cement, amalgam, gutta percha, zinc oxide and eugenol, acrylic resin and calcium hydroxide paste covered with cement. Some of the pulps of the teeth used were exposed and covered with these various materials to determine whether or not they irritated the raw pulp.

In this work with both human and dogs teeth it was possible to successfully cap pulps with gold plate, amalgam and calcium hydroxide paste if the materials could be placed carefully enough to bridge the exposure and not be pushed into the pulp tissue. Zinc oxyphosphate cement, silicate cements, acrylic resins, zinc oxide and eugenol mixes all irritated the pulps when applied to them. These substances were not followed by pulp injury when they were placed in the deepest cavities as long as there was some dentin between them and the pulp tissue. The studies just complete and the work of others as well as reports from clinical studies have shown that one can expose a tooth pulp without losing this vital organ. In this study the pulp showed evidence of injury when it was exposed and traumatized with irritating material. In instances of severe trauma of the tooth pulp from exposure with airbrasive materials where a non-irritating covering such as calcium hydroxide or a metal such as gold was carefully placed over the injured tissue healing resulted. In some instance a few airbrasive particles of aluminum oxide became embedded in some of the pulps but it did not cause inflammation. This study showed that exposing a pulp with airbrasive was a lot less injurious to the pulp than an

(Continued on page 54)

A Case Report on a Mandibular Implant

by Paul E. King

The search for a panacea in the replacement of natural teeth by prosthetic appliances in difficult cases goes on. The latest among the ever-mounting number of technics that have been presented is the sub-periosteal implant. Implantation of metal and bone sections into the human body has been practiced as far back as the history of man. Gold, silver, and platinum have been used longest to close skull openings and to replace segments of other bones lost by disease, accident or infection. Bone segments and pins have also been widely used with a fair degree of success. Since the advent, in the early '30s, of stainless steel alloys of chrome and cobalt, metal implant work has been far more successful and consequently has been more widely used. The principal reason for the increasing success is that the surgical stainless steel alloys are inert and are highly tolerated by the human tissues. However, the implant denture as presented today is an entirely new concept and although not widely accepted as yet, it offers a great deal of promise for those patients in whom it is indicated.

Since the impact of the implant denture in its present form has been so great it was felt that some attempt at research should be made at Indiana University by the Prosthetics Division in order to gain some first hand information pertinent to the subject. With the support of our progressive-minded dean, Dr. Maynard K. Hine, and the able assistance of one of our own staff surgeons, Dr. Wilbur C. Moorman, the first case was begun in January of this year.

The patient was a white female aged 59. She had worn conventional dentures for several years with little or no satisfaction and was genuinely desirous of an implant. On the patient's first visit a com-

plete X-ray examination was made, including full mouth intra-oral films and lateral jaw plates. These were studied for pathology, compactness of the bone and the relationship of the mandibular canal and the mental foramen to the crest of the ridge. The patient was then referred to the medical department for a complete physical examination, including chest X-rays, electrocardiograms, complete blood picture and a search for debilitating disease. Upon finding the patient's physical condition satisfactory, the procedure for making the implant was begun.

1. A complete upper and lower impression was made the same as for conventional dentures.
2. The centric relation and vertical were established.
3. The teeth were set up in wax and corrected to satisfy prosthetic requirements.
4. An outline was made on the mandibular cast to be covered by the implant casting.
5. An acrylic tray was then constructed to cover the area outlined.
6. The patient was pre-medicated one hour before surgery with 1½ gr. seconal and 1/150 gr. atropine to check the flow of saliva. Two mandibular nerve blocks and two long buccal injections were used for anesthesia.
7. An incision was made over the crest of the ridge from the retro-molar pad on one side around to the pad on the opposite side. Retraction of the mucoperiosteum was done carefully to avoid mutilation of the tissues. Tissues on the lingual were

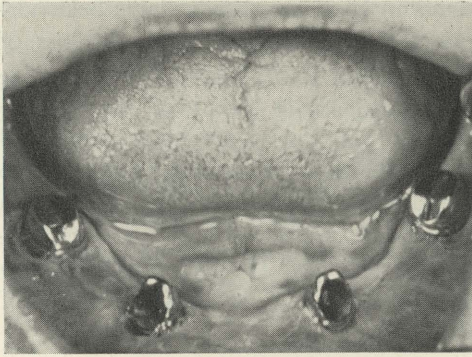


FIG. 1. Implant showing abutment posts.

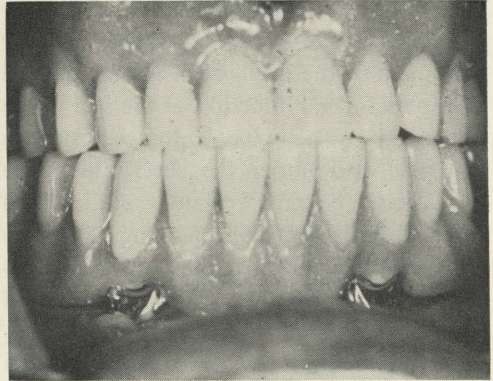


FIG. 2. Finished case in situ.

ligated and the sutures tied across the floor of the mouth to hold them out of the field of operation.

8. All sharp spiculae and unsmooth areas were removed by bone files.
9. Using a diamond stone or fissure bur the crest of the ridge was notched on both sides in the bicuspid area. This provided a definite seat for the implant casting.
10. The acrylic tray was filled with low fusing compound and the impression of the bone taken.
11. The tissues were then closed by continuous sutures. Edema and pain, of which there was little, were controlled by ice packs and codeine and A.S.A. compound. The patient was given 400,000 units of penicillin parenterally.
12. The laboratory carried the implant and the superstructure to completion. All castings were X-rayed for flaws. The implant was auto-claved for one hour and then stored in cold sterilizing solution. The patient was pre-medicated as before. This was three weeks after the operation for the bone impression on February 19. The incision was made in the same line and the tissues retracted

and held away by sutures. The sterile implant was seated on the mandible and secured to it by four 5 m.m. screws in bicuspid and molar areas. The tissues were then coapted and closed by single sutures except around the abutment posts. Here mattress type sutures were employed in order to attain a circular growth of tissue around the posts.

13. The patient was given 400,000 units of penicillin and hyaluronidase solution was injected into the tissues to control edema. Pain was controlled by codeine and A.S.A. Compound. The patient was placed on a soft diet rich in proteins and was seen every other day for ten days at which time healing was complete.

The tissues over and around the implant were allowed to heal thoroughly for a period of about three weeks, at which time the vertical and centric were re-established and the case remounted on the articulator. The lower superstructure was mounted on a model of the lower implant and the lower teeth set to the upper finished denture. After obtaining balanced occlusion, the lower denture was waxed up and processed.

During the time the cases were being

processed and finished, an inflammatory area was noted around the left posterior abutment of the implant. It was diagnosed as a pericoronal infection of the soft tissue produced by heavy calculus deposits on the post and under the soft tissue. The area was opened, irrigated and packed open with aureomyecin packing. After the inflammation subsided the wound was allowed to granulate in without the use of sutures. The insertion of the finished dentures was necessarily delayed during this treatment and subsequent healing for about two weeks. The dentures were inserted in the patient's mouth some four weeks ago and at the present writing it is our belief that they are clinically successful at least. The histologic picture is still cloudy because up until the present time, no complete series of experiments has been done to show what the future of implants will be.

Implant dentures are indicated for pa-

tients in good health who have been virtually dental "cripples" since the loss of their natural teeth. Included in this category are patients with poor mental attitudes toward conventional dentures and those with nervous muscular habits, large tongues, gagging tendencies, knife-edge and sharp spinous ridge, or severe resorption of the ridge. The patients are far too numerous and all of us know many of them.

The known disadvantages are economics and poor health.

The technic is quite long, as much as three months being required to complete a case. Also much time is required after the dentures are inserted in order to check balance, take X rays and clinically watch the case.

Although implant work has been done over a period of five years it is still not widely accepted and must be still considered as experimental. Nothing is now



FIG. 3. Profile view with patient wearing old dentures.

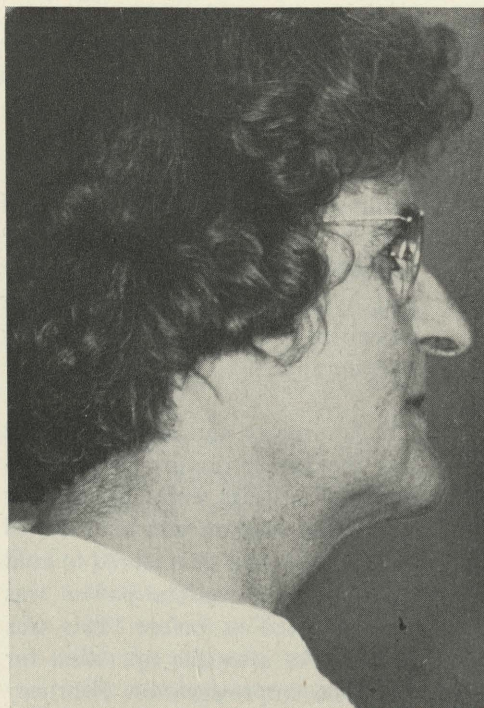


FIG. 4. Profile view with implant denture

known about the functional life expectancy of implants or what the conditions around them will be in five or ten years. The essence of it all is how well received implant dentures have been by patients who have them. The patients are now able to resume the pleasure of normal mastication of their food and have complete mental and physical comfort. Many

patients having implant dentures have been examined, X rayed and evaluated and to my knowledge no instance of pathology or serious infection has occurred.

NOTE: The paper together with colored slides of a mandibular implant was presented at the May meeting of the I.S.D.A. as part of the prosthetics program. Bibliography: W. E. Pernece, D.D.S., History of Implant Work and Report on Mandibular Implants By The Direct Impression Method. J. Pros. Dent. 2:51 54, 1952.

Roy L. Bodine, Jr., Col., U.S.A., Experimental Subperiosteal Dental Implants. U. S. Armed Forces Medical Journal, Vol. IV, 441-451, 1953.

Research in Periodontia

by Henry M. Swenson

The Effects of Dilantin Sodium on Rat Gingiva

The dental profession is aware of the frequent hyperplasia of gingival tissue resulting from the use of dilantin sodium for treatment of epilepsy. Some cases, however, show practically no changes, which is due to lack of local irritation.

A study is being made to determine the effects of local irritation on the amount of hyperplasia occurring in rats when they are placed on this drug. Orthodontic ligature wire is placed around the lower anterior teeth to act as an irritant. No definite results are obtainable at this time as to the effects it will have on the gingiva.

Wound Healing in Electro-Surgery

Electro-surgery has certain indications for its use. It has been noted, however, that some cases are delayed in healing. Dogs were used to study the relationship in healing between a high frequency cutting current and a sharp scalpel. The flank of the dog was shaved and was then anesthetized. Incisors of the same depth and length were made with a sharp scalpel and the electro-surgery machine. The operations were spaced so that the healing could be studied for a period of three weeks. It was found that electro-surgery

was definitely slower in healing. By this we do not infer that it should not be used, but rather that it should be used with caution and selectivity.

The Use of Tannic Acid in Surgical Dressings

Tannic acid has frequently been incorporated into surgical packs that were used as a dressing following a gingivectomy. In recent years it has been shown that tannic acid sometimes retards epithelization.

Surgical dressings have been made, some containing tannic acid. A gingivectomy is performed on a dog and part of the operative area is packed with the dressing containing tannic acid while another part is packed with dressing containing no tannic acid. Histologic sections will be made of this tissue to determine if healing is retarded by the incorporation of tannic acid in the dressing.

The Histopathology of the Periodontal Pocket

The tissue removed during a gingivectomy is sectioned for microscopic study. In this way an attempt is being made to correlate the microscopic findings with the clinical picture. Special technical procedures are employed to study the physiology and pathology of this tissue.

Crown and Bridge Department

by John F. Johnston

In the field of research the efforts of the Crown and Bridge Department have been of a clinical nature. The problems which were present when the reorganization was started have been solved in part only, due to the military service of Roland Dykma and the death of Robert Botkin. However, success is now in sight. Next year those of the staff who are continuing will have a maturity of outlook, an ability to diagnose and a confidence in operating which will give added authority to their teaching.

