

JOURNAL OF THE AMERICAN COLLEGE OF DENTISTS



SEPTEMBER 1963

Volume 30 • Number 3

JOURNAL OF THE AMERICAN COLLEGE OF DENTISTS

Volume 30, Number 3—September, 1963



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The JOURNAL is a publication member of the American Association of Dental Editors.

For bibliographic references the JOURNAL title is abbreviated J.Am.Col. Den. and should be followed by the volume number, page, month, and year. The reference for this issue is J.Am.Col.Den. 30:(pp), September 1963.

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The Journal of the American College of Dentists is published quarterly—in March, June, September, and December—by the American College of Dentists at 1201-05 Bluff Street, Fulton, Missouri • Subscription \$7.50 a year; single copies \$2.00 • Second class postage paid at Fulton, Missouri • Copyright 1963 by the American College of Dentists.

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Editorial

A NEEDED NEW AUXILIARY AID

Jaffe's paper in this issue spotlights attention on the need for recognizing, establishing, and training a new category of dental auxiliary personnel. This would be a group of dental administrators who would assist, knowingly and competently, in the promotion and management of the rapidly increasing measures currently being taken to extend dental service to more people.

These programs include the prepayment plans of Blue Cross, Blue Shield, and commercial insurance companies; labor-management provisions; employer-employee systems; dental care and service corporations; and the growing adaptations of group practice, to mention a few of the several methods. All of these approaches to providing and financing dental service, organized and comprehensive as they are today, require properly qualified dental consultants and administrators. Here follows pertinent and contemporary background on this situation.

Late in 1961, New York Governor Nelson A. Rockefeller and Chancellor Edgar W. Couper of the New York Board of Regents, acting on a recommendation of the Committee on Higher Education in New York State, appointed a special State Committee on Medical Education. Thomas Parran, M.D., William R. Willard, M.D., and Malcolm Muir, chairman, comprised the Committee. Raymond J. Nagle, dean, School of Dentistry, New York University, represented dentistry at the conference on goals for the education of health personnel in relation to future health needs.

In June of this year, the Committee's 114 page report was published under the title *Education for the Health Professions*, with the sub-title "A comprehensive plan for comprehensive care to meet New York's needs in an age of change." (Copies of this Report are available from the Board of Regents, New York State Education Department, Albany, N. Y.)

The broad charge to this Committee stated that: "The current shortage of physicians and nurses and other trained personnel in medicine and allied fields is a major barrier to providing the medical services which the people need. With an increasing population and a changing age limit within the population, particularly in the older age group, coupled with the continuing progress in medical sciences,

and the greater awareness of the value of medical care, we shall face a situation of crisis proportions unless we take definite steps now to assure an expanded supply of qualified personnel."

Further, it was requested that the Committee "... with the optimal health care of all New York citizens as its standard and the full spectrum of education for the health professions as its field of investigation, look ahead as far as 1980 and give its considered advice on ..." five pressing needs that were then spelled out.

These needs involve dentistry in that they consider the number of health professionals that will be required in the next two decades, their recruitment and education, as well as continuing research into problems of health profession education and patient-care.

Among the baker's dozen chapters of the study is one headed "Administrators for Public Health and Medical Care Programs." This considers a matter that is of current concern to dentistry. One should not quibble that this Report merely concerns Empire State affairs and problems. What this Committee says is needed in New York to administer health care programs is applicable to dental care programs in all of the states.

The providing and financing of health care today is big business and demands good organization. The New York report states that: "Good organization is the province of capable administrators, thoroughly familiar with their field. The current demand for administrators professionally educated for the health fields far outstrips supply." It goes on to say that the qualifications for these administrators "... imply an academic background which is balanced in the biological, physical, and social sciences, and generously weighted with the humanities."

Dean Lenor S. Goerke, of the UCLA School of Public Health, is quoted: "Medical administrators of the future must be sensitive to the needs of people, understand the role of the community in meeting health needs, appreciate the aims and objectives of the medical profession and allied groups, be prepared to participate in community planning, as well as understanding the task of business administration." Certainly this applies to dental administrators.

The *Survey of Dentistry*, in the section on "Dental Health" by Wesley O. Young, also has acknowledged this critical shortage of

people with skills in dental administration—those who have the “ability to cope with such mundane details as budgets, lines of authority, public relations, accounting, and personnel relations.”

Where and how will dentistry acquire persons with these executive and administrative abilities? Jaffe is of the opinion that while the dental profession has men of sufficient culture, creativity, and depth of wisdom from which such administrators might be obtained, it would be difficult if not impossible to find enough of these men who could function in these capacities. Except in rare instances, the recruitment of such men from present dental organizational set-ups just does not seem to be in the cards.

Two of the recommendations of the *Survey* were that:

1. The scope of training in schools of public health be broadened to provide instruction in administrative methods which would be useful in education, research, and dental care management, as well as in the traditional public health programs; and

2. The profession give greater recognition to the importance of developing administrative skills; encourage formal training for those who may become engaged in administrative dentistry; and encourage outstanding dental students and dentists to enter the field.

The New York State Committee urges immediate consideration to the desirability and feasibility of setting up specific programs in the appropriate New York State institutions designed to prepare persons for health administrative posts; that there be an investigation into the need for aid to students in public health and medical care administration for study within or without the state; and that there be a prompt investigation of the desirability of establishing a School of Public Health and Medical Care Administration dedicated to the development of experimental programs within the State University.

Thus the New York study and the *Survey of Dentistry* point to the nation's schools of public health as the best source for obtaining these specially trained individuals. However, both studies indicate that some changes in the programs of these schools will be necessary.

In 1962 the twelve public health schools granted a total of 715 graduate degrees, but only a minority went to students specifically trained in administration. And although there are some universities and other agencies offering courses related to health administration,

the training is aimed more on institutional management with specialized training in health care administrative principles and techniques receiving little attention. It would seem that this situation could be corrected.

These two studies, both recent, emphasize the emerging need for a new profession of health care administrators. Indeed, the New York State Committee says: "Because of the variety of titles involved, there is no dependable census of the total of medical care administrative positions in the country (or the State), or the number of existing vacancies. The Committee is satisfied, however, that there are approximately 10,000 such jobs now filled in the country, a large majority of them by persons without appropriate training. And it is apparent that the need for qualified professionals will increase rapidly, along with the growth of population and complexity of health services."

Leadership in the development of these *dental* administrators should be forthcoming from the profession itself. And before much more time elapses.

The "Dental Health" section of the *Survey of Dentistry* concludes with: "An increase in the number of dentists with training and broad experience in administrative dentistry, men with skill and imagination, would vastly increase the effectiveness of all organized programs to improve the health of the public."

The recommendations of the Commission on the Survey of Dentistry in the United States to make these organized dental care programs more effective should be promptly given the green light, and the word should be "Go!"

Surely the critics of the *Survey* will not present bitter opposition to *these* two recommendations.

T.McB.

NOTE ON JOURNAL PUBLICATION DATES

Beginning in 1964, the months in which the JOURNAL is published will be changed. Instead of appearing in March, June, September, and December, the JOURNAL will be mailed to you in January, April, July, and October. There will be further comment and notice of this change in the next issue.

Dental Consultants and Administrators

PAUL E. JAFFE, D.M.D.

The problem of payment for dental care has demonstrated vividly a shortage of competent dental administrators and consultants. There are a number of reasons why this situation exists:

- (a) Delayed recognition of changing patterns of health care.
- (b) The fact that group dental care purchase has not developed at either the rate or level of interest of the hospital, medical, surgical care area.
- (c) The development of competent dental administrators and consultants requires specialized training and background.

While the dental profession has men of sufficient culture, creativity, and depth of wisdom from which such administrators and consultants might be obtained, it would be difficult if not impossible to recruit such men from the profession itself. Odin W. Anderson, Ph.D., Research Director of the Health Information Foundation, Chicago, has stated: "I cannot believe the money necessary to pull health professionals in the required number out of their usual role—patient care—would be available. Hospitals cannot get physician administrators, except for the big ones—and the hospital administration programs are not getting physician recruits."

Most practitioners are not too aware of, or for that matter concerned with, reasons for dental care needs and attitudes. Certain early studies have provided us with interesting information. The dental administrator or consultant certainly must be well informed in this regard. So far as the future is concerned, most of our colleagues have little idea as to just which of their patients will or will not purchase their own dental care (or have it purchased for them) by whom, when, or in what manner. This is, of course, understandable in light of the manner of dental practice. Most dentists practice in so called solo fashion, and as such are not directly exposed to the many changing factors being brought to bear on the purchase of

Dr. Jaffe is a practicing orthodontist who has published previously on dentistry and the behavioral sciences, and the socio-economics of dental care.

health care by labor, management, and government. It must also be recognized that a large segment of the population does not look upon dental care in the way we would like them to. This fact has been pointed out in many studies which have been available to us by the Health Information Foundation in their bulletins and statistical studies. To quote from one such study, "An astonishingly low priority is set on dental care by the American people, even by those better educated and with higher incomes. In groups with less income and education, apathy toward dental health is more marked. Hence the possible discrepancy between ability to pay and willingness to pay (1)."

While dentists are held in very high regard as professionals, only about 40 per cent of the population receives adequate dental care. In a speech to the Bronx (N. Y.) County Dental Society in 1961, Odin W. Anderson pointed out that there is a vast discrepancy between what people know about dental care, and what they actually do about obtaining dental services.

If we are to consider individual or group purchase of dental services, then we must have a thorough knowledge of public attitudes toward dentistry, standards of care, and levels of same. What we as dentists may define as cosmetic, basic, functional, or comprehensive care may not be considered the same by our patients, labor, or management. Three years ago I stated that it is not the dentist's ability to perform a given service, but rather his inability to understand the factors that affect his patient's attitude toward dental care that will greatly determine the future pattern of payment programs for dental services. Certain treatment situations are particularly indigenous to dentistry and do not necessarily exist in other areas of health care. For one thing most dental treatment is not done at hospitals, and is elective in nature.

So far as group health programs are concerned there is the primary factor of negotiation in the management, labor, and insurance fields. Secondly there is the need for those who will represent the dentist to have a thorough knowledge of the attitudes and background of the people he is negotiating with. We have to face the fact that many different and varying kinds of plans may have to exist side by side. Group dental care programs will have to be aggressively sold in the same manner as other forms of insurance. Blue Cross and Blue Shield programs have recently discovered this fact. Insurance companies have known this for a long time.

While we in the profession are concerned with the problems of group care committees and dental service corporations, all of which take time and are responsible to a democratic membership, many potential purchasers of group health care are in no such predicament. They have long since passed this stage as evidenced by the vast network of programs in the hospital, medical and surgical fields. The Larsen Report (Commission on Medical Care Plans, American Medical Association, 1958-59) was evidence of this. The rapidity with which groups seeking care can act is quite evident. It would therefore be most helpful to bring together the many people concerned with dental care and acquaint them with the purchase and payment methods involved. In this regard Dr. Emil Lentchner has said, "Confrontation by means of a working conference of the various groups with a stake in dental care distribution and financing should be arranged so as to explore in depth the desires and needs of all groups to crystallize both the common ground and the areas of difference."

The preoccupation with medical, hospital, and surgical fields may have given dentistry a breather for a short period of time, so far as groups seeking care are concerned. Why hasn't prepayment dental care grown as rapidly as Blue Cross-Blue Shield, Major Medical, and other forms of health insurance? The majority of the insurance companies are not rushing into this vast area of potential new business development. If labor or management were to have manifested a dynamic interest in dental care they would have already moved in this direction. This is certainly not meant to minimize the programs started in many parts of the country by various employer-employee groups. Nonetheless there has been relatively little activity in the dental area in comparison to that in the medical, hospital, and surgical fields. This coupled with the attitude of certain segments of the population toward dental services does not necessarily mean that interest in dental care is not growing. It does however demonstrate that such interest in dentistry as a health service is developing at a slower pace. While this has given us a chance to scan the horizons in other areas of health care, we must be alerted to the immediate necessity of developing the highly skilled negotiators we will require.

Where then are we to obtain such skilled personnel? Men who represent dentistry on these levels must be experienced in the structure and orientation of dental practice, as well as in labor relations, health care trends and statistics. While the need for consultants and administrators does not seem to involve a large number of individ-

uals, their significance should not be underestimated. Care should be given to the establishment of their career patterns, and arrangements concluded for adequate financial compensation.

In the meantime what about future development of prepaid dental care programs? This will not take place until there is some stabilization of rising medical, surgical, and hospital care costs. This is still a long way off, with no apparent end in sight. As long as these dimensions of health care continue to utilize the largest amount of the worker's dollar being spent for health care, the facts are that problems related to hospitalization and surgery cannot be postponed to any marked degree, and that certain illnesses linger for prolonged periods and thereby tax the financial structure of many families. Until these problems have approached a greater degree of stability the likelihood of a marked demand for purchase of dental care by groups does not appear to be in the immediate future.

The impact of individual purchase of dental care upon both patient and dentist will continue to be a major force. Serbein has stated, "Until such time as prepayment methods have been extended to provide payment for all types of medical care, most persons will continue to pay a large part of their medical bills out of current income, savings, and loans. Perhaps it will always be desirable to require the individual to pay some part of his total medical bill (2)." Payment methods other than prepayment will continue to involve the dental practitioner in direct negotiation with his patient. In this regard dental care will undoubtedly continue to maintain a high degree of direct doctor-patient relationship due to the very nature of the solo practice of dentistry.