One phase of research in the Crown and Bridge Department during the past year has been concerned with the reproduction of the crown portion of teeth in porcelain. Disassociated natural teeth are used and these reproductions are accomplished using porcelain facings of all types.

The first step is in the selection of the correct type and size of facing. In order to reproduce the anatomical characteristics found on teeth, the facing selected must be 1-1½ mm. wider and 2-3 mm. longer than the tooth being duplicated. The facing is then ground to correct form, using various mounted carborundum stones, particular attention being given to reproduction of convexities, concavities and individual anatomical markings or characteristics.

Although the proper form of a facing is the most important single factor in creating the illusion of naturalness, we have found that often it is necessary to employ staining procedures in order to achieve maximum esthetic results. Opaque areas, hair-line checks, and surface stains in the enamel which cannot be removed, are the most common duplication necessary.

Technique for Staining

The technique used for this staining is as follows:

After the facing is ground to proper form and the surface smoothed, it is cleansed *thoroughly*. A coat of glazing material (Super-Glaze or S.S.W.) is then applied and fused. It is important to remember that the first coat of glazing material does nothing but fill the porous surface of the porcelain, but will permit the application of the stains so that they may be confined to the desired areas.

Low-fusing mineral stains, such as S.S.W. (1600°) or Steele's Super stains (1762°), are used. The powdered stains are mixed with a solution of 50% glycerin and 50% H₂O to a creamy consistency and applied to the glazed facing with a No. 000 camel's hair brush. The desired shade is often obtained by mixing various colors. It has been found that the addition of minute portions of black, and sometimes pink, are most often needed to accentuate the characters.

After application the stain is fused in the porcelain furnace. If the desired effect results, a coat of glazing material is then placed over the stain and fused. This second application will give the illusion of depth to the stained areas and thus will increase the naturalness of the reproduction.

This project has been carried on by Don Cuninghame and Ralph Schimmele. It will be continued during 1953-54, being adapted to altering the surface appearance of acrylic jackets, acrylic veneers on full cast crowns, and fabricated acrylic facings on pontics.

Acrylic Veneer

A second research project deals with full cast crown with an acrylic veneer. It is felt that this restoration is better than the crown with an acrylic window. With that in mind the Crown and Bridge Department has directed the junior students

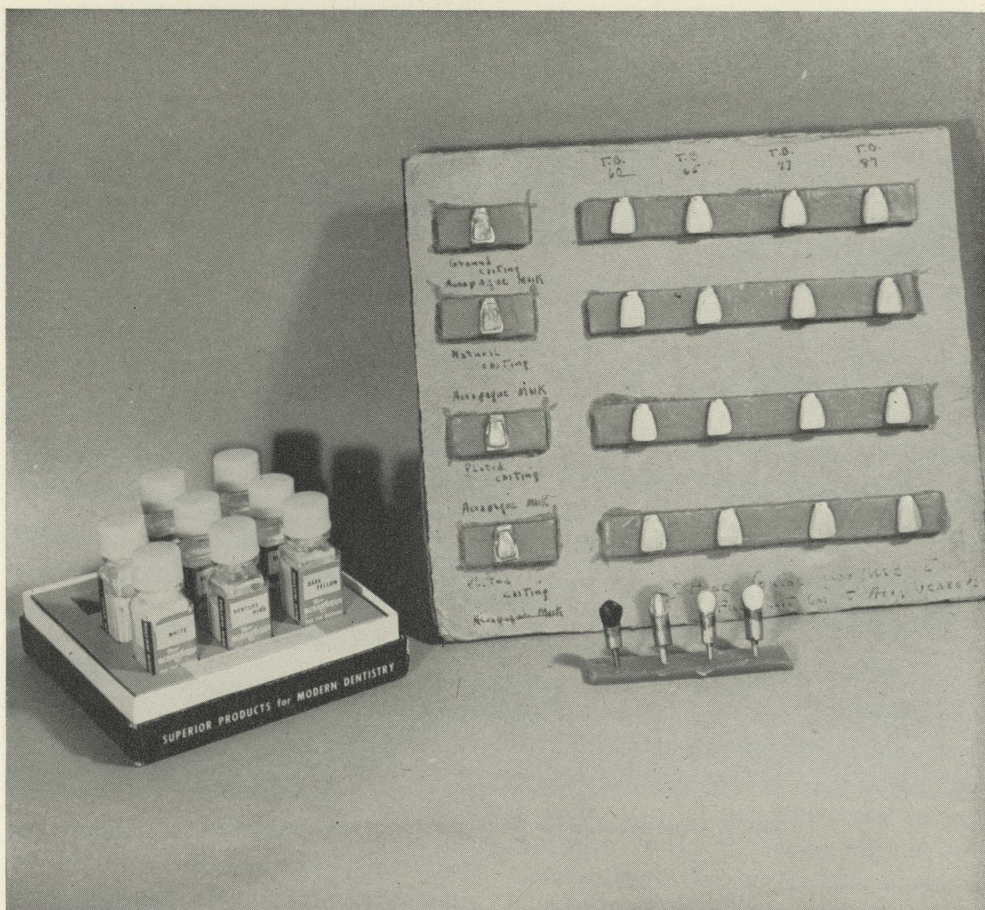


FIG. 1. Specimens used for studying masking materials and their efficiency in producing given shades. Color Difference Meter is used to detect color change.

in their technic course to construct such a crown. The much discussed difficulty of obtaining an esthetic restoration is in evidence here, but we believe that the very uniformity of bad results can be turned to uniformly good results by developing an acceptable masking material or materials along with the artistic color sense necessary in application. To that end an attempt has been made to standardize the controllable factors such as shape of the gold blank, thickness of the labial wax, and surface of the finished acrylic, leaving only the masking material and gold surface as variables.

The veneers which are processed will be analyzed first by inspection to see if they have some "life" to them; second by comparison to the shade guide to see if general color is satisfactory; and third by the Hunter Color Difference Meter to get an exact color comparison in various areas of the veneer.

The commercially available materials will be the first to be so analyzed. If they prove satisfactory a shade guide for each material can be made which will give a measure of exactness to the presently erratic results. When certainty of shading has been achieved, we feel this crown will

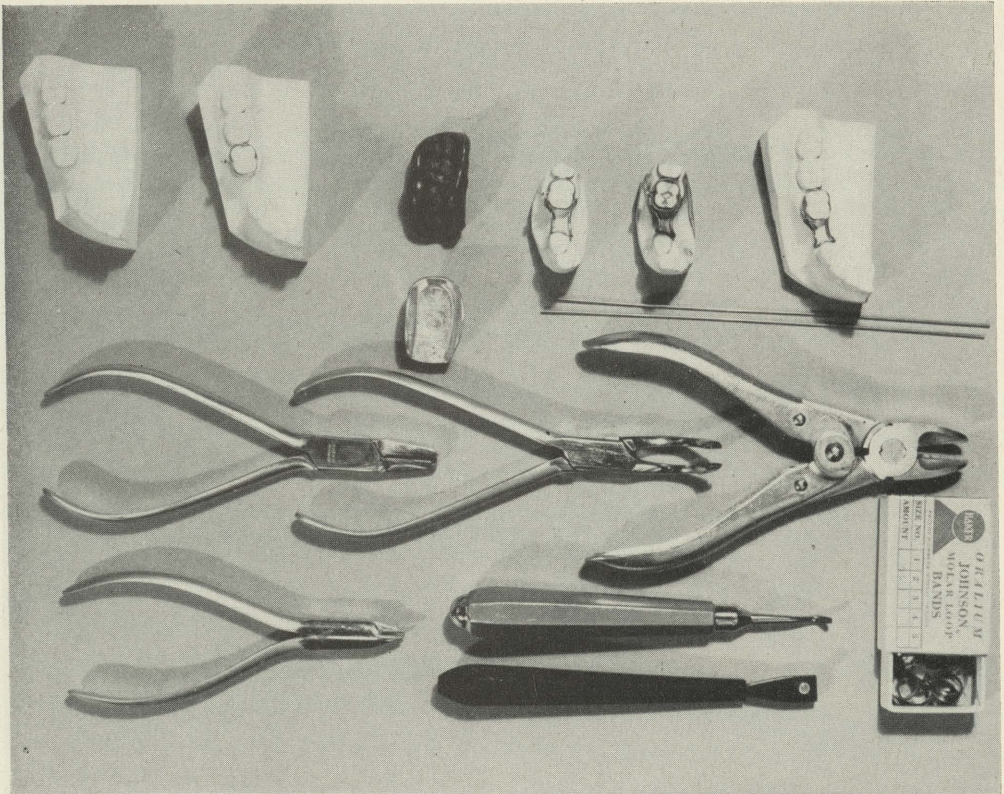


FIG. 2. Armementarium for the construction of space maintainers

gradually displace the jacket of acrylic or porcelain. It has the advantages of better fit, occlusion, service and resistance to wear.

At the present time each shade is being run in a series of four:

1. With the masking over unpolished gold.
2. With masking over polished gold.
3. With masking over a flash-plated surface.
4. Over a flash-plated surface with no masking.

John DuMond, with help from others of the staff, has carried this effort to a point which affords a glimpse of the possibilities.

Copper-plating

Although very little technical research

has been done on electroplating to date, an attempt is being made to popularize the electro-formed die. Dan Cheek and DuMond have assembled an inexpensive electro-deposition apparatus and have prepared a solution about which information will be available in the early summer to those who are interested.

Loftus Brown, 1953, supervised by these men, has written his senior essay on this subject. This will be mimeographed and used as a guide for future instruction of undergraduates. Information may be obtained by writing to the Crown and Bridge Department or to the Dean's office. In this field, work will start soon on the electro-forming of hydrocolloid and alginate impressions.

Already some work has been done on

(Continued on page 55)

Research in the Orthodontic Department

by J. W. Adams

Progressive companies, years ago, came to realize that although they occupied a position of leadership in their particular fields that the establishment of research foundations to stimulate general progress was desirable. This was found to be true from the standpoint of developing their own personnel, seeking basically new ideas which could lay the ground work for new industrial procedures, and the opening up of new channels of thought. Not infrequently this resulted in the company producing things quite different from what they had formerly manufactured. They did not wait for colleges and university departments to make important finds. In many instances the company research men and graduate students were experimenting on about the same thing concomitantly—perhaps using different procedures. The resultant findings of the two or more laboratories strengthened each other and were actually or potentially more factual in their application.

As the experimental car of today can be the standard model of the future so can the research observation, no matter how seemingly modest, be the stepping stone to an improved clinical procedure or an improved office technique. We can say, without discrediting our predecessors, that dentistry has been prone to do the same thing in a little better way rather than find a new line of reasoning to solve a problem. We anxiously await the introduction of a new material which we hope will be the answer to our clinical problems. Too often we finally learn that we are up the same blind alley. The scientific horizon had not been pushed back.

Research can bring benefit to those who are involved in it, as well as those who sustain an interest in that direction, in indirect ways. It can help to combat a smug

attitude that the final goal has been reached by pointing out how much is not known and what it is not known. The informed individual is apt to work hard to find a solution for the unknown whether it be clinical or non-clinical in its usage. Many important findings had their inception in chair side inquisitiveness that was motivated by a desire on the part of the individual to improve the general situation and make a worthwhile contribution to his chosen field.

The development of a man in any branch of a profession usually involves two main phases, namely education and training. There is ample evidence to support the contention that a graduate dentist who is not an accomplished operator is limited in his scope and not a true asset to society but at the same time we can generalize by saying that he will not be a modern dentist for all the title implies if he does not have enough basic knowledge and know-how to reason clearly and logically. We tend to admire the professional man who can readily ferret out obscure facts, utilize these facts wisely and arrives at a smart conclusion as to what should be done and what should not be done. We say that such a man has splendid clinical judgment. The student or teacher who works on an investigative problem under proper guidance is being helped in the direction of this educational achievement.