The development of dental consultants and administrators will undoubtedly present new and perplexing problems. Odin Anderson has stated to me that "we are creating a managerial class which has to be trained to understand and appreciate the role of the health professional and the type of setting he needs for good performance. Eventually, I believe these lay managers will be acquiring more power vis-à-vis the physician, dentist, etc., but I think a balance can be achieved. Undue domination of the professional is not in the cards as long as there is a seller's market." Since the actions of such dental administrators and consultants will obviously have a decisive effect on the patterns of our future professional existence, much thought and care must be given in regard to the competence and

qualification of people to be chosen. The degree of financial compensation should also be large enough to motivate well qualified individuals.

We are faced with the problem of an ever growing population. If this is to be translated into an ever increasing demand for more and better dental care many people will have a vital interest in the concept of programs to be developed. The development of competent dental consultants and administrators will help the dentist to maintain a voice in the patterns of care to be developed.

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1. The Public Looks at Dental Care. H.I.F. Research Series No. 6, Chicago, Illinois.
2. Serbein, O. Paying for Medical Care in the United States, Columbia University Press, N. Y., 1954, p. 372.

MEMO: FROM PRESIDENT BLACKERBY

In addition to the usual Convocation activities on Sunday at Atlantic City next month, there will be a session on Saturday afternoon. For the first time, the College will be holding a day and a half meeting.

The Saturday program will be a panel discussion on "The Image of Dentistry." The observations of a distinguished university president, a big-city newspaper editor, and a long-time champion of the laborer, promise an opportunity to "see ourselves as others see us." This will be an open meeting.

The Sunday morning presentation will emphasize "Continuing Education" with its challenge to the dentist, the dental society, the state board, the dental school—and to the Fellows of the American College of Dentists. The principal address at the afternoon session on Sunday will focus attention on "Leadership."

These sessions will be informative and inspiring occasions. The complete program appears on pages 221-224 of this issue.

Dental Education in Iraq

SIDNEY G. BARRETT, L.D.S. (Leeds), M.Sc.

In 1954 when I was a member of the Department of Prosthetic Dentistry at the Eastman Dental Hospital, Post Graduate Institute of Dental Surgery of the University of London, England, I was invited to apply for the new Chair of Prosthetic Dentistry at the College of Dentistry, Baghdad, Iraq. In September 1955, I arrived in Baghdad to begin the building up of a new department, and to live in one of the most interesting countries in the world.

Iraq, for all its ties with ancient history, is a modern country. Just after the World War I when the Ottoman Empire was broken up, and of which Iraq was a part, the country came under the administration of a British Mandate. Twelve years later Iraq gained her independence.

Iraq has a population of about seven million people. Its neighboring countries—Turkey in the North; Syria, Jordan, and Saudi Arabia in the West; Iran (Persia) in the East; and Kuwait in the South, are all Islamic. Except for Iran and Turkey they are all Arab States. Baghdad is the capital and it is situated in the central plains of the country on the banks of the river Tigris. It has a population of about one and a half million people.

The discovery of oil in recent times and the marketing of it has given the potential development of the country a tremendous impetus. Since the time of the British Mandate considerable attention has been given to the development of the health and education of the country. A medical college and a school (later a college) of pharmacy were founded in Baghdad during the Mandate.

In 1953, after an earlier abortive attempt, a program of dental education was embarked on in Baghdad. Some twenty students began their dental training in several old houses with inadequate equipment and materials, and insufficient trained dental teachers. Fortunately the basic science subjects were taught in the adjacent Medical College. The early days were difficult for those who were respon-

Dr. Barrett came to the United States in September, 1962, and undertook graduate training in prosthodontics at the Ohio State University College of Dentistry. He received his Master's degree in August of this year. Presently he is continuing his studies at the Ohio State University.

sible for this program, and to add to their difficulties official opinion was divided as to the necessity of having a dental college.

Until 1958, when the College of Dentistry graduated its first students, dental treatment in Iraq was carried out by Iraqi dentists who had graduated in Universities in other countries, notably the Syrian University in Damascus, Syria; by a few foreign dentists in the country; and by dental mechanics who probably formed the largest body. The practice of dentistry is now limited to those dentists who have received their training from a recognized institution and who are registered with the Iraq Medical Professions Association.

In the early days of its development the College of Dentistry was a part of the Faculty of Medicine which also included the Colleges of Medicine and Pharmacy. The Faculty of Medicine came under the direction of the Ministry of Health. Later, when the University of Baghdad was formed in 1958, each college became independent within the framework of this new University.

In 1957 I was made the Acting Director of the College, and in 1958 when the College severed its ties with the Ministry of Health to become part of the University, I was appointed Acting Dean. Deans of the Colleges in the University are members of the University Council, a body which is responsible for all the affairs of the University. As representative of the College of Dentistry on that council I was the only foreign member. All discussions were in Arabic, and voting on a number of delicate issues was an additional burden.

RECRUITMENT OF STAFF

The greatest problem in developing a dental college, or indeed any other college, is the recruitment of capable people to do the work. The availability of dental teachers in Iraq was totally inadequate to train an intake of between twenty and thirty students a year. This meant that recruitment had to be made from countries outside Iraq. This is a problem, since there are few established dental teachers who are prepared to leave the security of their appointments in their homelands to come to a country where there is always the possibility of political upheaval with all its attendant disadvantages. The man who has a family will also have the problem of education for his children, and in some instances it will be necessary to leave his older children at home to attend school there. It is important

that the appointee, besides being capable, should be able to adapt himself to new people with different customs from his own. Iraqis are very personal in their relations with other people.

There was very little difficulty in persuading the authorities that a dental professor should be recruited from abroad, but a dental college is also dependent on lecturers and ancillary staff. These also had to be sought for outside the country, and to attract a skilled dental technician or a maintenance engineer meant offering him an attractive salary. This salary was usually considerably greater than some of the senior Iraqi members of the University were receiving. The result was that their work was more closely scrutinized by the local people. The College of Dentistry was fortunate in recruiting the foreign wife of an Iraqi who was a qualified general nurse with dental office experience. She was responsible for the training of chairside assistants. These girls came from families with modest backgrounds who are traditionally conservative about their daughters associating with the opposite sex.

By the beginning of the academic year in 1961, the College had its maximum number of foreign staff which included myself as Acting Dean and Head of the Department of Prosthetic Dentistry, three Australians who were all heads of departments, namely Oral Surgery and Oral Medicine, Conservative Dentistry, and Orthodontics. There was also a Swedish dentist, two dental technicians—an Austrian and a German—and an English maintenance engineer. The dental nurse was Irish.

THE STUDENTS

Education in the State-controlled schools and the University is free, so that students at the College of Dentistry come from all levels of Iraqi society. Instruments and materials are provided by the College during their training. Patients pay a nominal sum for the treatment they receive.

In the State-controlled schools primary education begins at the age of six, and the pupils remain at the primary school for six years. Intermediate education lasts three years, and secondary education for two years. During the secondary school training pupils elect to specialize in arts or science. Those students receiving the highest grades in their final examinations in the secondary school usually apply to enter one of the colleges. The long establishment of the Medical and Engineering Colleges, and the fact that both professions con-

fer a high social status and opportunities for good remuneration makes them popular first choices of all the colleges. Each college has its minimum standard of grades before it will accept a student. As the College of Dentistry progressed, students were accepted on a similar basis to those of the Medical College. Sex is no bar to entry in the College and approximately one-third of the students were women.

Arabic is the language of the country, but partly due to the lack of modern scientific literature written in Arabic those colleges teaching scientific subjects teach in English, which is the second language of the University. Unfortunately the early training in English is quite inadequate for highly specialized courses like dentistry, and difficulties arise both for the teacher and for the student. It says a great deal for the students' efforts that although many start out their dental training weak in the English language, by the end they are able to present their answers at written and oral examinations very satisfactorily.

Iraqi students are hard working and they have a tremendous enthusiasm and intellectual curiosity, but the memorizing of facts and a preoccupation with examinations sometimes blunts their critical approach to a subject. Learning by memorizing is the traditional way in Iraq, and it is not unusual to see students in the street or in their gardens at their homes pacing forwards and backwards reading their notes in a way their fathers before them might have learned the Qur'an.

Unfortunately, from time to time, the continuity of the training is interrupted by political upheavals in the country. Although many students would rather leave these problems to the politicians, invariably they get caught up in the general excitement and emotion. There are demonstrations, strikes, and imprisonment. Of all the problems to be dealt with by the administration of a college the most difficult to manage is the one arising out of political differences of the students.

ARRANGEMENT OF THE CURRICULUM

The academic year of the University is composed of two sixteen-week terms with the first term beginning in the Fall. Students at the College of Dentistry in their clinical years continue their clinical work throughout the Summer months.

All the basic science subjects are taught in the Medical College by

the Medical College faculty. In some subjects they take the same courses as the medical students, but in others they receive independent instruction because of the large numbers involved when students from the two colleges are combined.

During the first year the dental student receives courses in chemistry, physics, and biology. This consists of lectures, practical exercises, and demonstrations. The second year subjects are anatomy, principally the head and neck, human physiology, biochemistry, general histology, and dental anatomy. In these subjects the student also receives lectures, practical work, and demonstrations. During the third year the student begins his technic work in operative dentistry and prosthetics. He also receives courses in general pathology, bacteriology, pharmacology, and dental histology. At the beginning of the fourth year the student is introduced to clinical dentistry for the first time by way of prosthetic dentistry. He will also begin clinical practice in operative dentistry, and in the oral surgery department. In addition to receiving lectures and clinical demonstrations, he will carry out extractions of teeth under local anesthesia.

In the Fall of 1959 a course in orthodontics was introduced for the first time. This course continued into the fifth year. Courses in general surgery and general medicine are given by members of the Medical College Faculty. During the fifth and final year the student receives lectures, demonstrations, and clinical experience in operative dentistry, periodontology, oral surgery, oral pathology, radiography, prosthetic dentistry, crown and bridge prosthesis, endodontia, and orthodontics.

All examinations are carried out by the various departments, and when the student has successfully completed his course he receives the degree of Bachelor of Dental Surgery.

In addition to the basic qualifications, the Dental College Council, which is made up of the heads of departments and elected members, drew up regulations for a Master of Dental Science in 1961. These were submitted to the University for approval and were accepted.

BUILDINGS AND EQUIPMENT

When the College of Dentistry was started there were no buildings which were designed or reconstructed for the purpose of training dental students. Once the authorities were convinced of the need for more suitable accommodation there was no difficulty getting the

building up, but the problems arose in the laying down of pipes for the dental units. The local engineers who were responsible for the work were completely unfamiliar with the setting up of numbers of dental units and consequently all sorts of difficulties were encountered. As more and more units were laid down, by the Summer of 1962 there were fifty chairs and units functioning, and the problem of overloading the electricity in the neighborhood arose, and new pipes were needed to step up the water pressure.

Fortunately the College received an adequate supply of money for the purchase of equipment which was mainly brought in from abroad, although some purchases were made from the local dental supply houses.

PROSPECTS FOR THE DENTAL GRADUATE

In 1958 there were about two hundred dental practitioners in Iraq, and of these the majority were practicing in the big towns such as Baghdad, Mosul, and Basra. In spite of the small ratio of dentists to population, the number of dentists probably met the demands since with the exception of the principal towns, relief of pain, usually by extraction, was the treatment most sought after. As the College developed and students graduated, the demand for more specialized forms of dentistry increased.

All the graduates, except those medically unfit, are required to spend sixteen months in the Army where they spend some of the time learning the rudiments of Army training, and the remainder with an Army Dental Unit.

The graduate who gained the highest grades in the examinations may be appointed to the staff of the College of Dentistry, but the majority of graduating dentists serve in dental centers in the Ministry of Health. The official Government hours however allows the dentist to build a good practice. The majority prefer to stay in Baghdad, where besides the professional possibilities there are greater social facilities and better living conditions.

Iraqi students are eager to continue their educations abroad, preferably in America or Britain, and there are excellent opportunities for the student who receives high grades in his examinations in the form of government grants and scholarships. A number of the Iraqi staff in the College received training abroad.

In all branches of dentistry there is tremendous scope for develop-

ment in Iraq. There have been very few surveys carried out in the incidence of dental caries and periodontal disease.

In June 1962 for personal reasons I left Iraq, and in September of that year came to the United States.

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POSTGRADUATE STUDY

"Another question is whether it is right to grant a young man a degree which gives him a monopoly during his whole professional life. If he develops into the poorest type of practitioner, no one can do anything about it as long as he does not infringe the law. In military service, soldiers are called back as reservists at certain times in order to ensure that they have not forgotten what they have learned and also to become acquainted with and used to new methods which have been introduced since their last period of service. It does not seem illogical or unfair to demand that the dentist, every three (or at least every five) years, in exchange for his monopoly, should follow post-graduate courses in the various branches of his profession where new methods have been introduced."—Dr. C. F. L. Nord, Amsterdam. Extract from a paper prepared for the World Health Organization Expert Committee on Dental Health, as noted in the *WHO Chronicle*, January 1963.

How Can Dental Education Methods Be Improved?

ROEL JOSEPH WYMAN, D.D.S.

Over the years, the scope of dental education and the task of the educator have widened and altered measurably. To meet the hungry demand for dental services of an under-cared-for public, schools have constantly been increasing in number and size. Unquestionably, modern techniques in dental technology and its teaching are producing graduates who are potentially capable of more and better dental service per unit of time of actual procedure, and especially, per hour of instruction. Unfortunately, this has in many instances been accomplished by the much-touted and highly-deprecated "mass production" approach to training. Increasingly larger classes and certain types of audio-visual aids, improperly used,* have changed the status of the instructor from that of a tutor with a direct responsibility for each member of a small group of students. He is now a lecturer who must follow a prepared text in order to make the most of a fixed amount of time, in which to convey the maximum amount of information to a large audience. The lack of close communication and rapport between teacher and students which is emphasized by its welcome, though all too rare, exceptions, prohibits the teacher from impressing his own attitudes and ideals upon his pupils. Rather, he is forced, in the main, to try to teach facts, most of which are available in textbooks, and which may be more profitably learned from these sources.