The investigative work which we have done and which we will continue to do ranges from the development and testing of a small appliance accessory over a period of a month's time, to long term studies which were started in 1946 and will not be crystallized until about 1960 since the patients must grow to adulthood to culminate the experiment and prove the points conclusively. We not infre-

quently need the assistance of other departments for criticism, clinical techniques or equipment and hence we call on surgery, dental materials, pedodontia, pathology and others. The procurement of complete and concise records is an unending task in our field so the final work would not have been possible without the unselfish help of Drs. Hanes, Lindquist, Stoner, Kelley, Rodriguez, Vorhies, Hapak and others.

Broadbent Bolton Technique Used

In the enumeration of what has been done and what is being done by these men as well as the author it is difficult in an article of this type to do justice to the work and still make it understandable to the person who is not in daily contact as we are, so the indulgence of the reader is appreciated. One would expect an orthodontist to be naturally interested in the variation in form of faces, especially that of the growing child. Since we have had available to us equipment to X-ray the heads of living persons by the standardized Broadbent Bolton technique, we have learned to use these in a manner comparable to intra-oral X rays in the hands of the modern dentist. A carefully made tracing of important structures points out the facial pattern of the individual, i.e., how these structures are put together, how they work, how much they grow, where they grow and what happens during orthodontia treatment.

Our studies clearly show (1) That the relationship of the first permanent molar is not necessarily correlated with the type of face nor an accurate indicator of jaw relationship. (2) That within a given group of malocclusions there can be tremendous variation ranging from untreatable to almost self-correcting. (3) That very basic differences exist in the size and arrangement of facial bones between Class II, Div. II and Class II, Div. I malocclusions rather than chance arrangement of teeth. (4) That the facial pattern is sur-

prisingly stable in most malocclusions as in normals though in some the jaw discrepancy becomes worse with age whereas in others it shows considerable improvement. (5) That too much tooth mass in the modern human is the rule rather than being an exception to the rule and (6) Muscles to a large degree dictates the final positioning of the teeth, especially those in the lip region.

"Indiana Polygon" Developed

Downs found it necessary to express facial pattern in terms of a series of angular and linear measurements which resulted in a cumbersome table of figures. The readings of a given case were given meaning by comparing them to previously derived ranges and means of normal faces. Downs' analysis was accepted as an improved way of reaching a workable conclusion. We have developed a graphic way of illustrating these findings of a given case against the accepted normal by means of "The Indiana Polygon" which has enjoyed almost universal acceptance.

For years we have glibly spoken of the normal deciduous denture and the face of the 3-6 year face in which it was found. It was generally believed that malocclusion in this age range was not common and it was taken by consent that most malocclusions had their inception coincidental with eruption of the permanent teeth. Our work, done with critical standards, indicated (1) That normal deciduous dentures were to be found in less than 10 per cent of those examined. (2) That normals in this age group showed about the same variation as older age groups. (3) That the axial inclination of permanent incisors was a very intrinsic part of the general facial pattern. (4) That a minimum of overbite and definite spacing of the deciduous incisors was a necessary characteristic of this normal. (5) That the articulation of the second deciduous molars was variable according to tooth mass

and would have a profound effect on how the first permanent molars would occlude following eruption. (6) This supported our previous findings that the first permanent molars in some dentures would have to give a mesio-occlusion impression to have proper interdigitation in the bicuspid and cuspid regions of the normal young adult denture.

The above observations were made from very complete and accurate records of twenty-five children to which we intend to add cases when available. The collective findings have been linked to comparable studies of older age groups with interesting and integrated conclusions. It is our hope to repeat these records from time to time and note their ultimate trends for better or for worse. We are laying plans to cross-sectionally study malocclusions in deciduous dentures and finally observe them serially as they grow up.

We have perfected a method of treating unilateral cross-bites in deciduous dentures and are observing the effects of this treatment on the general facial pattern, the erupting position of the first molars as well as the permanence of the treatment. Similarly we have perfected the cemented lower anterior bite plane in the treatment of anterior cross-bites and observing its effect on mandibular position. The application of the specially designed partial lower denture combined with space maintenance has had our sustained interest. Work of this type is directed toward making good orthodontic management available to more children through selected general practitioners.

It is only natural that orthodontia would concern itself with the devastating effect of mutilation on the natural denture and calling attention to the profession at large of ways of minimizing it. Hence our interest in (1) early detection and proper management of the ankylosed tooth. (2) The analysis, treatment and prevention of

The Temporo-Mandibular Joint Syndrome. (3) We are studying the matter of early extraction of selected permanent teeth in instances where severe malocclusion is inevitable but want it known at this time that it is a complex problem and we have no conclusive statements to make at this time.

Extra-oral Appliances

We have had splendid results from the application of extra-oral appliances whenever cooperation was good. It is effective in that it offers restraint to one arch or the other — occasionally both. Strangely enough we find it difficult to explain in detail why, where and how it works. We are anxious to have this information so that we can apply this knowledge in other directions. The time may come when this too will be presented to selected dentists at the postgraduate level who are sufficiently interested and qualified to treat selected malocclusions.

A thesis was recently done in the field of study of carefully noting what happens to the first permanent molars and permanent incisors of malocclusions where the cases go from typical mixed dentures to a stage when all deciduous teeth have been shed. The conclusions were that it was less orderly, less predictable than we see in the same stage of normalcy. This may well explain why orthodontists have had such varied experiences in this age range and have tended to avoid treating most malocclusions until all or most of the permanent teeth have erupted.

Indiana has been one of the institutions that has done considerable work in the field of surgical correction or prognathism with close orthodontic correlation. Our interest has gone beyond the improvement of facial esthetics and occlusion and we have noted that deep structures, namely tongue, hyoid bone and soft palate have benefited immeasurably by this procedure. Our present feeling is that the operation

(Continued on page 56)

Library

Mrs. Mabel Walker, Librarian

Additions, Services, Developments

In January of this year the School of Dentistry received from the class of 1929 a beautiful glass museum wall case (fig. 1). This gift was presented in memory of two members of the class of 1929, Captain Howard A. McCurdy and Captain Edwin H. Connley, who lost their lives in World War II. The case has been placed in the library and is being used to house more than 100 old and rare books. We are extremely grateful for this gift. An arrangement of this type has been needed for a long time to give proper care to and display of rare books.

The oldest book owned by the library is, "A Treatise on the Teeth," 2d. edition, by A. Tolver, published in London, 1752 (fig. 2). The rarest book probably is, "A Dissertation on Artificial Teeth in General," by Nicholas Dubois de Chemant, published in London, 1797. Of considerable value is the first series of 10 volumes of the FIRST dental periodical, AMERICAN JOURNAL OF DENTAL SCIENCE, published in Baltimore, Maryland, 1839-1850, also housed in the museum case. Of great interest to us are many books in this collection bearing the signatures of deans and members of the faculty. Among them are those of the first and second deans, Dr. Phineas George Canning Hunt and his son, Dr. George Edwin Hunt.

Additional equipment which will facilitate use of the library is visible kardex title files for all periodicals contained in the library and their location on the shelves. One of these files is kept in the reading room and another in the basement stacks.

Among the new books added to the library recently are:

- Gesell, A. L.—First Five Years of Life, 9th ed., Harper, 1951.
- Glickman, I.—Textbook of Periodontology, Saunders, 1953.
- Haupl, K. and others—Textbook of Functional Jaw Orthopaedics. Mosby, 1952.
- Johnson, W.—Speech Problems of Children; a Guide to Care and Correction, Grune & Stratton, 1950.
- Jolliffe, N. and others—Clinical Nutrition, Harper, 1950.
- Morse, M. E. and others—Microbiology and Pathology for Nurses, 3d ed., Saunders, 1951.
- Lee, A. B.—The Microtomists' Vade-medum, 11th ed., Blakiston, 1950.
- Schlosser, R. O.—Full Denture Prosthesis, Saunders, 1953.
- Sicher, H.—Oral Anatomy, 2d ed., Mosby, 1952.
- White & Geschickter—Diagnosis in Daily Practice, Lippincott, 1947.
- Yearbook of Dentistry, 1952.

These books are available for loan to all alumni.

For several years prior to the fall of 1951 instruction in the set-up and use of the library had been presented to the sophomore students by giving each a copy of the "Library Handbook" and an "Outline for Paper Writing," both prepared by the library staff. As a paper was required the first semester of 1951-52 in the sophomore history and ethics course, the library orientation program for the past two years has been given at this hour about two weeks after the beginning of school and was extended to a lecture to the class by the librarian including a brief history of the library and an oral explanation of the "Library Handbook" and "Outline for Paper Writing." The history and ethics course in the future will be given to the freshmen students and the library pro-



FIG. 1. Museum case presented by class of 1929.

gram presented to them. This was done for the first time the second semester of this year on the Bloomington campus. Dr. John F. Johnston, instructor in the course, suggested, since the students at Bloomington would be entirely unfamiliar with the physical plan of the library, that they be given floor plans of the reading and stack rooms drawn to scale. These were done by multilith process from drawings made by a student assistant and inserted in the "Library Handbook."

Color Slides Made

The need of more visual aid in library instruction had been recognized for some

time and the idea of projection slides of card files, indexes and books considered. Dr. Johnston thought this method would be practical and suggested that colored slides be used. In addition to the above-mentioned items pictures were taken of all parts of the library reading room including the current periodical racks, stacks, card catalog file, loan desk, book sections, close-up of two shelves so that detailed arrangement of both dental and non-dental books was shown, museum case, close ups of a few rare books, sample pages of both dental and medical indexes, exhibit case, date due slip and book card showing

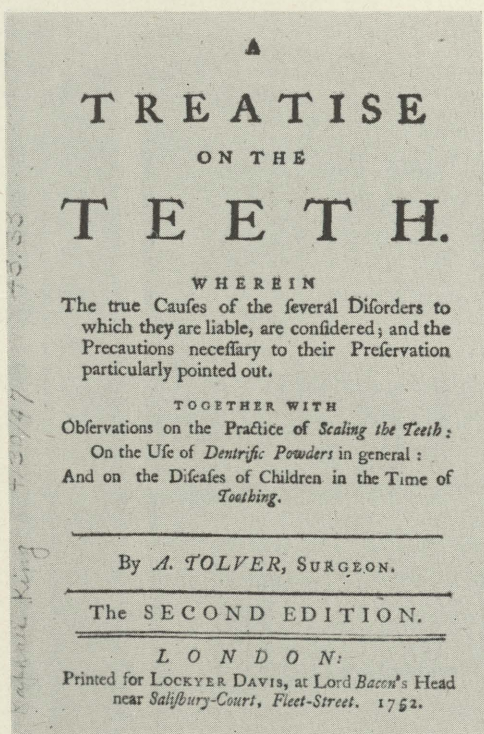


FIG. 2. Title page of oldest book owned by library.

method of charging books, and library office. When slides were shown detailed explanations were given of the use of indexes, listing of bibliographies, filing arrangement of books on shelves in relation to card catalog and charging books.

A history of the library was read to the class by the librarian followed by black and white slides of various views of the dental school library through the years beginning with a small collection of books in the college office in 1898. Also along with the historical slides of the library were shown the six buildings which have been occupied by the Indiana Dental College and the Indiana University School of Dentistry, beginning with the first building, the Thorpe Block at 147 East Market Street, Indianapolis, Indiana, in which eight rooms were leased by the school from 1879-1881.

This method of presenting the library

to the student body has been by far the most practical and seemingly interesting of the various methods attempted. Present plans are to continue with it. It prepares the student for the paper required in the first semester freshman history and ethics course, the second semester freshman chemistry course and the subsequent sophomore and senior papers required when the student comes to the Medical Center in Indianapolis. The freshman dental hygiene class is small enough that the entire class comes to the library for instruction. They, too, are given copies of the "Library Handbook" and the "Outline for Paper Writing," which are explained to them. They are taken on a tour of the library and given practically the same explanation of the files, shelves, indexes, etc. which is given to the dental students in their classroom.

Alumni Meeting

Our annual fall meeting on the campus at Indiana University will be highlighted by several events of outstanding interest.

Heading the speakers program will be Dr. Kenneth McFarland, who is being sent to us through the generous courtesy of General Motors. We need only to mention his name in any circle acquainted with good public speakers and favorable comment is forthcoming. His address needless to say will be worth the trip to Bloomington. He will appear on the Friday afternoon program.