It is the purpose of this paper to attempt to show how theories of learning, notably Skinner's Operant Conditioning Theory, developed through investigation into the psychology of learning, enable us to understand and exploit the learning processes in man. They

Class of 1963, University of Toronto, Faculty of Dentistry, Ontario, Canada.

This essay was judged first in the 1963 Writing Award Competition of the American College of Dentists. A plaque and \$500.00 were given to Dr. Wyman.

* In descending order of the severity of misuse: television, slides, motion pictures. The reasons for this phenomenon are not entirely clear, but may be connected with the amount of time given to review of material before presentation; e.g. professional editing of motion pictures as compared with less expert editing of slides, and with limited amounts of television pre-broadcast rehearsal time.

show us how proper and effective use of certain teaching aids, combined with a uniform and enlightened concept of the purpose and meaning of the phases of education, will enable us to reduce, in effect, the size of the largest class to that of the old fruitful tutorial group, restoring a vital type of personal communication between the instructor and every student within his responsibility. The key to the problem is the amazingly promising and exciting development of programmed educational research known as the teaching machine.

ON UNDERSTANDING TEACHING MACHINES: THEIR DEVELOPMENT

The so-called "teaching machine" is only a few years old, but already has both strong adherents and violent enemies. As the name "teaching machine" is obviously good copy, the public has been subjected to a barrage of information, and often misinformation, in the press. The net result has been a great amount of confusion. Articles in the popular press make good and fascinating reading for the parent who has been offered such a machine by an encyclopedia salesman, and who is eager to help his child "face up to the kids next door" (as one manufacturer has actually advertised). Unfortunately, they contain little or no meat for the serious student who is interested in knowing the theories of teaching machines and programmed learning, their origins and psychological-educational bases, the workings of modern mechanical devices, and the promise and portent of mechanized programmed teaching for the future.

Also, the documentation of legitimate research in this new and fertile field has only begun. The publication in 1960 of Lumsdaine and Glaser's (20) monumental collection of over 50 significant papers was the first source book for students of programmed education. Except for this, the literature consists mainly of many single papers, collections of papers, and reports of seminars, conferences, etc. There is, as yet, no text in the field.

One might think that any field as new and fluctuating as this would be traceable to a recent basic breakthrough, in one or more respects, by a single man or group. Curiously, this is only partly true. Although rapid and independent development did not receive any particular emphasis until the catalytic action of Skinner's memorable 1954 paper (23), the history of teaching machines is long and fitful.

The first recognized attempt at using a mechanical device to aid

in teaching is documented by the United States patent granted on February 16, 1809, to H. Chard, entitled "A Mode of Teaching to Read." Between this early date and 1936, the period covered by Mellan's study of patented educational devices (21), no fewer than 668 patents were granted to inventors of teaching aids and instruments. Few, if any, are in use today, indicating that the bulk of them were perhaps based on less than sound educational theory.

In 1926, *School and Society* carried a short article by Ohio State University psychologist Sidney L. Pressey (22), in which he described a machine built from old typewriter parts which he devised for testing students. The machine presented multiple choice questions on a drum, to be answered by the student's pressing one of four buttons. The machine kept an error count, and the right button had to be pressed to proceed. A candy "Lifesaver" was dispensed for a correct answer. (Presumably, a high incidence of caries combined with sticky fingers was indicative of a successful candidate!) Pressey recognized that a device which informed a student immediately of his success, or lack of it, would do more than test the student—it would teach him. The psychologist also saw that machine instruction would allow each student to proceed at his own pace.

In succeeding years, Pressey experimented with a punch-board device, tried by thousands of students (10). If a pencil went deep into a certain hole, the student's choice was correct. Pressey gave an automated course in psychology to 15 students, and pursued the matter of teaching by testing. However, prevailing economic conditions and cultural inertia seemed to work against the "coming industrial revolution in education" that he foresaw. Despite further studies by his own small group, Pressey met with no encouragement from educators, and he was forced to write, in 1932, that he was "regretfully dropping further work on these problems" (24).

Poor timing and response aside, Pressey's machines had certain limitations that probably contributed to their failure. They were mainly testing devices to be used after some amount of learning had already taken place elsewhere. They did not use the principles of programming that later emerged from the study of operant reinforcement.

THE REVOLUTION AT LAST: SKINNER STEPS IN

Twenty-two years later, B. F. Skinner, professor of psychology at Harvard University, re-activated interest in mechanical teaching by

means of his address, "The Science of Learning and the Art of Teaching," presented to a conference of his colleagues at the University of Pittsburgh in March, 1954. In it he told how the results of 30 years of research into the behavior of animals led him to develop, upon classical theories of teaching, a new and exceptionally successful type of teaching machine.

The transition from response conditioning of animals to teaching human students is less abrupt and far-fetched than one would expect, if it is accepted that learning is defined as a change in behavior (and behavior patterns) in response to a changing environment. To quote Hilgard, "learning is a change in behavior potential" (16). It follows that an organism learns mainly by adapting to an increasing number of changes in its environment. It is only recently, however, that such changes have been manipulated. To explain how behavior is effectively changed (i.e., how learning occurs) at the will of the instructor, we must also explain that mysterious phrase which now occurs for the third time—"Operant Conditioning."

In the traditional devices for the study of learning—in the serial maze, for example, or in the T-maze, the problem box, or the familiar discrimination apparatus—the effects produced by the organism's behavior are left to many fluctuating circumstances. Animals are presented with a situation in which they must perform a particular function, in order for reinforcement to occur; reinforcement being any sort of event or reward in a learning situation that increases the probability of occurrence of the response (17). This presupposes the accidental accomplishment of the set task at least once, following which the organism is more likely to repeat the action. Ultimately, it becomes part of the organism's repertoire. It is not surprising that techniques of this sort yield only very rough data, in which the behavior of the *individual* organism can be predicted only in a statistical sense (25). This leads to guesswork and inference in trying to determine the learning processes, the chief object of this kind of research.

Being in some ways an impatient man, Skinner declined to wait for the chance occurrence of correct responses on the part of his animals. He states that the "law of effect" (that any response which the experimenter can arrange to reinforce can be acquired by the learner) (17) was taken seriously, and that he made sure that effects *do* oc-

cur, under conditions which are optimal for producing the changes called learning.

Each individual unprovoked, and random motion of the organism in a given environment is referred to as an operant. It may be completely unrelated to the environmental situation; that is not a criterion. Utilization of these operants (the sum of which is called operant behavior) provides the key to learning. Selecting an action which he wishes a pigeon, for example, to perform, Skinner first reinforces any operant which tends to lead the pigeon towards his goal, such as extending a foot, turning the head, etc. This is then repeated. As these tiny steps are learned, he gradually withholds reinforcement until a broader scope of response occurs, such as more of the required movement. It requires some skill to select extensions of the desired movement, while avoiding extinction of the response by reinforcement at the wrong time, but a properly prepared pigeon seldom requires more than two minutes to learn, for example, a clockwise turn—a single complete and swift movement ending with reinforcement, easily reproducible.

If this response is then extinguished and a counter-clockwise turn is shaped, the clockwise turn can be recovered and the pigeon taught to pace a figure eight, also within a few minutes. This response now remains a part of the pigeon's total behavior pattern; that is, the response has been learned, and may be elicited at a future date without re-programming. We have just described operant conditioning. The power of this technique has to be seen to be believed. Skinner has caused animals to exhibit complexities and subtleties of behavior probably never before achieved by members of their species. He has, as an extreme example, trained a rat to pull a string in order to obtain a marble from a rack, pick the marble up with the forepaws, carry it to a tube projecting two inches above the floor of the cage, and drop it inside (18).

THE SKINNER MACHINE

The famous French philosopher René Descartes (1595-1650) described the Cartesian method, a basic technique of programming. This consisted of breaking down a subject to be taught into its smallest component parts, and then arranging them into a hierarchial order to aid the learning process. This was obviously standard practice with Skinner throughout his animal researches; what he aimed

to do now, however, was to apply this Cartesian method to the Socratic or tutorial method of teaching by questioning, with a minimum of exposition, and a maximum of active participation by the student.

What he did was to atomize a fifth-grade arithmetic course and his own college freshman psychology course into their most basic elements, and arrange them for presentation in a machine as a sequence of questions. Each question contains a very small amount of information, and is carefully designed so as to elicit only the right answer. Should student-response data show many errors at any item, the material is revised to provide 95 per cent surety of obtaining the right answer.* The student derives reinforcement from being told immediately that his answer is correct. The machine insists that each question be answered (correctly) in turn, and exposes the questions only one at a time. The student also derives a satisfying reinforcement from being permitted to proceed to the next question, as well as a certain amount of secondary reinforcement from the audible click which the machine makes in advancing the material, and from manipulating the controls. Right and wrong answers are entered on a counter, for future reference or for scoring. The answers are entered on a separate paper strip, so that the program is not destroyed.

EFFECTIVENESS OF THE TEACHING MACHINE

Skinner's method succeeds in establishing a new set of behavior patterns (learning) unmatched by any other teaching method. The courses were covered in a fraction of the normal time, with much less effort on the part of student and teacher alike. Tests carried out during and after the program showed much greater understanding and retention of the material; especially significant when considered with the eager and voracious desires of the students for further advanced material. The students themselves took a keen and active interest in the course, and reported that they actually found it fun. Upon conducting an interview with 500 students who took the psychology and behavior course, Skinner found that 99 per cent felt that the machine helped them understand the text, and 78 per cent

* One very important variation of programming is based on multiple choice questions, where errors are anticipated and explained to the student in an informal, tutorial manner. Crowder's (8) "Intrinsic Programming" is more flexible than Skinnerian "Linear Programming," and is better suited to complicated professional courses.

actually felt they learned more from the machines than they did from the text (26).

These results are borne out by many other investigators who have completed similar projects. In Roanoke, Virginia, 34 grade-eight students completed a full year's work in less than one semester, using machines only (without the aid of a teacher). Half of them got a ninth-grade score on a standard achievement test; all passed (11). At New York's Collegiate School, Komoski described exceptionally good results with courses in statistics, calculus, and French (population: grades ten-and-eleven) (12).

One student completed a 1,000 item program—half the fall term's homework—in four and a half hours, and wrote a perfect final examination in January. Cartier told of reduced learning time and greatly increased marks in junior high school students in British Columbia (6). Countless other experimental trials establish the effectiveness of teaching machines and programmed learning. And Skinner says, "I would risk the guess that any given material can be learned in half the time, with half the effort" (26). Rash words, yes; but certainly indicative of the possibilities of the technique. (See Table I.)

TABLE 1
TYPICAL LIST OF THE ADVANTAGES OF TEACHING
MACHINES—BRIGGS*

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1. An expert program writer can reach a number of students.
 2. Misconceptions held by minimally qualified instructors will not be passed on to students.
 3. Errors are immediately corrected, and do not lead to further errors in the problem sequence.
 4. The student works at his own rate.
 5. Slow students are required to master the material, and fast students can save time.
 6. Slow students are not embarrassed by their lower rate of learning.
 7. Fast students can do extra assignments, participate in discussion groups, and perform laboratory or field exercise to develop further.
 8. The need for examination is greatly reduced.
 9. Good instructors may use their time to better advantage than performing rote drill or reciting facts. Good teaching leaves the door open for scholarship and recent advances.
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* Briggs, L. J. "Teaching Machines: History and Possible Applications to Air Force Education and Training Programmes," annotated in Fry, E. B., Bryan, G. L., and Rigney, J. W. *Teaching Machines: An Annotated Bibliography*. Audio-Visual Communication Review 8:22-23; Supplement 1, 1960.

To these might be added the obvious usefulness of the programmed self-instructional machine in performing controlled experiments where uniform presentation of material by a machine tends to remove the variability of a human instructor and maintain a constant environment.

THE NEED FOR BETTER METHODS OF DENTAL EDUCATION

The introduction to this essay states clearly some of the problems which beset dental education today. They are worth reiterating. A list would, of necessity, include the following principal problems:

1. Classes are too large.
2. Audio-visual aids are, as often as not, improperly used and boring.
3. There is insufficient and improper communication between the instructor and the students.
4. Many instructors, due to the ever-present teacher shortage, are minimally qualified.
5. There is insufficient standardization of course content and quality from school to school.

The solutions, unfortunately, are by no means so readily visible as the problems themselves. Most of the standard suggestions for the improvement of an educational system are applicable. We must treat students as individuals, and group them according to ability. We must bring and keep textbooks and other materials up to date, and make good use of our excellent professional literature. And of course, we must constantly strive to attract the most promising young men to the faculties of our dental schools, to replenish, refresh, and maintain the quality of the teaching staffs. These suggestions, however, are not new. Their merit is recognized, and we are working to implement them as much as possible; but they really consider neither the effectiveness of the teaching process itself, nor the peculiarities of the dental educational system.

The chief difficulty, the one to which all the others finally defer, is the lack of communication between the best instructors and the students. Students who are forced to sit through lecture after unsatisfying lecture, bound hand and foot by discommodities not of their own creation, tend to pay less and less attention to the material presented. When even a strong and conscious effort to keep up with the material bears little fruit for the mind, the mind wanders, sleeps, and seeks mischief. A poor lecturer often has a noisy class, for the stu-

dents have little to do but amuse themselves. They can always "get it later from the book." Unfortunately, this is seldom true. Unfamiliarity with the classroom material leads to severe handicaps when it comes to using reference material.

Students should not have to learn a course from the textbook; this is almost impossible for the average student to do correctly, and leads to "cramming" before tests and exams. Few people delude themselves that this type of curriculum of study, brought on by deficient teaching methods, produces any sort of permanent learning, regardless of the test results that may be shown. Students who operate in this way, and they are likely in a majority, will be most unlikely to be prepared for office emergencies or other situations where they are called upon to think fast and rely on past knowledge.

This situation can cost lives. We cannot afford it. With the number of dentists and estimated graduates yet to come unequal to the task of supplying adequate dental care to an ever-expanding population, we must use our time more profitably to help turn out better-rounded, more competent dentists, who can assist in bridging the gap. Current techniques of teaching, with the possible exception of the strategy of tripling the relative number of teaching staff to student population, are very unlikely to be able to accomplish this task. On the other hand, programmed learning may very well be both necessary and equal to the task.

HOW PROGRAMMED LEARNING CAN BE USED TO IMPROVE DENTAL EDUCATION

Of the many types of programmed learning material to be used in machines or the so-called "scrambled texts,"* and the many ways in which they can be used and applied, there are three contingencies that would appear to be best-suited to the aims of dental education:

1. Introductory Material for a New Course or Subject

Used as an introduction to a course, programmed material can, at the very first, establish the vocabulary and the basic elements of the

* A variation of intrinsic programming, in which the material is printed in a book (called a "paper teaching machine"). Multiple choice answers supply page numbers, assigned at random, so that successive informational items are not near each other, and cheating cannot take place.

particular discipline, providing new students with a working knowledge that can reduce the length of the course, or allow for additional material to be included in it. Barlow (3) has arranged Earlham University's beginning Russian course for programmed teaching. His students take two years' basic work in one, starting with programmed texts and a tape-recorded program which allows them to practice conversation. When they attend their first class meeting, part way through the year, they have already mastered the new (and difficult!) alphabet, grammar, and a sizeable vocabulary, and have conversational skill. Hamilton University has done the same for a logic course; Harvard and Radcliffe, for psychology and behavior. U.C.L.A. is ambitiously working, with the Rheem-Califone Corporation, on an entire engineering course. Presumably, any dental school could begin an introductory program in anatomy, pathology, prosthetics, or bacteriology, to name but a few, and expect similar results, saving hours of time and energy, and benefitting students and teachers alike.

2. Uniformity of Teaching in All Schools

We are uniquely blessed in that most of the leaders of the dental profession in North America sit on the faculties of the various dental schools, and that they take an active part in the planning of curriculums, and in teaching itself. Of course, not all schools are fortunate in having a good cross-section of specialists in all disciplines. Larger schools tend to have more and better consultants who can teach undergraduate classes, but even here, there may well be inequalities and imbalances in the make-up of a school's staff. To help overcome this disparity, courses could be designed by the foremost authorities in their specific subjects, in association with programming specialists, for distribution to all participating dental schools. This would tend to:

- (a) ensure a reasonable amount of uniformity and high standards in teaching of a subject, regardless of where taught, or by whom; still allowing for individual variation and opinion, which may be added in classroom periods by independent instructors.
- (b) give the effect of personal teaching by the authority himself, or a panel of authorities, in every school; otherwise an obvious impossibility.
- (c) give the effect of personal visitations to each school, without unnecessary expense.
- (d) allow the individual instructor to concentrate on new or controversial

material, or on interesting sidelights, experiences, and personal opinions; the teaching of rote material having been consigned to the (previously approved) programmed material.

(e) allow individual students to proceed at their own rate through the course, without being tied down to a scheduled rate of learning either above or below their capabilities; fast students being allowed and encouraged to proceed to special advanced material, and slow students being singled out for extra help.

(f) uphold the usefulness of the increased understanding, retention, and rate of learning, by providing material which is worthy of the tutor and the pupil, and is guaranteed valid.

These courses would begin in advance of the lecture and laboratory portions of the curriculum, and continue simultaneously with them in a complementary relationship. A good balance for a course would be one-quarter each; programmed material, lecture, laboratory, and text or reference.

3. Special Types of Programmed Material

Certain specialized types of educational programming, while not applicable to all courses, can be used to great advantage in particular fields of dental education. For example, the ACS Pagoda Cup Assembly (19) trains students in complicated manual procedures and instrumentation, important features of the dental curriculum.

Although our scope does not permit a full discussion here, the reader is particularly referred to the fascinating article by Glaser, Damrin and Gardner (20) for a most illuminating discussion of the so-called Tab Item System. This aid, though non-mechanical, sets up imaginary cases and circumstances for the student to diagnose, plan treatment, and prognose. This ingenious system, which is one of the most highly satisfactory types of special material, and certainly among the most promising, may well revolutionize the teaching of all types of diagnosis, medicine, and pathology.

CONCLUSIONS

It is evident that teaching machines and programmed learning materials have left a considerable mark on the field of education. Some investigators have found them to be of considerable benefit and promise, while others, such as Casmir (7) and Gilbert (14), have taken strong stands against them. Casmir has pointed out the complexities of a (partly) mechanical system, including the possibility of

mechanical breakdown. He also finds fault with much of the programmed instructional material currently available, and believes that it is not likely to achieve a satisfactory level of quality and effectiveness. Though Casmir appears to have honest doubts about the true value of the system and concept of teaching machines, Gilbert's objections seem to be typical of those whose opposition is based upon psychological and economic fears, rather than sound educational premise. Blyth⁵ described this state of mind:

The phrase "automation of education with teaching machines" represents such a summation of horrors for some people that it blocks intelligent inquiry into the merits of teaching machines.

Fortunately, dental educators do not appear to fall into this category. As Blauch and his associates (4) point out, dentistry has always been quick to adopt, or at least investigate, the use of new forms of audio-visual and other aids. This is evidenced by the widespread use of, among other things, slides, motion pictures, and television (1) all of which, *properly used*, are extremely valuable tools, used independently or integrated with programmed material.

Certainly, teachers need have no fear of losing their jobs; they are essential to the development of the less tangible features of the growing student's mind. Teachers and teaching machines must work together, according to Zschokke (27), to "mechanize the mechanical aspects of teaching the basics, and humanize the rest of teaching." Komoski (19) states succinctly, "Any teacher who can be replaced by a machine, deserves to be."

It would seem that the problems which beset dental education today in the pursuit of its goals may be, to a large extent, methodological. Teaching machines may or may not create an answer to the great challenge by providing a new methodology and a new understanding of teaching and learning. They do not, of course, provide a panacea for all the ills of dental education. Nor are they intended to appear so.

It seems certain, however, that there is justification for further investigation and research into the matter. It is recommended that establishment of experimental sample programs be proceeded with, to some degree, so as to establish some base line or reference point, from which to consider the further extension of programmed teaching methods to the improvement of the dental curriculum.

REFERENCES

1. Adams, J. C., Carpenter, C. R., and Smith, D. R., Eds. *College Teaching by Television*, Washington, D. C., American Council on Education, 1958.
2. Amsel, A. Error Responses and Reinforcement Schedules in Self-Instructional Devices (in Lumsdaine, A. A., and Glaser, R., *Teaching Machines and Programmed Learning: A Source Book*, Washington, D. C., Department of Audio-Visual Instruction, National Education Association, 1960, p. 507).
3. Barlow, J., described in Eaton, D. K., *Teaching Machines*, University of Oregon Curriculum Bulletin, 211:4-5, March, 1961.
4. Blauch, L. E. *Teaching in Colleges and Universities*, With Special Reference to Dentistry, Indianapolis, American Association of Dental Schools, 1945, 263-83.
5. Blyth, J. W. *Teaching Machines and Human Beings* (in Lumsdaine and Glaser, op. cit., p. 414).
6. Cartier, A. L. Experiences in the Classroom, in *Programmed Learning and Its Future in Canada*, Ottawa, Canadian Teachers' Federation, 1961, 47-50.
7. Casmir, F. L., described in Eaton, D. K., op. cit., p. 9.
8. Crowder, N. A. Automatic Tutoring by Intrinsic Programming, in Galanter, E., Ed. *Automatic Teaching: The State of the Art*, New York, Wiley, 1959, 109-116.
9. ———. Automatic Teaching by Intrinsic Programming, in Lumsdaine and Glaser, op. cit., 286-298.
10. Eaton, D. K., op. cit., p. 5.
11. ———. Ibid., p. 6.
12. ———. Ibid., p. 7.
13. Foltz, C. I. *The World of Teaching Machines*, Washington, D. C., Teaching Research and Technology Division, Electronic Teaching Laboratories, 1961, pp. 1-62, 67.
14. Gilbert, T. F., quoted in Eaton, D. K., op. cit., p. 10.
15. Glaser, R., Damrin, D. E., and Gardner, F. M. The Tab Item: A Technique for the Measurement of Proficiency in Diagnostic Problem-Solving Tasks (in Lumsdaine and Glaser, op. cit., pp. 275-86).
16. Hilgard, E. R., discussed in Kimble, G. A., *Hilgard and Marquis' Conditioning and Learning*, New York, Appleton-Century-Crofts, 1961.
17. Kimble, G. A. *Principles of General Psychology*, New York, Randal Press, 1956, p. 205.
18. ———. Ibid., p. 206.
19. Komoski, P. K. Canadian Teachers Federation, op. cit., p. 45.
20. Lumsdaine and Glaser, op. cit. (see reference No. 2).
21. Mellan, I. Teaching and Educational Inventions, *Journal of Experimental Education*, 4:291-300, March, 1936.
22. Pressey, S. I. A Simple Apparatus Which Gives Tests and Scores—and Teaches, *School and Society*, Vol. 23, No. 586, March 20, 1926 (reprinted in Lumsdaine and Glaser, op. cit., p. 35).
23. Skinner, B. F. The Science of Learning and the Art of Teaching, *Harvard Educational Review*, Vol. 24, No. 2, 1954. Also available in Lumsdaine and Glaser, op. cit., p. 99.
24. ———. *Teaching Machines*, *Scientific American*, 205:90-105, November, 1961.

25. ———. Reinforcement Today, *American Psychologist*, 13:94-99, March, 1958.
26. Skinner, B. F., and Holland, J. G. The Use of Teaching Machines in College Instruction, Lumsdaine and Glaser, op. cit., p. 159.
27. Zschokke, T. F., quoted in Eaton, D. K., op. cit., p. 7.

CRISIS IN RESEARCH

"We are becoming a research-oriented society, a condition that has arrived so fast that, quite understandably, we are encountering growing pains. I do not feel that the present magnitude of our government research effort is too large, even though it may be lacking in balance. I do feel, given present rates of growth, that we face crucial decisions about the future size of the effort. . . . If we are to have the personnel who can master these advanced technologies, we must accept the necessity of doing two things:

"*First*, we must increase the number of scientists and engineers educated by our universities and institutes of technology. . . . In a recent study (the Gilliland report) issued by the President, his Science Advisory Committee recommends, as a minimum, that the number of doctor's degrees awarded each year in engineering, mathematics, and the physical sciences combined be increased from the 3,000 presently given to 7,500 in 1970.

"And, *second*, we must devise ways to upgrade technical personnel already at work in industry.

"As a research-oriented society, we have the possibility of—in fact, we may now be in the midst of—a great creative thrust in which the energies of our people will find a new measure of release and our power as a nation will be raised to a new level of benignity. This renaissance through research, especially corporate sponsored research, can afford a flowering of individual skills and new avenues of individual fulfillment that will draw out as never before the latent talents and the sense of joyous exploration in increasing numbers of our people. Such is the promise of research if we deploy our funds and creative talent wisely."—James R. Killian, Jr., former president of Massachusetts Institute of Technology, now chairman of the corporation of M.I.T., writing on the topic "The Crisis in Research."

How Can Dental Education Methods Be Improved?

CYNTHIA M. SHELLBURNE, B.S.Ed., D.D.S.

As a dental school senior, I am flattered to be invited by the American College of Dentists to present my thoughts on this subject. It is well known that the "College" is composed of the finest minds, the most skillful technicians, and the most public spirited members of the dental profession. They are probably more keenly aware of the serious problems facing dentistry than any other group. Their judgment is mature and their dedication complete. With their cumulative experience, perspective and judgment, why would they consult senior dental students on this important question?

I can only guess at the answer. The Commission on the Survey of Dentistry in the United States, under the direction of Byron S. Hollingshead and the sponsorship of the American Council on Education, made a two year study which included this question. Dental members of the Commission included Otto W. Brandhorst, Secretary of the American College of Dentists. Being thus well informed of the exhaustive research and final conclusions of the Commission, I can only conclude that the "College" may be looking for a fresh approach. If so, while I will refer frequently to the Commission's Report and to its recommendations, I will also refer to other literature on the subject and attempt to treat it from a fresh point of view.

I do have some strong feelings about some aspects of dental education and welcome this forum as an opportunity to express them. I wish, however, to be clearly understood. I have no desire to be nor to sound impertinent nor presumptuous. I recognize my lack of maturity and perspective. The only way in which I can compensate for these deficiencies is to strive to interpret what I have observed, what I have heard here and elsewhere, and what I have read in the light of my own training and experience in the educational field and my background in dentistry.

Class of 1963, Indiana University School of Dentistry.

This essay tied for second place in the 1963 Writing Award Competition of the American College of Dentists. A plaque and \$50.00 (one half of the second prize money) were given to Dr. Shellburne.

I acknowledge with gratitude the assistance of some of my senior class colleagues who have answered my questions, always with candor, if not without profanity.

PROBLEM AND PREMISE

B. Duane Moen, Director of the Bureau of Economic Research and Statistics of the American Dental Association, speaking to the Michigan Workshop on Practice Administration in 1953 said:

I do not know how many dentists this country should have. It is not difficult to demonstrate, however, that the growth in the number of dentists has not been proportionate to the growth in population. Between 1930 and 1940 the population increased 7.2 per cent. During the same period the number of dentists actually decreased slightly. Between 1940 and 1950 the population increased 14.5 per cent. Final figures of the 1950 census indicate an increase of 6.6 per cent in the number of dentists during the decade (1).