Dr. Lee Norvell of the University Drama School will repeat his usual favor with a student drama presentation in the Little Theatre. This is unsurpassed entertainment. Following the Little Theatre program it is expected President Wells will give a reception for all visiting dentists and their ladies. Saturday morning Dr. George W. Helmbach of Evansville will

present a paper on "Hypnodontics—Patient Relations" with patient demonstrations. Also on the Saturday morning program will be Dr. William B. Gambill.

The program for the ladies will include a lecture and demonstration by a nationally known cosmetician.

Following a luncheon in Alumni Hall we will see Indiana match their prowess against Marquette on the football field for the first home game of the season.

Watch the mails for detailed program announcements, be prompt about your reservations, and we will all have a weekend to remember on October 9, 10 on the Indiana University Campus.

Victor Jordan, Jr., President

More Faculty Join Service

Six more members of the dental faculty are leaving dental teaching to join one of the Armed Forces this summer. Dr. Robert Boesinger, for many years a part time instructor in Operative Dentistry, has received his orders for induction in the Armed Forces and plans to leave late this summer. It is not known at this time which branch of the Armed Forces he will join.

Dr. Wilbur C. Moorman, full-time professor in Oral Surgery, leaves August 3 for the Army and is being assigned to Fort Sam Houston in San Antonio, Texas. Also leaving the Oral Surgery Department is Dr. Joseph C. Ropski, who has been a full-time instructor in Oral Surgery for several years. Dr. Ropski has a commission in the Air Force.

Dr. Edgar Benjamin, full-time assistant in the Periodontia Department, accepted a commission in the Public Health Corps and left June 15.

Dr. James Yaeger, Graduate Assistant

in the Department of Anatomy, who assisted in the teaching of Gross Anatomy to dental students, leaves soon to serve in the Army.

The sixth faculty member to leave for the Armed Forces this summer is Dr. Arthur V. Gilliom, part-time teacher in Operative Dentistry. He is the sixteenth member of the Dental School faculty to be called to the Armed Forces since the Korean "incident" began.

It is recognized that the Dental School has responsibilities to the Armed Forces but the continued loss of such teachers makes it difficult to maintain the dental teaching program at a desirable level.

M. K. Hine

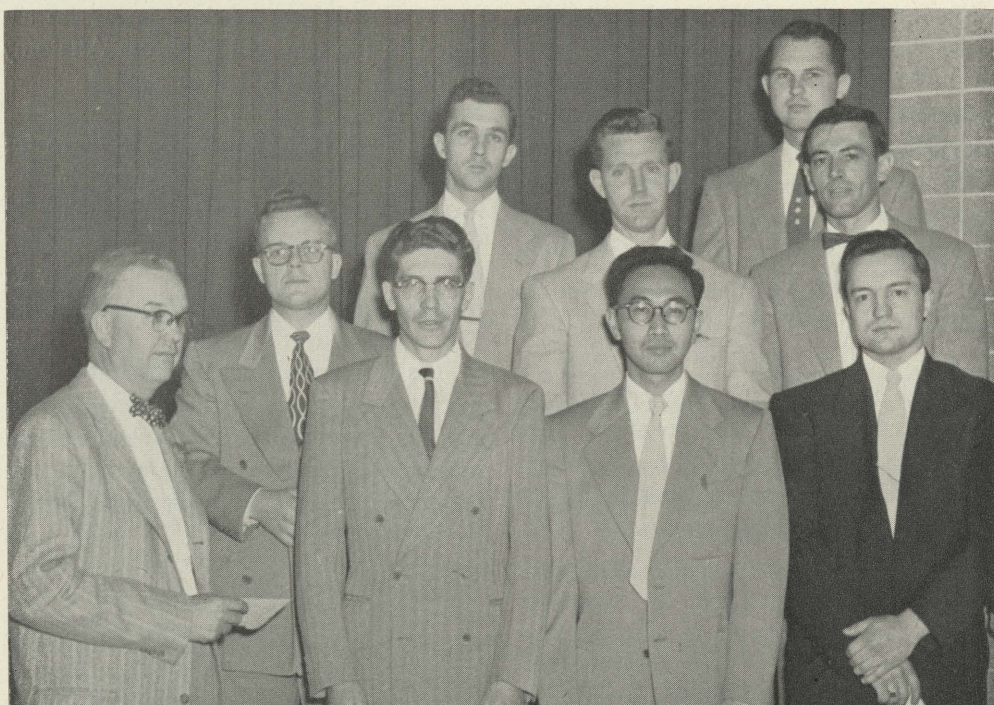
Senior Awards

The annual Senior Honor Day Program and Senior Honor Day were held May 28 in Rice Auditorium of the Indiana State Board of Health. The program was given in the evening and was well attended by wives, parents and friends of the graduating class.

Scholastic honors, recognized through election to Omicron Kappa Upsilon, were received by eight members of the graduating class. The keys were presented by Dr. R. A. Misselhorn, President of Theta Theta chapter. The recipients were:

1. Sanford Asahina
2. Ralph E. Brennan
3. Loftus Brown
4. Walker W. Kemper, Jr.
5. Francis E. McCormick
6. William E. Peet
7. Richard H. Reinking
8. Robert T. Wilson, Jr.

Other honors included the C. V. Mosby awards for outstanding work in operative to Sanford Asahina; for outstanding work in prosthetics to John E. Vogel; for outstanding work in oral surgery to Basil



Dr. R. A. Misselhorn presents keys to: first row—McCormick, Asahina, Peet; second row—Wilson, Brennan, Brown; third row—Kemper and Reinking.

Remley; and for research to Richard Reinking. The certificate of merit for proficiency in dental medicine was presented to Walker Kemper while the certificate of merit from the American Society for Dentistry for Children was presented to James Vorwald and to David Lehman.

Mr. Asahina was given the plaque from the Hamilton Study Club for having done outstanding work in the field of crown and bridge. Dr. Philip Fogle presented a plaque from the National chapter of Alpha Omega fraternity to Ralph E. Brennan, who earned an outstanding scholastic record during his four years of dental study. The award from the American College of Dentists to the student showing the greatest improvement since his freshman year was presented to John Vogel. The award from the American Academy of Periodontology was given to Leon Turner.

The cash awards for the best essay on

Oncology from the United States Public Health Service Cancer Research were given to Wayne Risinger and Harry Shaver. The Leonard Senior Essay Contest awards were as follows:

1. Walker Kemper
2. Richard Reinking
3. Martin Linderman

Dr. Hine presented a certificate to Charles Infante for having made an outstanding record during his freshman year.

Miss Fisk presented pins to the Dental Hygienists and also awarded Miss Joan Malacina the C. V. Mosby award for her excellent record during her two years of study.

A new award inaugurated this year was the Botkin award, in memory of Robert A. Botkin, a former member of the dental school faculty. Louis Disser received this award.

Fifty-eight in Graduating Class

Fifty-eight seniors received their D.D.S. degree at Commencement Exercises in Bloomington on June 15, 1953. The names of the graduates and their home addresses are listed below.

Sanford Asahina
Honolulu, T. H.

Dale Baker
Odon, Indiana

Charles Bewick
Gary, Indiana

Paul Braden
Indianapolis, Indiana

Ralph Brennan
Gary, Indiana

Loftus Brown
Glenridge, N. J.

Robert Carnes
Richmond, Indiana

William Conrad
Anderson, Indiana

William Crawford
Indianapolis, Indiana

Louis Disser
Shelbyville, Indiana

Thomas Drakos
Gary, Indiana

Arnold Dunfee
Plymouth, Indiana

Bernard Ellins
Miami, Florida

Thomas Garman
Goshen, Indiana

Dale Goris
West Lafayette, Indiana

Wendall Grassmyer
Monticello, Indiana

Wayne Heath
Fort Wayne, Indiana

James Holder
Elberfeld, Indiana

Bert Horn, Jr.
Evansville, Indiana

Stanford Hyslop
Francisco, Indiana

William Kelly
Oxford, Indiana

Walker Kemper
Indianapolis, Indiana

Richard Kerlin
Sullivan, Indiana

Edward Lawton
South Bend, Indiana

David Lehman
Goshen, Indiana

Martin Linderman
South Bend, Indiana

John Mapes
Bedford, Indiana

Robert Marshall
Terre Haute, Indiana

Harold Maxwell
Gary, Indiana

David McClure
Butler, Indiana

Francis McCormick
Waynetown, Indiana

Thomas McKean
Montpelier, Indiana

William Meek
Indianapolis, Indiana

Victor Mercer
Indianapolis, Indiana

Estell Morris
Dale, Indiana

Harry Motsinger
Salem, Indiana

William Peet
Indianapolis, Indiana

Henry Plaschkes
Indianapolis, Indiana

William Potasnik
Whiting, Indiana

Richard Reinking
Fort Wayne, Indiana

Basil Remley
Anderson, Indiana

Charles Rigg
Gary, Indiana

Wayne Risinger
Indianapolis, Indiana

Arthur Robbins
Paoli, Indiana

Ralph Rohn
Alexandria, Indiana

Benito Ruiz
Rio Piedras, P. R.

(Continued on page 56)

Alumni Notes

Mrs. Cleona Harvey, Recorder

The shouting and tumult of another year is about over. Even State Boards have been completed, so you know we are writing this column late in June. Good old smothering Indiana summer and the boys who are brave are still here sweating it out in the clinics improving their techniques and helping to give the school an air of activity. As usual we have a 10 weeks summer session and it promises to be a rather busy one.

We have received most interesting letters from far and near and while we can't (at least we don't) answer them all we want you to know we do appreciate getting them and are happy to convey your greetings and news about you to your classmates through this column.

Class of 1886

Dr. W. H. Rowand died December 25, 1952, at the age of 87. Mrs. Rowand wrote us in March. Her address is 2401 Holmden Ave., Cleveland, Ohio.

Class of 1892

Dr. A. A. Powell, 1984 Lundy Ave., Pasadena, California, writes a most interesting letter and we are so sorry that space prohibits printing it all. He has had a most enjoyable life and has been a very busy man. Among other things he says, "In my time I made exactly 2003 plates. Only three plates were not paid for! A lot of them were "free make-overs" for I used to guarantee a fit! Gave me fits, too." However, he does not claim to have learned all about it in dental school; in fact, he describes his education as follows:

"After two winter courses of only 5 months each, I was graduated from the Ind. Dental College March 1, 1892. In that time, with a limited faculty, not much

was taught. I was not the only student that never filled a tooth, nor extracted one, nor made a plate for a patient, etc. Some such things were done on dummies in the Lab'y."

He retired in 1931 and has visited 52 countries and islands. He has certainly liked it all and says "No man could enjoy 'the fruits of his labor' more than A. Archie Powell."

Class of 1897

We want to pass this word on to you from Dr. R. A. Adams: "Having retired and taken on the Heculean task of just being a "lazy loafer," kindly change my address from 212 Metropolitan Building to 1268 Steel St., Denver 6, Colorado.

Class of 1899

We received a very interesting news clipping concerning Dr. A. H. Littlefield of Parker, Arizona. We believe you will enjoy reading it, too:

"The oldest practicing dental surgeon in the Southwest has decided to 'let the younger men take over.' He is Dr. A. H. Littlefield, 84, of Parker, who announced his retirement last week after 54 years of practice, including 35 in Parker.

"Dr. Littlefield enjoyed a wide practice throughout Arizona and Southern California for many years and one of the highlights of his work has been his availability on a 24-hour basis for emergency work.

"He also performed his own dental work, standing in front of a mirror to pull his own teeth.

"Graduated from an Indianapolis dental college in 1899, Dr. Littlefield decided to set up practice in Los Angeles but side-tracked to Iowa for several years before starting West.

"When he reached Arizona, Dr. Littlefield liked it so well he developed a trailer for his equipment and made a circuit of Northern Arizona in the summer months and Southern Arizona in the winter.

"I never did get to Los Angeles, he says."

Class of 1902

A good letter from Dr. Roland Low of Whittier, California reports:

"I am the oldest dentist here in years and in years of practice I am sure. This coming August I will be 77 years old and I am still putting in a full day at the office. . . . If my wife and I live until November 23, 1954, we will celebrate our 50th wedding anniversary. Greetings to I.D.C. and to all my old classmates."