The more recent report, *The Survey of Dentistry in the United States*, predicts an increase in our population to 235 million by 1975. On this basis, it is projected that the nation will need 134,000 dentists in order to maintain the present ratio of 1 dentist for every 1,900 people. It is further projected that if the recent rate of increasing demand for dental services is continued, the nation will need 190,000 dentists by 1975 instead of 134,000 (2). This is recognized as an impractical goal.

My conclusion is that if the validity of the opinions cited is granted, that present and projected dental school capacity cannot graduate enough dentists to maintain much less improve the present dentist-population ratio, a change must be made in our image of the dentist's functions in dental practice.

I cite one more authority because I particularly like the wording and the emphasis. This is Gerald D. Timmons, President of the American Dental Association and Dean of the College of Dentistry at Temple University, addressing the Interstate and Foreign Commerce Committee of the House of Representatives in support of H.R. 4999:

Within the dental profession there is an increasing concern over the problem of providing the quantity and quality of dental health care that a rapidly expanding and increasingly health conscious American public demands and expects. Through recently expanded programs in dental research and through other important developments, significant progress has been

made in controlling dental diseases and in extending the availability of dental care. Yet much more needs to be done.

At the present time, the shortage of dental manpower stands out as the most formidable barrier to continued progress in dental health. The capacity to produce dental personnel continues to be outrun by the growth in population and the increased demand for dental care (3).

Faced, therefore, with a rapidly expanding population and an increasing appreciation of the value of good dental care on the one hand, and a limited capacity for the education and training of dentists on the other, there is, as I see it, only one solution. The dentist must be trained, in school, to head a team consisting of a secretary-receptionist-bookkeeper, one or more chair assistants, one or more hygienists, and one or more technicians. To put it another way, the dentist must limit his own activities in dental practice to examination, diagnosis, treatment planning, surgery, treatment of the hard and soft tissues of the oral cavity, and the administration and supervision of a team of auxiliary personnel who will perform every other duty required in the conduct of a dental practice.

If this premise is correct, and it is the premise upon which this paper is based, some definite changes are indicated in our over-all objectives, in class scheduling, and in our dental education procedures with particular reference to curriculums, faculties, and teaching technics.

CURRICULUMS

Curriculum is a constant problem, especially in the field of biologic science. The accelerated pace at which the body of scientific knowledge is expanding makes frequent review and revision a necessity. With more to teach in a fixed time period the squeeze becomes enormous. What is the solution?

The following principles must govern our considerations:

1. Acknowledge that the objective of dental education is no longer to train the dentist to practice alone or with one assistant whom he trains himself. That instead, he must be trained as a diagnostician, a dental therapist, an oral surgeon, and an administrator. Further, that the auxiliaries whom he is to employ should be trained with him so that they may develop their inter-related skills as a team.

2. Constantly remind students, from freshman orientation to commencement, that their dental education is not complete at graduation. They must realize from the beginning that they must be con-

stant students, building upon the skeletal foundation which their school has barely had time to provide.

3. Classify all theoretical and technical subjects and subject matter as:

- a. Fundamental, basic and absolutely essential.
- b. Desirable, a filler to be placed between the fundamentals.
- c. Interesting, depth areas of special interest.

Guided by these principles, evaluate each subject and its subject matter. Retain or bring in that which is fundamental and leave the rest for post-graduate education.

Such an approach should result in a decreased emphasis on laboratory technics and a much greater emphasis upon oral diagnosis, treatment planning, the correlation of basic and clinical science, and practice administration including office planning, practice location and building, utilization of auxiliary personnel, patient education, case presentation, fee determination, accounting, insurance, records, etcetera.

It should also result in a decreased emphasis on the research that has established our present concepts in such subjects as physiology, pathology, dental materials, and so on. All that is needed for our basic training is a thorough knowledge of presently supported theory and a constant reminder that ours is a profession in the midst of rapid change; a reminder that we must continue to learn and be prepared to change with the growth in our knowledge and the alterations in our objectives.

FACULTY

The subject of faculties is undoubtedly a very sensitive one. It is, I am sure, a major problem with every dental school administrator. In all honesty, however, it must be conceded that herein lies our greatest weakness in dental education.

Re-evaluation of the criteria for selecting dental school teachers must be long overdue. Any dental school senior will advise one to avoid the teaching graduate of last year at all costs! It should have been obvious long ago that the mere possession of a D.D.S. or D.M.D. degree does not qualify one to teach. Teaching is a profession in itself. Successful teaching requires the application of the principles of educational psychology and specialized teaching technics.

Though it should not be changed, is it not ironic that kindergar-

ten teachers must meet the highest and most rigid requirements? And even the teachers of high school seniors are required to have majors in the subjects they teach plus a major in educational psychology and teaching methods. Their qualifications must be certified by an agency of the state. Only at the college and professional school levels have we abandoned the principle that teaching requires specialized training; that teachers, for the most part, are not born but made; that if the teacher does not teach, the student either will not learn or will learn only by his own application at a greatly retarded rate.

Merrill J. Shepro, formerly a member of the faculty at the College of Dentistry, University of Illinois, and the Walter Reed Army Institute of Research, in a paper presented at a "Seminar in Principles and Methods in Dental Education" at the University of Illinois said:

. . . The professional educator in dentistry is required to be well above the usual in professional dentistry, but he is not required currently to meet even minimum professional requirements in education.

. . . A study conducted by an educator (who is not a dentist) at a western school of dentistry revealed the need for educational training among dental teachers. Gillette reported four major findings:

1. A general tendency (among members of the teaching staff) to think of the curriculum as consisting of only the printed courses. . . .

2. An unawareness of the basic principles of educational philosophy. . . .

3. A limited knowledge of the philosophy of evaluation. Few instructors seemed able to separate 'grading' or 'marking' from the total process of evaluation.

4. A tendency to react to proposals for enrichment of the program by saying: 'There isn't enough time' . . . or 'It isn't practical' (4).

These findings indicate that there is a definite need for educational training for dental teachers; yet, little is actually being accomplished in this direction. Leading dental school administrators increasingly are making public statements to the effect that this kind of education would be desirable or should be necessary, but these words still seem a long way from translation into action. *The inertia of the status quo and the obedience paid to tradition appear yet to be formidable obstacles* (5). (Italics added.)

As further evidence of the need for educational training of dental school teachers, the following excerpts from the *Survey of Dentistry* are pertinent:

. . . of the graduate degrees that teachers have received, many were obtained in programs intended to prepare them for specialized practice, not for teaching. . . .

. . . every possible effort should be made . . . to develop more graduate programs intended to prepare teachers.

Fifty-three per cent of dental teachers are 39 years of age or less . . . (which) reflects a lesser maturity in some schools . . . (and) may also confirm the complaint of many deans that some young dental graduates serve as teachers during the formative years of their private practices and then resign to devote their entire time to practice.

. . . Almost two out of three dental teachers have had no more than ten years of teaching experience.⁶

As a result of these observations and findings the Survey Commission recommended that:

Dental schools improve the quality of their instruction by;

- a) Increasing the number of teachers employed.
- b) Raising the qualifications required for beginning teachers.
- c) Improving the teaching skills of present faculty members.
- d) Employing a larger proportion of teachers on a full-time basis.
- e) Employing part-time teachers generally on at least a half-time basis (7).

I not only concur in these recommendations, but would add the following:

1. That the implementation of recommendations (a) to (d) above should be on the basis of making dental school teaching a career, with specific teacher training as a requisite qualification.

2. That University Boards of Trustees must be persuaded that the salaries of career teachers in dentistry must be determined by what they could earn in private practice, not by what a Ph.D. in an academic subject might accept.

3. That some method must be found and employed to screen out of our faculties the complexed, the sadists, the pessimists, and the negativists. Teaching and leadership of young people should be done by people of character and integrity who can inspire by both precept and example. Russell S. Poor's keynote address to the Second Conference of Dental School Deans at Hollywood, Florida, in 1960 contained this significant paragraph:

Since strong qualified creative leaders are the key to success in all worthy ventures, the pressing responsibilities are to recognize qualities of leadership, to find potential leaders and to develop them. As representatives of the educational segment of one of the great health professions, yours is an especially significant responsibility in this great task. Your lives are dedicated to it. The raw materials with which you deal daily, your students, are the prime ingredients of the product the world is seeking (8).

As soon as we begin to adequately compensate our teachers with

both dollars and prestige, it is reasonable to expect that we may attract people who can and will develop, not destroy, leadership.

4. Finally, it is our conviction that dental school faculties must be under the administrative authority of the dean. The present practice in some schools of utilizing medical school professors to teach some of the basic science courses, such as gross anatomy and physiology, to dental school students is a laudable economy. In an *idealistic* society it would be both practical and wise. But until then the dental school dean should have complete control over the personnel, method and content of these courses.

TECHNIC

The history of dentistry is a story of rapid change. In a little over a hundred years an itinerant trade has become a respected profession. Moreover, the rate of change is accelerating.

Our dental school curriculums and teaching methods are attempting nobly to keep pace. (In this connection, Indiana has been in the forefront among dental schools in a forward-looking educational program. I cite the training courses for dental technicians and dental assistants in addition to the well established hygienist program.)

New tools, however, for more effective and more efficient teaching are constantly being developed. Among the most recent are the teaching machine, "programmed instruction," and closed circuit television.

While these are new tools, programmed instruction as a teaching theory is as old as the Greeks (9); the first patent for a teaching machine developed in this country was granted in 1866 (10). Its application to modern educational needs was stimulated by a behavioral psychologist, B. Frederick Skinner, of Harvard's Psychological Laboratories (11):

Skinner's machine was specifically designed to function as a teacher of students who have had no previous contact with the subject matter at all. Each student uses a machine, thereby coming into personal contact with the tutoring which has been written directly into the program.

Skinner comments,

This may suggest mass production, but the effect upon each student is surprisingly like that of a private tutor . . . (a) there is a constant interchange between program and student . . . the machine induces sustained activity. (b) Like a good tutor the machine insists that a given point be thoroughly understood . . . before the student moves on . . .

(c) like a good tutor the machine presents just that material for which the student is ready . . . (d) like a skillful tutor, the machine helps the student come up with the right answer. . . . (e) Lastly, of course, the machine, like a private tutor, reinforces the student for every correct response. . . . (Skinner, 1958, p. 971 (12).)

Foltz also puts it this way:

The Socratic or tutoring method of teaching, with or without the self-instructional device, carries certain benefits. A survey of classroom teaching revealed that the average student is actively engaged or interested in classroom activity only 20 per cent of the time. Programmed materials, which require continuous active response from the student, overcome passivity and inertia on his part. Studies at Harvard (Skinner and James Holland), the New York Collegiate School (Komoski), and in the Roanoke, Virginia (Dr. Allan Calvin) and Western Pennsylvania public school systems (Lumsdaine and Klaus of the American Institute for Research) indicate that learning time is decreased on the average of 50 per cent. Several of these programs have been tested for periods of a year or more. The results may be considered statistically accurate and free from any "novelty effect."

. . . By providing the student with immediate knowledge of the correctness of his answers, the well-programmed self-instructional device reinforces these answers and increases the student's learning rate considerably.

. . . As an individual tutor ready and willing to go as fast or as slow as the student desires, the self-instructional device has infinite patience. Intelligent students need no longer be bored or allowed to lose interest due to the slow progress of their class. They may progress as rapidly as they are able, and can be led into interesting educational byways, so that their time is not wasted while the rest of the class catches up to them. . . .

There are many more citations that might be made to suggest the potential benefits which these teaching aids might yield in dental education, but this should be enough to stimulate investigation and trial.

The third tool mentioned, while actually newer than programmed instruction and teaching machines, has already been utilized in dental education with impressive results—closed-circuit television. Its benefits in teaching technic courses to large groups has been so amply demonstrated that it would seem to require no further discussion. All that is needed is to overcome the inertia that blocks progress. For although it is expensive, it becomes economical when compared to the construction and staffing of new schools.

Remembering the basic premise upon which this paper is based, and considering the recently developed teaching aids for more rapid and more effective teaching, the following suggestions are made:

1. After a thorough curriculum review and revision has produced the list of subjects and the fundamental subject matter that must be

included, carefully program this material and present it by means of a suitable self-instructional device.

2. *Require* the learning of these fundamentals, and *only* these.

3. Test and grade on this basis. In too many cases the original reason for testing has been lost, and examination has become a bizarre and bitter game between the instructor and student. For example, a histological slide normally studied under one magnification may be placed under another for the test. Microscope adjustment is, of course, forbidden. There seems to be a widespread feeling among professors and their staffs that students must be kept humble and submissive by harsh grading and tricky questions.

It is my conviction that students should be taught and tested on the essential body of knowledge, and graded on the basis of 100, not on a curve.

The first stage in professional training must be indoctrination with fundamental principles and methods. Education can follow.

4. Let each student proceed at his own speed, and provide the more gifted student with advanced material from the list of desirable, but not essential, phases of the subject in question.

5. Teach technic courses by closed-circuit television which permits every student to observe as well as hear. Small details such as finger positions, a shiny spot on a casting or clasp, a bit of vaseline here or the smoothing stroke of a moistened finger there, will often make the difference between success and failure in a technical procedure. These courses obviously should be carefully programmed in advance, but of equal importance is the fact that the instructor should be one who continuously vocalizes his thoughts and actions as he proceeds.

Faced with too much subject matter and too little time, we can no longer afford the luxury of allowing every student to experience avoidable pitfalls and mistakes.

6. It is my conviction that all technical work should be done in the school, during school hours, under faculty supervision. It is my understanding that this once was the case. Perhaps it still is in some schools. But in at least five schools here in the Midwest, students are urged and expected by the school to either set up their own laboratories or arrange for access to one. Most of us, throughout the four years, average about 25 hours a week doing technical work outside and after school hours.