Dr. Harry E. Smalley tells us of his new address: 714 Vanes-Jackson Road, San Antonio, Texas, and adds "While I am at it, I may as well give you a little background: Graduated with the class of 1915; commissioned in the Army Dental Corps in 1917; served through the different grades and was retired in 1948 in the grade of Colonel; was married in 1920 and have two children. The oldest, our daughter, married an army officer and is now living in Germany. Our son, who is a biologist, is with the State Board of Health. Almost forgot to tell you how much I appreciate the bulletin and what a kick I get when the name of some member of the class of 1915 is mentioned."

Class of 1903

1953 marks the 50th Anniversary of the Class of 1903. As you will note, many are deceased. For quite a few we have no address and we hope that you members of the 1903 Class will write us if you have any additional information. We are pleased that so many responded to our request for news notes.

***Eli E. Blickenstaff**
E. Chicago St.
Royal Center, Indiana

Roy L. Bodine
135 San Rafael Way
San Francisco 27, California

George F. Brand
Address unknown

Adelbert A. Bridge
125 N. Main Street
Tipton, Indiana

(Wife, daughter and son join in a hearty greeting to each living member of the Class of 1903)

Harry O. Burgett, Deceased

C. G. Cameron, Deceased

Albert P. Campbell, Deceased

Glenn A. Cash, Deceased

Oscar W. Collins, Deceased

A. T. Corson, Deceased

***Thomas J. Costello**
707 Anderson Bank Bldg.
Anderson, Indiana

J. Arthur Davis
5116 Hohman Ave.
Hammond, Indiana

(Request for better lectures—by proficient men, on interesting subjects, the lecturer who knows how to portray and deliver.)

William A. Dicken, Deceased

George W. Early
Address unknown

Dora F. Ellison, Deceased

Charles Feldman, Deceased

***Louis F. Friedman**
c/o Palm Courts
Brownsville, Texas

E. L. Friel, Deceased

***Earl W. Gant**
1215 Roosevelt Bldg.
Indianapolis, Indiana

George E. Harter
Address unknown

K. E. Hatch
Address unknown

Perry Heath, Deceased

Walter Henkel
Address unknown

John B. Hinchman
114 Fifth Street
Greenfield, Indiana

Frank A. Holmes
25 N. Ritter Ave.
Indianapolis, Indiana

(Retired from the practice of dentistry after I returned from World War I. Then after spending 12 years in the U. S. Marshal's Office, I became Promotion Director of Riverside Amusement Park. I am still known as "Doc.")

Milus M. House

1001 Floral Drive
Whittier, California

(I visited Dr. Charlie Jackson recently who is the only living member of our faculty so far as I know.)

***Jesse D. Hughes**

21½ W. Main Street
Greenfield, Indiana

Edwin S. Hulley

609 Marion National Bank Bldg.
Marion, Indiana

(Am paying no attention to a mere 50 years, but will celebrate at 75!)

C. A. Isham, Deceased

***F. A. Krapohl**

301 N. Ball Street
Owasso, Michigan

Forrest L. Kreep

Address unknown

Wylie Lamb, Deceased

Delbert Lewis

Address unknown

O. H. Lowder

Address unknown

J. F. McCann

Address unknown

Robert H. McKinney

Holmes Bldg.
Hannibal, Missouri

(Have practiced in the same building for 49 years.)

Elba K. Mabry, Deceased

Frank M. Miller, Deceased

***Michael I. Moran**

309 W. Pine Street
Deming, New Mexico

Walter A. Morgan

Address unknown

M. E. Myers

Carlinville, Illinois

J. Emil Nelson

Address unknown

W. D. Place, Deceased

Glenn A. Rafferty

Address unknown

Charles W. Raymond, Deceased

***Frederick W. Reinders**

Mt. Pulaski, Illinois

W. L. Rowe, Deceased

William R. Russell

Address unknown

W. O. Sears, Deceased

***Margaret E. Shaw**

Rossville, Indiana

***R. J. Siegmund**

Main Street
Bedford, Indiana

Andrew Allan Spears

208-10 Citizens National Bank Bldg.
Brazil, Indiana

(Joined ISDA 1903, year of graduation; have never missed a State meeting except 1945 when cancelled by war and attended Trustees meeting that year as chmn. State Membership Committee.)

H. Guy Stalnaker, Deceased

Frank E. Stephens

Address unknown

F. E. Stevenson, Deceased

Joseph L. Strain

415 S. Grant Street
Bloomington, Indiana

C. B. Tattershall

Address unknown

J. W. Toye, Deceased

Roy S. Walker, Deceased

George S. Wampler

321 N. Howard St.
Union City, Indiana

(I am in full time practice and enjoy my work very much.)

Arthur L. Weaver

Ramsay Bldg.
Ellensburg, Wash.

(Practiced in Ellensburg, Wash. for 50 years. Am able to hunt and fish.)

Walter A. Wheeler, Deceased

C. E. White, Deceased

J. C. Whitney, Deceased

Edward D. Wilkison

Riley's Park
Mount Dora, Florida

(I liked dentistry more and more every day and quit with a dandy practice to turn over to Dr. Vessel.)

John E. Wilson

600 Armstrong Landon Bldg.
Kokomo, Indiana

(My hobby—golf and flowers.)

*An asterisk before the name indicates we did not receive an answer to our letter. Therefore, we are listing the address we have in our files. We will welcome corrections.

Class of 1922

Macy G. Martin, DC, USN, writes:

"The January issue of the Alumni Bulletin has been received, and I find a lot of pleasure in keeping up with good old Indiana Dental. My purpose of this letter is to give you a change of address. I am being transferred from the Fourth Naval District Headquarters in Philadelphia and detailed as Fleet and Force Dental Officer, Atlantic Fleet, with headquarters in Norfolk, Va. My address in Norfolk will be: Staff, ComServLant; Bldg. 142, Naval Base, Norfolk 11, Virginia."

Class of 1929

We are sorry to learn of the death of Dr. J. W. Harrold, who passed away very suddenly after an accident November 17, 1952. Mrs. Harrold's address is 369 E. Walnut, Hillsboro, Ohio.

Class of 1943

Dr. Gilbert LeVine Mellion, 217 Main St., P. O. Box 246, Rocky Hill, Conn., announces "the arrival of our third child on Nov. 12, 1952, Joan LeVine Mellion. After two boys the arrival of a girl caused extra excitement."

Class of 1944

Dr. Carl Stoner reads our column and acts accordingly: "In reading this month's Alumni Bulletin I noticed your reference to being informed of any change of address. I then also noticed that the bulletin had been forwarded to me from my old address. My new address is 325 State St., New London, Conn. During the past five years I have taken several post graduate courses in periodontia at both Tufts College and Columbia University with the prospect one day of limiting my practice to this field.

"Mrs. Stoner and I were blessed last August with a daughter named Jill.

"We hope to be able to visit you at the school during the next year."

Encouraging word from Dr. J. B. Wilkins, 114E Park Ave., South, Winter Park, Fla., is "There is not much sensational news from this suburb of heaven, just the usual hurried and somewhat confusing life. The sun is hot, the fishing's fine—so say those who take time to give it a try—and the afternoon showers and cool evenings are most welcome. If there are any men around there who might be interested in coming to Florida, please encourage them for the state is growing very fast and the need for dentists is great in any part."

Class of 1946

From far off French Morocco comes a letter from Dr. Bertram H. Kotin, who writes:

"My family, consisting of my wife Mimi, and my son, Geoffrey, are finishing up our tour of duty with the Air Force in French Morocco. We are stationed on the outskirts of Casablanca. We have been here for the last 18 months and it has been a most interesting tour of duty. . . . My separation date is the 15th of July. I'll be leaving here, by boat, on July 4 Independence Day (in many respects)." Let us know, Dr. Kotin, when you get settled in the States.

Dr. Swenson had a note from Dr. L. F. Radmacher of 4834 E. Belleview, Tucson, Ariz. Dr. Radmacher tells us as follows concerning his plans: "I expect to be released from the Air Force next month. I passed the Arizona Board last August and plan to open an office in Tucson as soon as possible."

Class of 1947

We are so happy to hear from Dr. Rocco P. Nazzaro, 896 E. 28th St., Paterson, N. J. He writes: "This is my

first contact with I.U. since I left in '47 and shall attempt to bring you up to date on my history. I am well married with three children, one boy and two girls. I have just been released from active duty with the Army in Feb. I was stationed at Camp Chaffee, Ark., for the full two years and while there was fortunate to have the company of other I.U. graduates. Jack Light, '50, was there for a while and then received orders for Korea. Irving Newmark, '45, was in the Prosthetics Dept., the full two years. Bob Daily, '50, came back from Korea and was stationed at Chaffee his last few months before being discharged. Sam MacIntosh, '50, came in a few months before I was discharged. We're all out now except Sam, who is still holding down the fort as far as I know. . . . Since being in service I have lost contact with several of my classmates except a few that I get a glimpse of through the bulletin. Here's hoping more will write in. Come on class of '47!"

Dr. Marvin Tuckman, 1010 Potomac Ave., Alexandria, Virginia, has written to Dr. Hine that "In a little less than 3½ months I'll be leaving the Army and going back to Paterson, New Jersey. All in all, the two years that I will have spent in service have left me none the worse. Coming as it did, right after the completion of my graduate training in periodontology, my time in service has given me the chance to figuratively "flex my muscles" and see how I shaped up as a periodontist when on my own and confronted with a wealth of clinical material. The results have been most gratifying, and I shall return to my practice with new confidence in myself and in the future of periodontia. I'll be limiting my practice to periodontia and oral medicine."

News from Dr. A. L. Kazwell, Cedar Lake, Ind., reports "I received my commission in the mail the other day—a rating of Captain. I will report for active duty at Ft. Sam Houston, Texas. My fam-

ily has grown since I left school and consists of Richard, age 6; Cynthia, age 3, and Billy, age 2."

Dr. Rogers had a letter from Dr. Ervin Byrd Barr who is in Korea with news concerning several alumni: Tom Esmon (1944) is stationed in Yokahama with Arnold Russo (1945). Art Mullin (1945) has transferred to Tokyo. James of 1944 is stationed with the 3rd Div. Raleigh Sheridan got promoted to Captain a few weeks ago. Spring is here, but we've only had a few nice days. Lots of rain and mud. It's supposed to be 17 tonight. I can hardly wait for warmer weather. They gave me a jeep not too long ago and I'd like to travel around some. Our travel is restricted at present due to the bad roads. I spent 5 days in Kokura, Japan. It was a welcome change—milk, steaks, sheets on the bed, modern sanitation and lots of baths!

Class of 1948

A change of address for Dr. Arthur J. Haacke indicates he is back in the States at 539 Corona Ave., Dayton 9, Ohio.

Class of 1950

Happy to learn from Dr. Arthur J. Wolin that "My replacement is here and soon it will be "goodbye Okinawa" for me. I would appreciate it if you would change my address to Dr. Arthur J. Wolin, 3464 Knox Place, Bronx 67, New York."

Dr. and Mrs. Harry Johnson announce "the arrival of Joyce Carol on May 18. . . . We are hoping to travel West again this summer and will certainly stop at the school if time permits. Our best to everyone."

Dr. and Mrs. Jack Z. Alexander announce the birth of Fern Loris, Born April 10, 1953.

Class of 1951

Dr. Sidney Schwimer announces "the opening of his office for the practice of

general dentistry at 4141 Brownsville Road, Pittsburgh 27, Pennsylvania."

Dr. Robert M. Stunkard is now located at 421 W. North St., Kokomo, Ind.

Dr. John R. Risch, 718 Underwriters Bldg., Indianapolis, Ind., writes: "I am in general practice, the visiting dentist at Sunnyside Sanatorium and am on the clinic staff of the Child Hygiene Div. of the Indianapolis City Board of Health. My regards to all at I.U.S.D."