This is wrong. I suggest the following reasons:

a) The proper type of faculty supervision would protect us against many time consuming, frustrating mistakes.

b) If we are to be trained as dentists, as defined in our basic premise, we need a larger portion of our after school hours for didactic study.

c) Many students cannot afford proper laboratory facilities. They waste too many precious hours working with inadequate equipment, or seeking something better.

d) The technicians with whom we should be trained to work should be doing a portion of this work, and under supervision.

7. Clinical instructors should be provided who are *constantly available*. The time lost by students waiting, standing in line, or searching the building for an instructor is appalling. This is another evidence of the need for career teachers, who are trained and dedicated. (If they could also be non-smokers, it would help.)

8. Our basic premise cannot be fully implemented until every dental school simultaneously trains dentists, hygienists, certified dental assistants, and certified dental technicians. In the basic technic courses, dental students and dental technicians should be trained together. By the senior year the dental student should be working as the head of the team, learning to utilize the assistance of the other three, while they each learn their duties in the team set-up.

9. Finally, the dental school has a responsibility to teach students that they will be more effective dentists if they will learn to balance their work with the correct proportion of play, love, and worship; that the preservation of their mental and physical health—their hands, legs, eyes, and backs—depend upon their willful and skillful balancing of these factors.

In their chosen communities, dentists have an obligation to be not only skillful practitioners, but good citizens. Their work should therefore be done with a team, in a normal working day. They cannot spend half the night at a lab bench and still have dependable care, skill and judgment at the chair the next day. We believe that these principles should be taught and encouraged throughout the four dental school years.

SUMMARY

The nation's need for good dental care is growing at an accelerating pace, due to the combined effect of a rapidly growing popula-

tion and an increasing demand for dental service. The challenge thus posed to our dental educational system can, in my opinion, only be met in time by quickly adjusting our dental curriculums, our faculties, and our teaching technics to harmonize with a new objective. That objective must be to train the dentist to head a team which will relieve him of every duty except those which *only* a trained dentist can perform.

To achieve this objective, dental school administrators must be willing to wipe away inertia, tradition and complaisance; to fight for adequate salaries; set up teacher education requirements; and to innovate in the fields of curriculum and teaching methods. At stake is dentistry's standing as a profession, which meets the challenge of its responsibility!

REFERENCES

1. Mann and Easlick. Practice Administration for the Dentist. St. Louis: C. V. Mosby Co. 1955, p. 68.
2. Survey of Dentistry. Final Report of the Commission on the Survey of Dentistry in the United States. Washington, D. C., American Council on Education. 1960, pp. 78-80.
3. American Dental Association. Reports of Councils and Bureaus. J.A.D.A. 64:110/556, April 1962.
4. Gillette, B. Frank. An adventure in curriculum study. J. D. Educ. 18:213-18, November 1954.
5. Shepro, Merrill J. In-service education of dental teachers. J. D. Educ. 25:87-9, March 1961.
6. Survey of Dentistry. op. cit. p. 303.
7. Ibid. p. 310.
8. Poor, Russell S. The social, economic, and political responsibilities of a health profession. J. D. Educ. 25:23, March 1961.
9. Foltz, Charles I. The world of teaching machines. Washington, D. C. Electronic Teaching Laboratories. 1961. p. 3.
10. Deterline, Wm. A. An introduction to programmed instruction. Prentice-Hall, Inc. Englewood Cliffs, N. J., 1962, p. 9.
11. Foltz, op. cit. p. 3.
12. Deterline, op. cit. pp. 12-13.

How Can Dental Education Methods Be Improved?

FRANK H. LOVELL, D.D.S.

The question "How can dental education methods be improved?" is asked today just as it was asked over a hundred years ago. Efforts toward the solution of this problem have improved dental educational programs, but the need for improvement still exists. Dental educators, practicing dentists, dental societies, and dental students recognize the importance of progress in dental education. Continuing interest will result in modifications essential to the maintenance of high standards of dental health for the people of this country and the world.

Education methods can be considered in the narrow sense, in terms of methodology. Conversely, the concepts can be broadened to include other facets which are crucial to dentistry. These include: student recruitment, student financial needs, predental preparation, refinement and expansion of the Dental Aptitude Testing Program, dental curriculum, attentiveness to constructive dental student criticisms, teacher outlook, and clinic policy. Comments germane to the improvement of dental education in each of these facets follow. It is in these areas that one finds the challenge. Each item suggests a method which can be used to improve and advance dental education.

STUDENT RECRUITMENT

Dentists, dental schools, and dental organizations must work together to recruit students who will be an asset to dentistry. Highly qualified students are sought by many professions. Career decisions are influenced by parents, friends, high school teachers, counselors, and college advisors. The vast majority of these people have little or no knowledge of the opportunities available to the dental graduate. This deficiency must be overcome. The practicing dentist in his office must educate parents; he must also directly influence high school

Class of 1963, The University of Alabama Dental School.

This essay tied for second place in the 1963 Writing Award Competition of the American College of Dentists. A plaque and \$50.00 (half of the second prize money) were given to Dr. Lovell.

students. Local dental societies should work closely with high school teachers, counselors, and parent-teacher organizations. State dental associations and particularly dental schools would do well to keep college advisors well informed. An understanding of dentistry by all these individuals associated with vocational guidance would prove invaluable in achieving a successful dental recruitment program.

There is a need for helping dental students finance their education when they have no other means at their disposal. Those who are interested in studying dentistry as a career usually undergo a self-screening process (1). Generally, only those who can financially afford a dental education will apply for admission. The existing scarcity of loan funds and scholarships is discouraging. This probably results in many well motivated, highly qualified students eliminating themselves from a career in dentistry.

Additional loan funds and scholarships must be created. These should aid dental students defray the cost of their education. Federal moneys can do much toward alleviating this problem. However, this should not be the only answer. A less socialistic and more desirable method involves the use of private capital. There are persons within each city, county or state who, individually or collectively, could create loan funds and scholarships. These individuals must be contacted and convinced of the need and propriety of investing their money in dental education. Organizations such as The American College of Dentists or The Fund for Dental Education could undertake such a venture. This would, indeed, be a real recruitment effort.

PREDENTAL PREPARATION AND THE DENTAL APTITUDE TESTING PROGRAM

Students must gain a broad education prior to entering dental school. Concurrently, admission requirements must be fulfilled. The Council on Dental Education requires a minimum of two years predental study with fixed requirements in certain courses. Students must have college training which prepares them for dental school. But there is an additional need for sound general education at the college level. The graduating dentist should be better prepared to take an active part in community affairs; he must understand people more fully; he must be conversant with subjects unrelated directly to dentistry and science.

Those individuals who establish predental requirements should be

cognizant of these needs and should reorient predental requirements. The effectiveness of dental education will be improved when superior students enroll in dental school. The status of the profession relates directly to the quality of the graduating senior. Perhaps two years predental training is insufficient (2).

The Dental Aptitude Testing Program conducted by the Council on Dental Education of the American Dental Association has proved successful. Unfortunately, it is oriented entirely toward the applicant's scientific knowledge and technical ability. It makes no effort to evaluate personal characteristics; it fails to separate individuals on a basis of personality traits. Such traits influence the practice of dentistry; they should be known when a person is accepted into dental school.

The techniques of satisfying the latter need have not been well established. One wonders, however, why some form of an experimental psychological testing program could not be initiated with the idea of correlating answers with the individual's performance five, ten, and fifteen years in the future. A long range program of this type could quite possibly result in a qualitative addition to the aptitude testing program.

It has already been suggested that there may be some need for increased predental training. There is no objective information to establish a relationship between increased predental training and greater cognizance of community needs and better citizenship. However, an expansion of the Dental Aptitude Testing Program along the suggested lines could be one means of establishing these data.

CURRICULUM

Dental school curriculums have changed. They will continue to change in the future. The areas of modification will be crucially important to dental education and to the elevation of dentistry's standing in the community. Two aspects of the curriculum will be considered: standardization and the basic sciences.

Standardization. The Council on Dental Education of the American Dental Association has proposed certain specifications to be used by dental school administrators in planning their instructional programs. However, it has not attempted to require dental schools to follow their dictates without variation. Dental schools are free within reasonable limits to add or to delete courses, to adjust the number

of clock hours, and to arrange the sequence of subjects as the faculties think best.

This practice of self-determination has produced a variety of curriculums. In planning their program of instruction, deans and teachers naturally have been influenced by their own backgrounds, experience, and by peculiar predilections. Since these facets differ widely, it is not surprising that 48 different curriculums are now to be found in as many dental schools.

Even though the dental schools operate under different circumstances (3), it should be possible to standardize curriculums somewhat more than is done at present. Such standardization measures (excluding curriculum experimentation) are desirable, if not carried to an extreme. They would improve dental education and make the graduate more knowledgeable of all areas of general dentistry. No graduate should be a pseudo-specialist in any field of dentistry nor should he be unfamiliar with any area of general dentistry simply because an important aspect of the curriculum at the dental school he attended was weak.

Basic sciences. All who complete their dental education will acknowledge the importance of the basic sciences. The reasons for such acknowledgment will vary from person to person. Importance ordinarily is attached to the basic sciences because of their application to clinical practice. The basic sciences add to professional stature; without them the profession would soon acquire a trade status.

Today there is considerable time expended in studying these sciences. As research reveals more information and didactic material continues to increase, it is important to realize that the new material cannot continue to be added without deleting something or revising the curriculum (4). Revisions and deletions are advantageous and continually necessary.

These sciences should not be taught in toto as isolated entities. This type of teaching necessitates considerable time and causes the student to lose sight of each subject's important relationship to other disciplines. The basic sciences should be taught as foundations on which to build. Each dental class includes individuals who will practice general dentistry; some will practice a speciality; a few will teach clinical dentistry, and an occasional graduate will elect to carry on research or to teach a basic science (5). The basic science program should be comprehensive enough to serve as a foundation for *further*

development of all these individuals; it need not be as detailed as some basic science instructors suggest.

STUDENT CRITICISMS

Dental students always have criticisms of their education. Some criticisms are constructive; others are not. Constructive criticisms, if recognized and acted upon, would improve dental education. Among those criticisms (6) are poor organization of study manuals, overlapping and repetition of course content, ineffective lecture presentations, subjective methods of grading, and a lack of an established relationship between some courses and clinical dental problems. Undoubtedly, these constructive criticisms are harboured more often than voiced.

Dental educators could improve dental education by recognizing student criticisms, evaluating them, and acting accordingly. Many dental schools have devoted a number of faculty meetings each year to this problem. Some dental schools which are attentive to recognizing student criticisms have added persons with special education in teaching methods to their faculties. Attention should be paid to constructive criticisms which students submit if dental schools are to avoid perpetuating certain intrinsic imperfections.

TEACHERS

The dental educational program includes various topics and many teachers. The methods which these teachers employ play an important role in dental education.

The Socratic method. More use of the Socratic method of teaching is recommended. Here the teacher draws out the student. He has him answer his questions. He is sympathetic, realizing that the student is a neophyte who is there to learn and not to be scolded. Contacts between students and teachers are marked by informality and warmth. There is a free and easy interchange of ideas and concepts. There is no place for a faculty member who uses the students to inflate his own ego (7). A tug-of-war between student and teacher in dental education, or in any educational discipline, should not exist.

Dental school teachers should use more clinical demonstrations in their teaching. This method is perhaps the last remaining vestige of preceptor-apprentice training. It has shortcomings as an exclusive method of teaching dentistry, but it is an excellent supplementary

method (8). It is one thing to be told how a technic should be carried out and another to see the method demonstrated.

Teacher training. Faculty members should have a scientific approach in all their teaching. They must be imbued with such an outlook if dentistry is to succeed in motivating superior students. Those lecturing on clinical dental subjects should be knowledgeable of related systemic factors included in other courses (9). Current concepts and recent research data must be included in lecture presentations. Such knowledge is then made more clear and meaningful to the dental student.

Procurement of qualified teachers is a critical problem confronting all dental schools; qualified teachers are difficult to find. This is due primarily to the scarcity of centers where a person can be prepared for a career in dental teaching (10). More graduate educational centers designed specifically to produce qualified dental teachers are needed. The establishment of such centers would produce capable teachers who, in turn, would improve the effectiveness of dental education through superior teaching.

In order to interest more qualified people in teaching careers, the remunerative aspects of teaching must be made more comparable to those of private practice. There is ample evidence that dental teachers are underpaid and overloaded with teaching and administrative duties. They have little time for self-improvement, preparation for teaching, or research. Salary and non-contact teaching hours are important to the teacher. His demands should be at least as well satisfied as are those of the laborer; the latter has his union to defend him.

CLINIC POLICY

No one would deny that the clinics, appearing late in dental education, have a profound influence upon the outlook of the student. Irrespective of what has been taught previously, it is in the clinic that the student begins to form more mature judgments and to evaluate the practical worth of the knowledge and ideals which previously had been accepted at face value. Those judgments reflect faculty attitudes in setting policy, atmosphere, and intellectual tenor of clinical practice (11).

Many years ago the view prevailed that success in the study of clinical dentistry was dependent on motor activity. This prompted organization of quantitative requirements. The student was made

to fulfill a stated number of operations in the various clinical fields. These quantitative specifications offer certain advantages, such as insuring experience in a variety of clinical problems. However, such requirements should not be excessive. If unrealistic requirements prevail, students will be interested only in performing solitary jobs. Learning may or may not have occurred during this motor activity. Excessive, unrealistic requirements destroy interest and initiative; they misdirect the student's effort. As with the basic sciences, clinical demands must be tempered with wisdom.