Class of 1952

Dr. David Frye, 432 - 7th Ave. Pl., N.W., Hickory, N. C., says he is happy he decided to practice there and plans to stay there forever. He also says, "I have had all the work I can do and am grateful for that. . . . It is a real pleasure to be earning my living again instead of depending upon the government hospital or G.I. bill. Taxes hold no fear for me. I have no complaints about paying mine."

Dr. Raul A. Iturrino, P. O. Box 253, Canovanas, Puerto Rico, says "I expect to leave for Europe on the 2nd of June on an extended vacation."

We know some people read this column because Dr. Geo. M. Houck has this to say: "I see by the January, 1953, issue of the Alumni Bulletin that it is heard that I am with the Veterans Adm. in California. So that there is no doubt I would like to have you hear it straight from the "horse's mouth." I am working full time at the VA regional office in downtown Los Angeles. I like the job very much, and I am gaining a lot of valuable speed and experience. They have a very interesting consultant program here with the instructors from the Univ. of Southern California. Dr. R. E. Applegate and Dr. G. R. Helmick of the class of '52 are also in Southern California working with the VA. Occasionally we get together and discuss "the good old days." It was pleasant reading through the Alumni Bulletin and I will look forward to future issues." Dr. Houck's address is 2002 Kelton Ave., Los Angeles 25, Calif.

Dr. Alvin Joseph Grayson, USPHS Hospital, Staten Island 4, New York, was married Feb. 22, 1953, to Miss Marion Spears. He wrote us a note in March informing us that "I am awaiting assignment for next year, my last in the Service. It has been a year well spent but I am anxious to get out into private practice. Hope all is well at I.U. Give my regards to all."

Dr. Rafael Aponte, Gallinger Municipal Hospital, 19th St. and Massachusetts Ave., S.E., Washington 3, D. C., wrote Dr. Hine a very newsy letter and we quote part of it: "For some time I have not heard from my Alma Mater, so as to get my "Hoosier Homesickness" out of my system, I thought I would write to you. . . . My internship is proving very worthwhile. The Oral Surgery Dept. has its own ward and we have to make rounds every day and write orders for medications, so dosages have to be at your finger tips. We see all kinds of pathology imaginable, so I got me an Exacta camera to take pictures of the interesting cases. . . . In or around July 1 I will receive my orders from the U. S. Air Force. This does not worry me because by that time I will have terminated my internship. The Advisory Comm. recommended my deferment until July 1 and the Air Force graciously consented."

Dr. Rowland E. Applegate, 2852 McConnell Drive, Los Angeles 64, Calif., gives us news, "At present I am planning to take the examination which will be given in Los Angeles this June. We had recent visits with Dr. and Mrs. Geo. Helmick and their son. They, too, were enjoying the June in January weather which we have been having. It was like Homecoming Week when they dropped in while the Dr. George Houck's were here. We all agreed that it was an advantage to start our careers with the background of training that Indiana University gave us."

Class of 1953

News concerning this, our latest, class, will be found elsewhere in this issue.

Listed below are the addresses of the Class of 1939. As usual we sent out questionnaires to the members of the class and these data are the result of their answers. An asterisk before the name indicates we did not receive an answer to our letter. If you know of the address of those for whom we have no address, we shall appreciate hearing from you. We shall also welcome corrections, etc. And now for the

Class of 1939

T. G. Beck

13½ W. Main St.
Peru, Indiana

H. K. Binkley

Beaver and Oak Sts.
Corydon, Indiana
(Married and have one daughter; 11 years old)

Wilber C. Boren

220 W. Broadway
Princeton, Indiana

John Lloyd Campbell

130th Station Hospital
APO 403 c/o PM, New York, N. Y.
(Received by M.S. degree from Univ. of Md., Jan., 1953, majoring in anatomy and bacteriology. Now in chg. Oral Surg., Sec., 130th Sta. Hospl., Heidelberg, Germany.)

Jack D. Carr

907 Hume Mansur Bldg.
Indianapolis, Indiana

James R. Davis

112 S. Main Street
Mishawaka, Indiana

Wilson C. Dyer

115 East Main Street
Worthington, Indiana
(Howdy!)

***Ralph C. Eastman**

36 S. Pennsylvania
Indianapolis, Indiana

***Philip J. Fichman**

30 W. Maple Road
Indianapolis, Indiana

Vernon J. Forney

530 New Customs House
Denver, Colorado

David L. Francis

322 East Main Street
Marion, Virginia

(Would like to take this opportunity to compliment the editors on their excellent publication; I enjoy every copy.)

W. W. Gainey

Stonestown Medical Bldg.
San Francisco, California

Francis W. Gamble

204 Rose Court
Muncie, Indiana

***John E. Geisel**

583 Broadway
Gary, Indiana

Richard C. Glassley

1612 Spring Street
Fort Wayne 7, Indiana
(1612 Spring St. is new brick bungalow office which I hope to be in by June 1, 1953; present address is 1706 Sherman St.)

***Emanuel J. Green**

9947 Gratiot Avenue
Detroit, Michigan

Paul F. Green

3622 Main Street
East Chicago, Indiana

Charles R. Gregg

Central State Hospital
Indianapolis, Ind.—ALSO
114 W. Main St.
Thorntown, Indiana

Samuel Groher

105 Main Street
New Canaan, Conn.

Dale W. Harvey

212 Murdock Bldg.
Lafayette, Indiana

***Saul Herman**

2623 W. Washington St.
Indianapolis, Indiana

Luis O. Irizarry

1858 Ponce de Leon Ave.
Santurce, Puerto Rico
(Married; two boys. Doing well in private practice.)

John P. Jarabak

U. S. Naval Hospital
Philadelphia 45, Pa.
(Have been ordered by the Navy to a year's Graduate work in O. S. at Univ. of Pennsylvania Graduate School of Medicine for next year.)

***Dick H. Jordan**

5836 E. Washington St.
Indianapolis, Indiana

(Continued on page 57)

Class and Fraternity Notes

FRESHMAN CLASS

This semester has passed very rapidly for the members of the freshman class. We have had a full schedule of studies and it won't be long now until finals rear their ugly heads. Among things planned by the class aside from the required courses is the publication of a collection of summaries of papers and speeches and their bibliographies which were prepared by our class members for our dental seminar course. This publication will be presented to the members of the freshman class and the University library.

The year has been and still is quite full as far as the social schedule is concerned. We had our formal dance preceded by a party at the Graham Hotel. Among other social events were the fraternity rush parties and dances held both in Bloomington and Indianapolis. These have filled our social calendar for several weeks. A class picnic is being planned to finish out the semester and barring any difficulties from ole man weather everything should work out all right.

And then to Indianapolis!

John Mink

SOPHOMORE CLASS

As the sophomore year draws to a close, the tempo of technic rapidly increases. New sounds, new comments and new experiences are recorded daily. The members of the class are finally gripping real dentistry.

The sound of the word, "clinic," has had a magic meaning in the classroom. The sophomores are having their first patients and most of them are turning out to be other sophomores. "Prophys" are being performed on one another and good friendship is getting the severest test of all.

Now late in May requirements have to be met and the class is working feverishly to get their work completed and enter into the realm of upperclassmen. Many of us are spending part of the summer in the clinic in an effort to improve our technic and to orientate ourselves for the coming year.

The social calendar of the sophomore class was rather limited because of many factors such as the J.A.D.A. Annual Dance, fraternity affairs, etc. We did manage to have one party

and dance this semester which was well attended and all presnt had a rousing good time.

With spring in the air a prospective young dentist's fancy lightly turns to golf. The clubs come out of hiding and many sophomores including Charlie "Ben Hogan" Hall, Bob "Sam Snead" Kuhn and John "Masters" Borkowski can be seen searching the bushes for the one that just missed the green. Why even Dick "Caddy" Harris is out on the links today.

Latest congratulations go to Gene and Mary Taylor on the birth of their lovely daughter. And Lou Benjamin and Russ Heyde were seen stocking up on cigars for a coming event. Dean Bowker was seen packing for a trip down the aisle this summer. Seems to be the current trend.

Of course more could be written about the sophomore class, but most of it would be about foils, inlays, bridges, and partials. So once again we must return to the place we have learned to love so well and recognize as home . . . the sophomore lab.

Norman Glassman

JUNIOR CLASS

With the first semester successfully completed and the end of the second semester in sight, the members of the junior class feel that their long range goal is in sight. We feel that we have learned a great deal this year from our clinical experience, but while watching the seniors take their practical exam, we know that we have a lot to learn. Our experience has brought our textbook knowledge up to a practical level. We have completed most of our basic requirements, with minor exceptions in some departments. Many members of our class plan to remain in the clinic during the summer months for the purpose of gaining more experience.

On the lighter side, the junior class held two stag parties which were well attended. The parties were held at the Psi Omega and Xi Psi Phi houses, with "Gaylord" McCloughan collecting most of the loose pocket change. As a result many babies will be without a new pair of shoes. The golfing members of the class have recently voted Harry Kerr, "the man most likely to succeed Dr. Cary Middlecoff on the links."

A great time was had by all at the recent Junior A.D.A. dance held at Westlake pavilion in Indianapolis. Members of all classes attended

the dance from 9:30 p. m. until 12:30 a. m. In the recent elections for officers of the Junior A.D.A., James Calland, of the junior class, was named President, while sophomores, John Rinhard and Norman Glassman were named Vice President and Treasurer respectively.

The Class of 1954 would like to take this opportunity to thank the members of the faculty, upper classmen, and alumni for their kind and sincere aid in helping us over a big hump in our dental careers.

Ralph C. McDowell

SENIOR CLASS

Since our last issue, this year's senior class has been literally snowed with invitations and preparations for that "Great Day that's coming." Late last winter we were all busy making the rounds to the various supply house parties. Those who went gathered in many ideas for furnishing their offices and, of course, laid away all the loot that was handed out. The dealers in dental supplies as well as one or two labs in town have all been very kind, gracious, and helpful. I want to extend to them a note of thanks from all members of the class. One company even featured the picture of one of our classmates in their advertisement. It was none other than our own "Pin-up Loftus 'Doc' Brown" in his first role as a model.

Along with all the other extracurricular activities we still had school, believe it or not. There were the national board exams, papers, surveys, national cancer exams, and the daily clinic beaverings to get that experience before we face John Q. Public.

On May 1, the class was the guest of the Eli Lilly Company. During the day we toured their huge plant and in the evening were treated to a wonderful chicken dinner. The annual Junior American Dental Association dance, from which I am still recovering, by the way, was held on May 8. Everyone seemed to have a fine time, including the sophomores.

All seniors, except Pat Kelly, tensed up for the mock state board practical examination held on May 14 and 15. I hope that Wayne Heath and the others who had so much difficulty with the dry run will find the state board much easier.

Activities to follow are the senior picnic, and annual Honor Day for the seniors. The Honor Day program will be held at the Indiana State Board of Health Building May 28, and all parents and wives are cordially invited.

Tom Garmon, Bill Rigg, and Vic Mercer are in charge of the last social event of the year, the famed Razz Banquet in honor of the faculty. Following this will come graduation and state board examinations. This will complete

four years of loafing for Hollis Sears and Colonel McClure.

Congratulations to Bill Peet, Dave McClure, Wayne Heath, and Bob Wilson, for taking time out to become poppas, and to Bob Vinzant for announcing to the world weeks ahead of time his marriage.

The members of the class wish at this time to sincerely thank the faculty for their words of wisdom, patience, and assistance in contributing to our education and preparing us for our careers ahead.

Basil Remley

PSI OMEGA

Psi Omega actives recently selected the following members to guide fraternity activities during the coming year:

Grand Master—

Robert Roetker, Terre Haute, Ind.

Assistant Grand Master—

John Borkowski, Indianapolis, Ind.

Secretary—

William Riffle, Indianapolis, Ind.

Treasurer—

Robert Johnson, Carmel, Ind.

Highlights of this school year were a Halloween dance and a Valentine dance which were held at the chapter house. In addition—and the biggest affair of the year—was the annual Christmas party and dance held at the Meridian Hills Country Club with a large and enthusiastic group of actives, alumni, and guests present.

Currently, plans for the yearly social function given by the fraternity for the freshmen are well under way. At this affair the freshmen are invited to look over Psi Omega as a prospective fraternity and to observe many demonstrations of technique problems which will gladden the days of their sophomore year. In addition entertainment, food, and dancing are to be features of the gala weekend at the chapter house.

The present well-groomed appearance of the chapter house is a point of pride to the active members and a pleasant sight for alumni who, incidentally, are always warmly welcome to drop in for a chat and look around. It is a matter of record that some of the men living at the house have asked permission to move beds, bag, and baggage into the renovated laboratory which has recently been given a treatment with tile and pleasing pastel.

With the coming of June another group of Psi Oemgas will complete a long metamorphic process and be transformed from actives into alumni. Psi Omega Fraternity is proud of these

men and best wishes for a happy, prosperous future are extended to each one. Psi Omegas graduating in the class of '53 are:

Charles Bewick
Paul Braden
Loftus Brown
William Crawford
Arnold Dunfee
Thomas Garman
Wendell Grassmyer
Wayne Heath
Walker Kemper
John Mapes
Robert Marshall
David McClure
Francis McCormick
Estell Morris
Harry Motsinger
Richard Reinking
Basil Remley
Benito Ruiz
Thomas Tanner
Robert Vinzant

The academic tempo of Psi Omegas is indicated by a recent statement by the appropriate vice president-in-charge that the consumption of "midnight oil" is spiraling higher as the year approaches its last crisis—final examinations!

Delmar R. Miller

ALPHA OMEGA

With the writing of this article, Alpha Gamma Chapter of Alpha Omega celebrates its 25th anniversary here at Indiana University, twenty-five years devoted to brotherhood and dentistry.

And as this year of fraternity life comes to a close, we may look back over a successful year under our past president, Bernie Ellins. With the aid of its members, alumni and friends the chapter prospered. Lectures and clinics took the places of certain business meetings and proved very beneficial to all. The past two months have been spent planning for our big social event of the year, the annual Senior Farewell Banquet. The burden of work has been carried by the chairman of the dance, Ed Pollack, with able assistance from Lou Benjamin. This year's dance is being held at the Lincoln Room of the Lincoln Hotel. Many alumni, classmates and friends are expected to be present at the honoring of our seniors.

This year's graduates are Marty Linderman, Bernie Ellins, and Hank Plaschkes. Marty Linderman is to receive the fraternity scholarship award for outstanding achievement in his class.

Pledges for the coming year were entertained

at a dinner in Bloomington. We are looking forward to welcoming them to Indianapolis and into the chapter this fall.

The guiding lights for the coming year are:

Jack Weinsoff.....President
Ed Pollack.....Vice President
Lou Benjamin.....Treasurer
Norm Glassman.....Secretary and Scribe
Jerry Shulman.....Sergeant-at-Arms

This year as before the alumni have supported the Alpha Gammas with time and resources. That welcome mat is always out for you at every meeting and we would appreciate seeing more of you at our meetings if at all possible. The meetings are still bimonthly at the Public Health Building. Dr. Phil Fogel is our chapter advisor and we certainly benefit from his knowledge and advice.

The men of the chapter wish the graduates the success they so rightly deserve, and thank them for the advice and assistance they have given those behind them. We in turn look forward to aiding those to come and maintaining the chapter on the same high professional plane it now stands.

Norman Glassman

XI PSI PHI

The members of the Xi Psi Phi fraternity have, in addition to their school curriculum, actively engaged in house improvement, fraternity rushing, and election of officers. Inspired by the generosity of our alumni who have purchased for the house new draperies, new tile floor, new furniture and television, the members have attempted to improve the function and appearance of the laboratory and the yard. A new "wet" table for plaster mixing, a blower for the lathes and new dental engines have been installed in the laboratory. The back yard and side yard have been cleaned, plants cultivated and trimmed, and the parking lot has been graveled, thus eliminating a parking problem and also improving the appearance of the premises.

Fraternity rush week end was very eventful. We had a table clinic for the freshmen at the Friday evening stag party. The Saturday night dinner-dance had as its theme, "The Sea." The main floor was decorated in the light of objects above the sea with ship pictures, a fishing trophy room and of course the kitchen was the ship's galley. Downstairs in the party rooms some 100 odd yarn-masht fish hung from the ceiling and undersea murals decorated the walls.

The members of Xi Psi Phi voted junior student, Robert Bogan, president; sophomores,

Dan Hayes, vice president; Richard E. Harrison, secretary; Joe Rinard, Treasurer; Robert Percival as Chief Herald and Pledge Master; Darrell Hollingsworth as Editor and Guard; Grant Michel as Sentinel; Wallace Bellas as Monitor; Don Anderson as Master of Ceremonies for the next school year. Joe Rinard was also elected as Vice President of the Junior American Dental Association.

With this year almost at a close Xi Psi Phi is looking forward to a new and prosperous year with our newly elected officers, further house improvement plans, gay social program and interesting and enlightening school curriculum.

Richard E. Harrison

PATHOLOGY

(Continued from page 7)

presents new facets for future evaluation. It is a rare experiment which does not lead to two new projects and so it has been with these described above. Although it is often difficult to reconcile such basic studies with their application to the clinical practice of dentistry, the far-sighted dentist with a trained scientific mind must admit to the fact that most new routine clinical procedures, materials, techniques and pharmaceuticals were merely laboratory curiosities just a few short years ago and that the experimental findings of today may form the basis of the armamentarium for the dentist of tomorrow.

RADIOLOGY

(Continued from page 8)

position with no lateral pressure on the mandible, more accurate radiographs of the rest position would be obtained. A stand supporting the cephalostat, counter-balanced so that it is easily movable vertically, is now being designed.

It is hoped that in the not-too-distant future it will be possible to produce serial radiographs of the temporomandibular joint with the mandible in motion and at the same time show the changes of the positions of the meniscus. This will re-

quire some very special apparatus and more space than is available at present.

Another program being initiated in the Department of Radiology is the study of the extent of resorption of the alveolus after extraction. For this study, an apparatus is being designed to standardize the position of the patient's head and to duplicate angles. This is a long range program and should produce some very valuable data.

PEDODONTIA

(Continued from page 11)

proximity of the carious lesion to the pulp horn. An electric pulp test was made on the carious tooth as well as the adjacent teeth. All of the carious dentin was excavated and the clinical appearance of the exposed pulp was recorded. Only those teeth which apparently had vital tissue at the exposure site were included in the group, in other words teeth which at least from a clinical point of view appear to be good risks for capping or a pulpotomy.

The excavated teeth were then extracted and immediately placed in 10 per cent formalin. After decalcification the teeth were sectioned for microscopic examination.

Preliminary findings indicate that the electric pulp test is not a reliable means of determining the normalcy of the deciduous pulp. Some of the teeth which gave a normal response to the vitality test demonstrated upon histologic examination advanced inflammatory and degenerative changes. Many teeth which seemed to have a normal vital pulp from a clinical examination of the point of exposure demonstrated a marked inflammatory cell infiltration upon microscopic examination.

Early observations indicate a need for the continuation of the study and a revision of our standards for diagnosing early degenerative changes in the dental pulp.

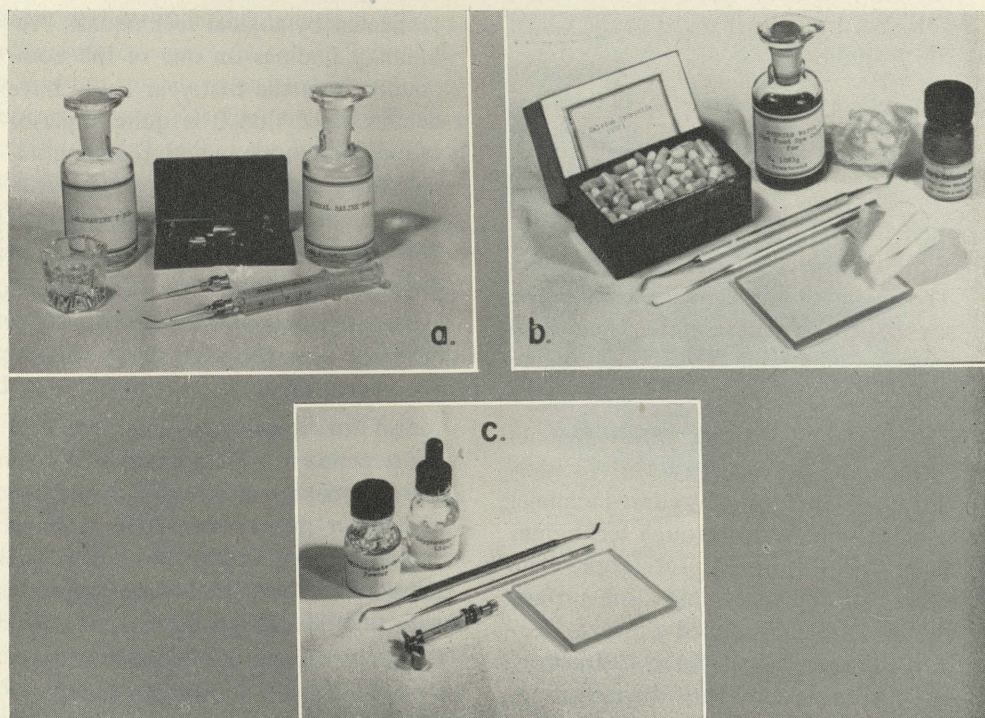


FIG. 2. Instruments and medicaments used for capping exposed pulps. a—agents for irrigation. b—medicaments for pulp capping. c—medicament and instruments used to hermetically seal cavity.

PULP TREATMENT

(Continued from page 12)

ing with a thin mix of oxyphosphate cement followed by a thicker mix of cement to the cavo-surface of the cavity preparation. This treatment should not be disturbed for about two weeks. At this time if clinical signs and symptoms are negative the tooth can be restored with a permanent restoration. This tooth should be examined every six months for a period of two years. The six month post-operative examination should include X ray, electric stimulator and percussion test.

From this study the following conclusions were made:

1. Exposed healthy pulps can be protected by capping them immediately with a non-irritating material such as calcium hydroxide.

2. Healthy pulps are conducive to successful capping at any age.
3. A capped pulp may not protect itself with a bridge of secondary dentin; therefore a symptom free tooth should not have its capping disturbed or removed.

BIOCHEMISTRY

(Continued from page 14)

attempts to screen anti-caries compounds by powdered enamel techniques. A satisfactory solution to this problem has been devised, and over 200 different compounds and anti-caries agents have already been evaluated. A correlation between powdered enamel solubility, rat caries and the structure of the whole tooth as shown by the electron microscope is being

correlated with the results of the whole tooth studies.

6. The effect of androgenic and estrogenic hormones on the calcification of the skeleton is being made. This is a portion of the general study being conducted with the cooperation of Dr. William Shafer of the dental school. The effect of the salivary glands, the sex organs, the skeletal system and various endocrine organs is being studied.

7. The structure of the intact enamel surface and the effect of various anti-carious agents on powdered enamel is being conducted through techniques using the electron microscope. The effect of surface and sub-surface change is being studied through electron diffraction and X-ray diffraction. The purpose of this investigation, which is being conducted with Dr. Robert Fischer, is to provide more fundamental knowledge concerning the changes in the apatite molecule after the application of different anti-carious agents. The effects of reagent concentration, hydrogen ion concentration, duration of application and so forth are variables under investigation.

8. The dental school has provided funds for the past two years in order that a study of the relationship between the electrical surface potential and the effect of various anti-carious compounds and the enamel structure can be made. Using such techniques as these to measure the surface potential of powdered enamel and intact enamel surface it will be possible to predict what effect different cations, anions and hydrogen ion concentrations might have on enamel solubility and subsequently on caries reduction in the human.

9. With the cooperation of the Indiana State Board of Health two new anti-caries agents are being clinically in-

vestigated by topical techniques. Preliminary findings on one of the compounds from the first year study have demonstrated that it is quite superior to sodium fluoride in both reducing initial caries experience and arresting lesions already in progress. Each separate study is to extend for a period of at least three years.

RESINS

(Continued from page 17)

use of the "brush and flow" technics for retention as well as cavity wall and margin adaptation along with the use of thinner mixes when bulk packing should prevent or do away with the loose restorations that were common with thick dough packs.