Clinics should be effectively organized so that the patient's individuality is considered and treatment in its entirety is assured. Certain mechanics in clinic organization, such as lack of clinic time and unrealistic requirements, may coerce the student into overlooking the patient's individuality and into neglecting his responsibility of total-patient treatment. Dental students frequently lose sight of the complete individuality of each patient. They often fail to appreciate fully that the dignity of the individual is a reality, and ethical implications are inherent in all facets involved in his treatment.¹¹ The need for emphasizing the importance of total-patient treatment and all it implies has already been widely accepted in dental education. Implementation of this concept, however, has progressed slowly.

SUMMARY

Dental education methods and considerations concerning their improvement have been considered in a broad context rather than in terms of methodology per se. Much can be done to improve dental education. Methods which can be employed involve concepts relating to student recruitment, student financial needs, predental preparation, the re-orientation of the Dental Aptitude Testing Program, further attention to the dental curriculum, cognizance of student criticisms, and increased attention to teacher training and clinic policy. No doubt there are other facets of dental education which also can be used as methods for improving dental education. Those cited, however, are of paramount importance and if implemented will contribute at least a partial answer to the question, "How Can Dental Education Methods Be Improved?"

REFERENCES

1. Mann, William R., and Parkin, G. The dental school applicant. *J. D. Educ.* 24:18, March 1960.

2. O'Rourke, John T., and Miner, M. S. Dental education in the United States. Philadelphia, W. B. Saunders Co., 1941, p. 91.
3. Fleming, William C. Public relations, alumni, and recruitment. *J. D. Educ.* 24:116, June 1960.
4. Muhler, Joseph C. Preventive dentistry at Indiana University. *J. D. Educ.* 24:179, June 1960.
5. Hine, Maynard K. Correlation of the teaching of endodontics with the biologic sciences. *J. D. Educ.* 22:124, March 1958.
6. Hollingshead, Byron S. Philosophic problems of dentistry—1959. *J. D. Educ.* 24:151, June 1960.
7. Noyes, Harold J. Operational principles and problems of the dental school. *J. D. Educ.* 24:109, June 1960.
8. Grossman, Louis I. Methods of teaching endodontics at the undergraduate level. *J. D. Educ.* 22:133, March 1958.
9. McCracken, William L. The importance of internal medicine to prosthodontics. *J. D. Educ.* 24:65, March 1960.
10. Blackerby, Philip E., Jr. How do we secure qualified teachers? *J. D. Educ.* 22:332, November 1958.
11. Fisher, Alton K. The indoctrination of dental students with a professional attitude. *J. D. Educ.* 24:39, March 1960.

MORE M.D.'S

The number of students admitted by American medical schools has increased in 1962-63, continuing a trend of expanding medical education, the Association of American Medical Colleges said last week. The total accepted during the year was 8,959, an increase of 277, or 3.2 per cent over the previous year. Ten years earlier, the total admissions were 7,778. But more significant than the increase in enrollment is the fact, that, for the first time since 1956, the total number of applicants has been gaining, thus reversing a trend that might have seriously depressed the quality of medical students. The increase in applicants in 1962-63 was significant: 1,466, or 10.2 per cent over the previous year.—*New York Times*, Sept. 8, 1963.

Dentistry—A Health Profession

KENNETH A. EASLICK, A.B., D.D.S., A.M.

It is disturbing to all practitioners of dentistry to find that a number of people, engaged in a variety of activities, including the other health professions, still question at times that dentists provide services to maintain and improve health. Since the impression seems to persist to some extent that the practice of dentistry is a mechanical art only, a review of the contributions of the dentist to health appears appropriate.

As a background for such a review, it should be noted that the profession of dentistry currently is interested in the maintenance of "positive health" (prevention) as well as the elimination of "negative health" (control and repair of damaged oral tissues and interference with oral maldevelopment). Furthermore, oro-systemic impacts may operate in either direction, from a focus in the oral cavity to the rest of the human body or from a focus in any extra-oral tissue, organ or system to the oral cavity. Finally, consideration of the conditions that have to be treated in the oral cavity shows that their treatment may be divided logically into four areas of professional contributions: (1) elimination of pain and infection, (2) restoration of function, (3) improvement of appearance in order to reduce emotional stress, and (4) development of dental epidemiological measurements. The specific conditions treated and the services performed by dentists are presented briefly.

DENTAL CARIES

Dental caries, by virtue of its widespread prevalence and progressive characteristics, leads to acute pain, extension of infection, loss of teeth, and reduction of masticatory efficiency. The dentist's contribution to the control of this bacterial disease is prevention, early detection, and restoration of carious lesions.

PERIODONTAL DISEASE AND DEGENERATION

The prevention, early detection, and treatment of diseases of the supporting tissues of teeth are necessary for optimum health. Persons

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with untreated periodontal disease are known to experience extensive infection, discomfort, pain, and even malaise. The oral odors accompanying loss of periodontal tissues are a frequent cause of social embarrassment. The scientific evidence is meager, but the impression is general, that loss of masticatory function, when supporting tissues are damaged and teeth are lost, leads to an undesirable selection of foods. Vincent's disease (necrotising ulcerative gingivitis) can be treated and thoroughly eliminated by one person only, the dentist.

MALOCCLUSION

The impact of malocclusion on a person's health has been defined as the existence of those dentofacial deformities which threaten the health efficiency or appearance of the dental mechanism. Existing irregularities, or the potential for the development of deleterious irregularities as a person matures, demand variable treatment, ranging from the supervision of simple interceptive devices to the preparation and supervision of comprehensive, time-consuming appliances. Malocclusion may result in injury to the supporting tissues, serious interference with mastication and disturbing emotional reactions in certain types of individuals.

SEQUELAE OF TRAUMATIC EXPERIENCES

The injuries sustained by the teeth and oral tissues from mechanical violence are frequent and variable in character. Pain, the introduction of microorganisms through lacerated tissues, fracture and displacement of the bony arches and teeth, and some degree of shock commonly accompany accidents experienced by the oral region. The dentist, because of his specialized knowledge of occlusion, morphology, and technics of treatment, provides a valuable contribution to the treatment of traumatic episodes. His development of protecting devices to be used by athletes has reduced to some extent the number of serious accidents suffered by the teeth of young, athletic persons.

PREVENTION AND ELIMINATION OF FOCI OF INFECTION

The dentist has to be concerned about oral infections at all times because of the possibilities that exist for the local extension of infection and the bacterial invasion of the blood-stream. Aseptic technics, the sterilization of instruments and syringes, pre- and postmedication, the treatment of acute swelling, the diagnosis of surgical risks, and the confirmation of elimination of bacterial invasion of root-canals all have to be mastered by the dentist as a student.

DETECTION AND TREATMENT OF DENTAL ANOMALIES

Although the prevalence of anomalous conditions of the teeth is not high, the skill and time required of the dentist to detect and treat some of the bizarre dental anomalies is tremendous. These anomalies have been classified as those conditions, probably genetic, which (1) affect the position of teeth and the orderly exchange of the primary for the permanent dentition, (2) the number of teeth, (3) the shape of teeth, and (4) the texture of teeth. Such syndromes of development as ectodermal dysplasia, dentinogenesis imperfecta, amelogenesis imperfecta, ankylosis of teeth, ectopic eruption of teeth, and fluorosed enamel will serve as illustrations of conditions which require thoughtful diagnosis and suitable treatment.

Recent research indicates that a possibility exists of associating the defects of the enamel of teeth with the periods of gestation in which deprivation, disease, or toxic activity were experienced by the mother.

DETECTION OF ORAL CANCER

A study of the United State Public Health Service, published in 1955, cites an approximate prevalence of 5 per cent of all human cancers to the lips and oral cavity. Inasmuch as the dentist who recalls his patients regularly can capitalize on a strategic situation for the early detection of neoplasms and precancerous lesions, the Public Health Service has appropriated funds for the continued education of dentists in detecting neoplastic disease and securing biopsies of oral tissues. The dentist has assumed a place in the "cancer team" for surgery, for maintaining oral hygiene during treatment, and for the construction of prosthetic appliances that minimize postoperative disfigurement.

DISTURBANCES OF THE TEMPOROMANDIBULAR JOINT

The extent of disturbances of the temporomandibular joint is difficult to estimate precisely but the condition is irritating, painful at times, and it interferes seriously with mastication. Whenever occlusal adjustment or surgical interference are decided as treatment, the skills of the dentist become important.

IRRITATION OF THE NERVES OF THE ORAL REGION

Although irritation of the cranial nerves that supply the oral cavity and associated structures constitutes a problem met in dental treat-

ment, the irritations of the fifth nerve which produce trigeminal neuralgia are an important and particularly troublesome concern of the dentist. The impact on the emotional stability of the patient is intense.

EDENTULISM

The lack of teeth, from failure of development, from neglect of cavities or supporting tissues, from trauma, or from premature exfoliation, creates a number of problems which have implications for health. Readjustment of occlusion, temporary maintenance of space, replacement, and design of prostheses that will maintain bony support of the remaining teeth, all have a direct impact on the physical and emotional health of numerous individuals.

REHABILITATION OF HANDICAPPED PERSONS

As the importance of properly functioning oral structures became evident, improvisation of approaches and technics for many types of handicapping conditions had to be developed by dentists. A list of the handicapping conditions will serve to illustrate the problems that have to be treated. Oral clefts, micrognathia, abnormalities of speech, cerebral palsy, epilepsy, inferior mental capacity, crippling defects of the spine or extremities, muscular dystrophy, hemophilia, and institutionalized patients (chair-bound, bed-bound, and room-bound individuals)—the aged and the tuberculous persons—provide the problems which have necessitated the development of special equipment and sophistication of the dentist in the procedures of the surgery-rooms of the local hospital.

CONTRIBUTION TO EPIDEMIOLOGICAL METHODS

Probably one of the outstanding achievements of epidemiology during this century has been the study of dental fluorosis. Its resultant technic of fluoridating drinking water has provided the most effective preventive measure now available for the control of dental caries. The indexes developed by dentists for the assessment of dental caries are precise and objective. Indexes are being developed rapidly for similar measurement of malocclusion, periodontal disease, and the staining of teeth.

Changes in Constitution and Bylaws

AMERICAN COLLEGE OF DENTISTS

The Secretary, in accordance with the requirements of the Bylaws, advised the membership on April 26, 1963, that the Board of Regents will ask the consideration of certain changes in the Constitution and Bylaws at the Sunday morning meeting of the College, October 13, 1963, at Atlantic City.

This was published in the June 1963 issue of the JOURNAL. It is brought to your attention again. The proposed changes are as follows:

The Board of Regents will recommend that Article II, Section I of the Constitution of the American College of Dentists, which now reads:

ARTICLE II. PURPOSES AND OBJECTIVES

Section I. The purposes and objectives of the College are as follows:

- a. To promote the ideals of the dental profession.
- b. To advance the standards and efficiency of dentistry.
- c. To encourage graduate studies and continuing educational effort by dentists.
- d. To encourage, stimulate and promote research.
- e. To improve public understanding and appreciation of oral health service.
- f. To encourage the development and use of measures for the control and prevention of oral disorders.
- g. To cooperate with other groups for the advancement of professional relationships in the interest of the public.
- h. To recognize meritorious achievement, especially in dental science, art, education, literature, and human relations by conferring Fellowship in the College on those persons properly selected to receive such honor.

be changed to read:

PREAMBLE

The American College of Dentists, in order to promote the highest ideals of the dental profession, advance the standards and efficiency of dentistry, develop good human relations and understanding with the public, and extend the benefits of dental health services to the great-

est number, declares and adopts the following principles and ideals as ways and means for the attainment of these goals:

- a. To encourage qualified persons to consider a career in dentistry so that the public may be assured of the availability of dental health services now and in the future;
- b. To urge broad preparation for such a career at all educational levels;
- c. To encourage graduate studies and continuing educational efforts by dentists;
- d. To encourage, stimulate, and promote, dental research;
- e. To urge the development and use of measures for the control and prevention of oral disorders;
- f. To improve the public understanding and appreciation of oral health service and its importance to the optimum health of the patient through sound public dental health education;
- g. To encourage the free exchange of ideas and experiences in the interest of better service to the patient;
- h. To cooperate with other groups for the advancement of interprofessional relationships in the interests of the public;
- i. To urge upon the professional man the recognition of his responsibilities in the community as a citizen as well as a contributor in the field of health service; and
- j. To encourage individuals to further these objectives, and to recognize meritorious achievements and potentials for contributions to dental science, art, education, literature, human relations, and all the other areas that contribute to the welfare and the promotion of these objectives; by conferring Fellowship in the College on such persons properly selected to receive such honor.

The Board of Regents will also recommend that Section IV of Article I of the Bylaws be amended to change the first sentence of said Section to read:

"A nomination must be presented, on a fully executed copy of the official nomination form, to the Secretary of the College before *March 1st.*" . . .

Book Reviews

ORAL SURGERY. By Kurt H. Thoma, D.M.D. 4th Edition. 2 Vols. both with index. St. Louis: C. V. Mosby Co. 1963. \$44.50.

In this 4th edition, the author has added the latest developments in the field of oral surgery. The new chapters, "Bioanatomy" and "Microbiology," result in a more complete text. This book is an excellent reference for both student and practitioner.

Photographs and illustrations are used widely to complete the text material; these reproductions are of good quality. The excellent color plates by Dr. Frank Netter contribute quality to the discussion of anatomy. Also, color is used to good advantage in illustrations throughout the text. The photomicrographs are of great benefit to the careful reader.

The chapter on microbiology adequately discusses this important phase of dental practice. This is complemented by the chapter on pharmacology which includes the description and dosage of antibiotics and chemotherapeutic agents. By using case reports, the author enables the reader to evaluate more readily and to appreciate the surgical techniques described.