- E. Proper protection of thin plates of dentin over the pulp by using a rigid base should eliminate pressure or strain forces from producing irritation to the end of the tubules or the pulp.

Color Reactions

One of the worst faults of the generally used resin materials has been that of color instability with the passing of time. The general pattern has been as follows:

- A. The more the restoration is exposed to light the greater the tendency to discolor.
- B. Restorations such as Class Vs and those covered by a low lip line discolor less.
- C. The more monomer used the greater the discoloration.

We advocate that the patient be advised of this poor quality or feature of resin and point out that it is his or her responsibility to assume this risk if resin is used as a restorative.

The manufacturers of the new paratoluine sulphinic acid catalyst resin that has become popular during the last year claim that discoloration due to a chemical reaction of the hastener and catalyst has

been eliminated in their product. Clinical observations over the past year have borne out this claim at least in part since restorations of this type of resin discolor considerably less than the benzol peroxide tertiary amine type.

Proper mixing technics to prevent voids, good adaptation and proper finish of margins as well as the bulk of the restoration will likewise enhance the esthetic qualities of the restoration as well as reduce accumulation of stains.

To date the self-curing resins used as a restorative leave much to be desired when compared to the qualities and properties the ideal restorative material should possess. Particularly is this true in regard to hardness, modulus of elasticity, color stability, and certain manipulative procedures. However, if the resins are used cautiously, recognizing their limitations, they offer the dentist a material that has many advantages and potentials as an esthetic restorative material.

DENTAL MATERIALS

(Continued from page 21)

color stability is not as good as the heat-cured resins.

7. "Factors affecting the surface condition of stone dies poured in hydrocolloid and alginate impressions." Various factors which influence the surface of stone dies poured in elastic impression materials are being studied. These include water-powder ratio of stone, fixing agents, method of mixing, environment where stored during the set of the stone, etc. The surfaces are uniformly lighted and photographed under standardized conditions.

The results emphasize such things as the necessity of using a fixing agent with alginate where recommended (figure 4), proper adherence to the recommended ratio, use of mild vibration accompanied by addition of stone in small increments with an even rate of flow, gently blowing out

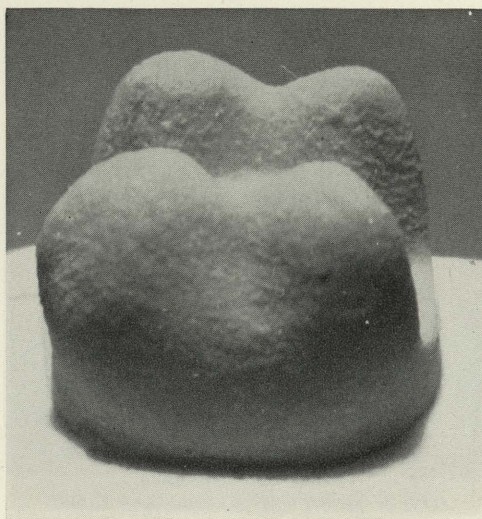


FIG. 4. Chalky surface results if fixing agent is not used.

excess droplets of water from the impression before pouring (figure 5). It has also been found that a brief immersion of reversible hydro-colloid in a two per cent potassium sulphate solution before pouring is advantageous to preservation of a dense stone surface.⁴

8. "Effect of moisture contamination on the compressive strength of amalgam." This research has been conducted by Dr. Rith Boozayaangool of Thailand. It is a well established fact that contamination with moisture of a zinc amalgam alloy will result in severe expansion and protrusion from the cavity preparation. It has also been suggested, although never shown, that such contamination will seriously reduce the strength of the restoration. In this study two different alloys, one containing one per cent zinc and the other no zinc, were employed. Specimens were prepared contaminated and uncontaminated. The compressive strength was measured at time intervals ranging from one-half hour up to one year.

Results show a gradual loss in strength with the contaminated specimens as compared to those which were not. The re-

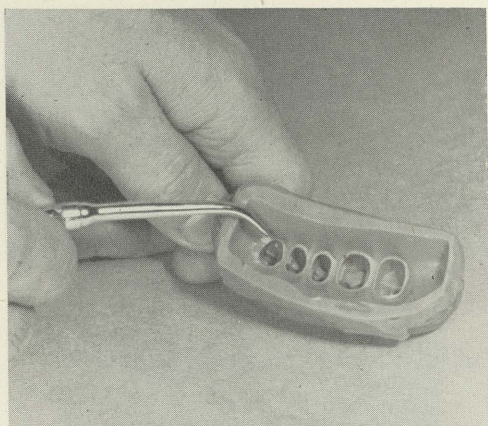


FIG. 5. Excess droplets should be gently blown from impression.

duction in strength was approximately 10 per cent, with both the zinc and non-zinc alloy. This research emphasizes the importance of maintaining the amalgam in a dry condition throughout its manipulation.

9. "Influence of nylon toothbrush bristle diameter upon enamel surface." Commercial toothbrushes of varying nylon bristle sizes are available. This study was to determine whether the diameter size influenced the enamel surface, i.e., would a large bristle (stiffer) abrade or polish the enamel more rapidly with a given dentifrice than a smaller bristle. A series of brushes, ranging in bristle size from .006 inch to .016 inch, were secured. The rapidity of polishing and the final polish attained were measured by means of a special reflectometer.

Results show no marked difference between the various brushes although brushes having a bristle diameter greater than .012 inch showed bands of polish. The work will be continued in an attempt to study the influence of water and wear on the stiffness of toothbrush bristles.

There are other minor research projects in progress relative to specific problems involved in the manipulation of certain dental materials. These will not be summarized here. The aim of the research

program in dental materials has been to make it as diversified as possible and to stress the correlation of laboratory data with clinical findings. However certain very basic problems, such as the conductivity research, are always in progress since it is from such fundamental work that very significant advancement in dentistry often comes.

As these research projects are completed, they are published in the various recognized dental journals. The information gained is also incorporated into the teaching program, thus keeping the student constantly abreast of the newer trends. The cooperation of the clinical departments is unexcelled. Much, or all, of the progress in this department must be given to the excellent assisting staff. This includes two full-time chemists (Miss Swartz and Mrs. Crouse), a graduate student (Dr. Schnell), Dr. Price, who assists in research and teaching, and six dental students who work on a part-time basis.

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OPERATIVE PROCEDURES

(Continued from page 23)

exposure with the steel bur.

This work again points out that operative technical procedures are exacting. It should always be remembered that we are dealing with sensitive tissues and irritating materials and that it is possible to protect one from the other. The operator cannot rely entirely upon rule of thumb technical procedures; he must be constantly aware of all the possibilities of living tissue and therapeutic materials, observe each step carefully and be ready to modify standard

filling techniques as soon as the occasion arises. At the present time it would be well if all operators would observe the following recommendation made by Zander⁹: "The deep cavity should be lined with an efficient calcium hydroxide lining material over which is placed zinc phosphate cement."

Summary

1. The exposed pulp can be satisfactorily protected from irritating filling materials with the immediate application of a calcium hydroxide paste or non-irritating metallic filling material. Whenever possible, a calcium hydroxide paste should be used in deep cavities between dentin and irritating filling materials.
2. Since it is difficult to detect minute pulp exposures with the naked eye the healthy exposed pulp should not be cauterized or sterilized.

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CROWN & BRIDGE

(Continued from page 30)

flash-plating of 24K gold behind the acrylic veneers on full cast crowns. This is being done as one means of masking the Ney coloration imparted to the veneer by the underlying gold of the crown.

Ralph Schimmele has done a quantity of work on tissue displacement. As a result, this department has definite ideas about good and bad procedures. His efforts have given us a standardized tech-

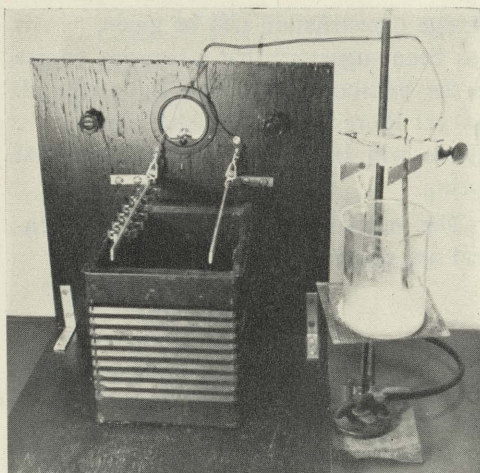


FIG. 3. Apparatus for flash plating of gold.

nique for hydrocolloid bridge construction which will be followed in the future both in technic classes and in the clinic. Also, he has spent considerable time working with space maintainers. Technically he has produced nothing new, but he has proved that—if talked about and believed in—the public will accept space maintainers. If accepted by the public and made and seated by the dentist, much damage can be prevented.

On the balcony, along the south side of the clinic, there is a new operating room where some high-speed cutting will be done soon.

Technicians Course Given

The course for technicians was well accepted and it will be repeated. Certain changes which were suggested by the members of this class will be incorporated in the future. The sequence of presentation will be rearranged and the time will be equally divided between lecture and demonstration. The department very much appreciates the interest displayed by those enrolled and has profited greatly by their constructive criticism.

In October (19-20-21-22-23) the second Post-Graduate Course in Crown and

Bridge Construction will be given. . . . It has been suggested that a two-day course in the hydrocolloid technique be offered. As yet there are no definite plans. . . . There will be another symposium next spring.

The outlook is good and things in general are shaping up satisfactorily.

ORTHODONTIA

(Continued from page 33)

through the body of the mandible is the operation of choice in practically all cases and that normal swallowing, speech and breathing can be expected if properly handled.

The culmination of all large orthodontia undertakings is the detail required to get the natural teeth in positions in which they may be expected to stay in balance; hence our careful attention to muscles which have an effect on the teeth and equilibration as advocated by periodontia and crown and bridge. Work in this direction led to a study of the size of the upper six anterior teeth as compared to their antagonists. It was found that variation in the derived ratio was considerable, contrary to that of artificial teeth, and that this had some bearing on the fact that overbite in normal natural dentures could range from end to end on the one hand to fifty per cent on the other.

Contact Pressure Measured

Along the same vein an attempt was made to develop a procedure that would record the pressure present at contact points or areas. A device was made which makes this reading numerically with acceptable accuracy and the ranges of each contact have been derived in living individuals who have very good complete natural dentures. It was noted among other things that lack of contact occurs with interesting frequency between the upper cuspid and first bicuspid. It was further noted that the placing of a tight

contact inlay or a separating wire had a profound effect on contact areas some distance away, not to mention the reverse, where careful occlusal adjustment would result in equalizing contact area forces that had formerly been open or too tight. Valuable information on the effects of lower third molar eruption on the rest of the natural denture will in due time be forthcoming.

Research on Materials

We have also done our bit toward general knowledge in working with dental materials. Our belief in the potentiality of alginate impression materials resulted in an accuracy test on a specially made critical die. We have helped to show the effects of mixing procedures on the quality of plaster mixes and that tarnish of precious metal alloys in the mouth is not necessarily associated with gold content. We have helped to prove that some of the inexpensive heat treating devices are very desirable when wisely chosen and carefully employed.

The purpose of this presentation has been to call to your attention some of the purposes of research and to enumerate the scope and magnitude of our efforts in this direction. It may seem that what we have done and are doing is far removed from your daily routine but in due time we feel you will directly or indirectly derive some benefit—or your patients will—or some member of your family will. For science is knowledge so classified as to be of value in the further search for truth.

GRADUATING CLASS

(Continued from page 39)

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(Continued from page 46)

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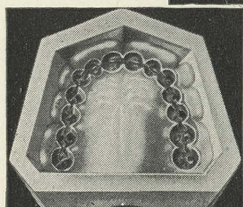
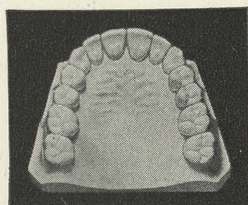
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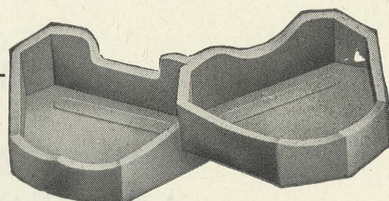
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