Each volume has a complete table of contents and index which is of considerable value to the searching reader. The entire text has been divided into ten parts with sub-chapters in each part.

Oral Surgery remains the outstanding text in the field; this edition is up-to-date in all areas. It is still the most complete and concise reference available.

William R. Wallace, Columbus, Ohio

SELECTED READINGS IN CROWN AND BRIDGE

PRACTICAL CROWN AND BRIDGE PROSTHODONTICS. By Wyman H. Wilson, D.D.S. and Robert L. Land, D.D.S. 254 pp. New York: McGraw-Hill Book Co., Inc. 1962. \$14.50.

FULL ARCH FIXED ORAL RECONSTRUCTION—SIMPLIFIED. By Leonard I. Linkow, D.D.S. 336 pp. New York: Springer Publishing Co., Inc. 1962. \$17.50.

CROWNS. By S. Charles Brecker, D.D.S. 495 pp. Philadelphia: W. B. Saunders Co. 1961. \$16.00.

CLINICAL PROCEDURES IN OCCLUSAL REHABILITATION. By S. Charles Brecker, D.D.S. 326 pp. Philadelphia: W. B. Saunders Co. 1958.

PRACTICAL PROCEDURES IN ORAL REHABILITATION. By Ernest R. Granger, D.D.S. 306 pp. Philadelphia: J. B. Lippincott Co. 1962. \$18.50.

MODERN PRACTICE IN CROWN AND BRIDGE PROSTHODONTICS. By John F. Johnston, D.D.S., Ralph W. Phillips, A.B., M.S., and Roland W. Dykema, D.D.S. 420 pp. Philadelphia: W. B. Saunders Co. 1961. \$12.00.

THEORY AND PRACTICE OF CROWN AND BRIDGE PROSTHODONTICS. By Stanley D. Tylman, A.B., D.D.S., M.S. and Stanley G. Tylman, B.S., D.D.S. 4th edition. 1063 pp. St. Louis: C. V. Mosby Co. 1960. \$17.50.

MINOR TOOTH MOVEMENT IN GENERAL PRACTICE. By Leonard Hirschfeld, D.D.S. 332 pp. St. Louis: C. V. Mosby Co. 1960. \$12.00.

PERIODONTAL THERAPY. By Henry M. Goldman, D.M.D., Saul Schluger, D.D.S., Lewis Fox, D.D.S., and D. Walter Cohen, D.D.S. 2nd Edition. 656 pp. St. Louis: C. V. Mosby Co. 1960. \$18.75.

These nine books, some recently published and some a few years old, would be a good library for the dentist whose practice today includes more and more the construction of crowns and bridges.

The success of a fixed prosthesis depends so largely on the health of the supporting tissue structures that a book such as Goldman's must be listed. There is a wealth of information here for the crown and bridge practitioner; the recognition and management of periodontal problems must be well understood.

Likewise, the inclusion of Hirschfeld's text on minor tooth movement is considered necessary. Many of the orthodontic procedures described here may be used to great advantage prior to the construction of a fixed prosthesis.

The importance of the role of both the periodontist and the orthodontist in this area of prosthodontics cannot be overly stressed.

No list of readings in crown and bridge would be complete without Tylman's text; this is the best general reference available. Detailed technics and descriptions of the many procedures in bridgework construction, some simple some involved, some new some old, also will be found more than adequately presented by Brecker, Johnston, Wilson and Land. Here are outlined practically all of the routine, everyday methods in the fabrication of a fixed partial restoration.

Granger and Linkow consider full mouth reconstruction and dental rehabilitation from a broad viewpoint. The total treatment principles and procedures they describe will be useful in solving many of the problems arising in the field of what has been sometime designated as "complete oral rehabilitation."

All in all, these several books contain many a "nugget" waiting to be picked up by the crown and bridge prospector. Any one of these texts, or all of them for the more ambitious fixed prosthodontist, will make for interesting Fall and Winter reading evenings.

T. F. McBride

BOOKS RECEIVED AND CONTENTS NOTED

- PRINCIPLES OF DENTAL PUBLIC HEALTH.** By James Morse Dunning, D.D.S., M.P.H. 543 pp. Cambridge, Mass.: Harvard University Press. 1962. \$11.00.
- CLINICAL APPLICATION OF THE TWIN-WIRE MECHANISM.** By Paul Geoffrion, B.A., D.D.S. 227 pp. Paris: Julien Prelat, Editeur. 1962. 46 NF.
- MATERIALS IN DENTISTRY.** By Richard H. Roydhouse, B.D.S. 210 pp. Chicago: Year Book Medical Publishers, Inc. 1962. \$4.75.
- MANAGEMENT OF TEMPOROMANDIBULAR JOINT PROBLEMS.** By Arthur S. Freese, D.D.S. and Paul Scheman, B.S., D.D.S. 235 pp. St. Louis: C. V. Mosby Co. 1962. \$8.50. (The Postgraduate Dental Lecture Series.)
- FRONTIERS OF DENTAL SCIENCE.** Edited by George C. Paffenbarger and Sholom Pearlman; activities by Walter R. Brown. 160 pp. New York: Scholastic Book Services. 1962. \$0.50. (This is a "Vistas of Science Book" produced by the National Science Teachers Association in cooperation with the American Dental Association.)
- HANDBOOK OF MEDICAL SOCIOLOGY.** By Howard E. Freeman, Sol Levine, and Leo G. Reeder. 602 pp. Englewood Cliffs, N. J.: Prentice-Hall, Inc. 1963. \$8.25.
- DENTISTRY AS PERSONAL SERVICE.** By J. Lewis Blass, Ph.G., D.D.S. 153 pp. Philadelphia: J. B. Lippincott Co. 1963. \$6.50.
- HOW TO PRACTICE SUCCESSFUL DENTISTRY.** By Geoffrey Marks, M.A. 204 pp. Philadelphia: J. B. Lippincott Co. 1963. \$7.50.
- CLINICAL DENTAL HYGIENE.** Edited by Shailer Peterson, B.A., M.A., Ph.D. (with 16 contributors and 7 advisors). 2nd Edition, 356 pp. St. Louis: C. V. Mosby Co. 1963. \$7.00.
- PARTIAL DENTURES.** By Louis G. Terkla, D.M.D. and William R. Laney, B.S., D.M.D., M.S. 3rd Edition, 374 pp. St. Louis: C. V. Mosby Co. 1963. \$11.50.
- HANDBOOK OF ORTHODONTICS.** By Robert E. Moyers, D.D.S., Ph.D. 2nd Edition, 599 pp. Chicago: Year Book Medical Publishers, Inc. 1963. \$11.00.
- DENTIST'S HANDBOOK OF OFFICE AND HOSPITAL PROCEDURES.** By Saul Levy, B.S., D.D.S. 311 pp. Chicago: Year Book Medical Publishers, Inc. 1963. \$4.00.
- YEAR BOOK OF DENTISTRY.** Edited by Stanley D. Tylman, A.B., M.S., D.D.S.; Donald A. Keys, A.B., D.D.S.; Robert E. Moyers, D.D.S., Ph.D.; John W. Knutson, D.D.S., Dr. P.H.; Hamilton B. G. Robinson, M.S., D.D.S.; and Carl W. Waldron, M.D., D.D.S. 479 pp. Chicago: Year Book Publishers, Inc. 1963. \$7.50.
- DENTAL EXAMINATION REVIEW BOOK.** (Vol. 1—Oral Pathology, Oral Roentgenology, Periodontics). By Alvin F. Gardner, D.D.S., M.S., Ph.D. 222 pp. Flushing, N. Y.: Medical Examination Publishing Co. Inc. 1963.
- ACCEPTED DENTAL REMEDIES:** 28th Edition, 212 pp. Chicago: American Dental Association. 1963. \$3.00. (Edition sold out April 1963.)

Convocation Program

OCTOBER 12 AND 13, 1963
CHALFONTE-HADDON HALL HOTEL
ATLANTIC CITY

SATURDAY

Vernon Room, Haddon Hall

AFTERNOON MEETING—2:00 O'CLOCK

THE IMAGE OF DENTISTRY

Presiding

Philip E. Blackerby, D.D.S., M.S.P.H., President, American College of Dentists

Moderator

Walter J. Pelton, B.S., D.D.S., M.S.P.H., Professor of Dentistry, University of Alabama, School of Dentistry, Birmingham, Ala.
"Lessons for Dentistry From Higher Education"

John S. Millis, Ph.D., LL.D., L.H.D., Litt.D., President, Western Reserve University, Cleveland, Ohio
"An Editor Looks at Dentists"

Martin S. Hayden, A.B., Editor, *Detroit News*, Detroit, Mich.
"The Concept of a Consumer on the Image of Dentistry"

Mrs. Goldie Krantz, B.A., Staff Analyst, Group Health Association, Washington, D. C.

Question and Answer Period

SUNDAY

Carolina Room, Chalfonte Hotel

MORNING MEETING—9:00 O'CLOCK

Invocation

Rabbi Harry Jolt, B.A., D.H.L., Congregation Beth Judah, Ventnor, N. J.

EXECUTIVE SESSION

Report of Secretary

O. W. Brandhorst, D.D.S., St. Louis, Mo.

Report of Treasurer

Fritz A. Pierson, D.D.S., Lincoln, Neb.

Report of Necrology Committee

John G. Carr, D.D.S., Chairman, Camden, N. J.

Report of Nominating Committee

Lon W. Morrey, D.D.S., Chairman, Glenview, Ill.

*Election of Officers and Regents**Report of Bylaws Committee*

George W. Teuscher, D.D.S., Chairman, Chicago, Ill.

President's Address

Philip E. Blackerby, D.D.S., Battle Creek, Mich.

Indoctrination Address

Jay H. Eshleman, D.D.S., Philadelphia, Pa.

CONTINUING EDUCATION

"Shall Learning Be Restricted to the Young?"

D. B. Varner, Chancellor, Oakland University, Rochester, Mich.

"A Cooperative Effort on the Part of the University, the Dental School and the Dental Organization"

William R. Patterson, D.D.S., M.S., Texarkana, Ark.

"The State Dental Association and the Department of Health"

David F. Striffler, D.D.S., M.P.H., Ann Arbor, Mich.

"The Interest of State Boards of Dental Examiners in Continuing Education in Dentistry"

Robert Thoburn, D.D.S., Daytona Beach, Fla.

"Base-lines and Responsibilities in Continuing Educational Efforts"

Kenneth V. Randolph, D.D.S., Morgantown, W. Va.

LUNCHEON—12:30 O'CLOCK

Vernon and Garden Rooms, Haddon Hall

Under the auspices of the New Jersey Section of the College

Frederick E. Schmidt, D.D.S., Chairman, presiding

Invocation

Reverend Harvey Bennett, D.D., First Presbyterian Church, Atlantic City, N. J.

*Introduction of Guests**Entertainment*

"Research—Gateway to Tomorrow"

Speaker

Mr. John J. Geier, Public Relations Supervisor, New Jersey Bell Telephone Company, Newark, N. J.

AFTERNOON MEETING—3:00 O'CLOCK

Carolina Room, Chalfonte Hotel

Invocation

Address

"The Need for Leadership in the Field of Higher Education"

Speaker

Herman B Wells, A.M., LL.D., Chancellor of the University, President of the Indiana University Foundation, Indiana University, Bloomington, Ind.

Conferring of Fellowships

Conferring of Honorary Fellowships

Presentation of Awards

EVENING MEETING—7:30 O'CLOCK

Carolina Room, Chalfonte Hotel

Presiding

President Philip E. Blackerby

Invocation

The Very Reverend Msgr. Michael I. Fronczak, A.B., M.A., LL.D.,
Irvington, N. J.

Dinner

Introduction of Guests

Installation of Officers and Regents

Presentation of Service Key to Dr. Philip E. Blackerby

Donald W. Gullett, D.D.S., Past-President of the American College of Dentists

Inaugural Address

Jack S. Rounds, D.D.S., Los Angeles, Calif.

Recital

Mr. Brian Sullivan, Metropolitan Opera, Mr. Ralph Linsley, Accompanist

A stalwart of the Metropolitan Opera since his debut in 1948, Mr. Sullivan has also sung at the Chicago Lyric Opera, the San Francisco Opera, as well as with the opera organizations of New Orleans, Miami and San Antonio. With the last named, he appears this summer with Dorothy Kirsten in Montemezzi's "Love of Three Kings."

Mr. Sullivan is one of the few tenors of our time who can range successfully from Wagner to Puccini, from Bizet to Moussorgsky, from Bach to Britten. He has sung Demetri in "Boris Godounov" in English, Italian and the original Russian.

His myriad talents have served him well in the fields of recital and television as well as the opera. He has appeared with most of the major American orchestras and on all the leading concert and recital series; he is a regular guest on the Bell Telephone Hour and the Voice of Firestone.

CEREMONIAL COMMITTEE

Robert W. McNulty, Los Angeles, Calif., *Orator*
James M. Epperly, Washington, D. C., *Torch Bearer*
Milton G. Walls, St. Paul, Minn., *Mace Bearer*
Frank O. Alford, Charlotte, N. C., *Grand Marshal*
Lawrence L. Furstman, Beverly Hills, Calif., *Asst. Marshal*

USHERS

Lawrence Reid Burdge, Red Bank, N. J.
Walter M. Dunlap, East Orange, N. J.
Edward M. Grevatt, Montclair, N. J.
C. Douglas Hoyt, Fair Haven, N. J.
William R. Joule, Newark, N. J.
Lionel Deckle McLean, Jersey City, N. J.
Lester Raw, Trenton, N. J.
Norman T. Sauer, Allenhurst, N. J.
Ernest J. H. Schneider, Maplewood, N. J.
Arthur G. Warden, Orange, N. J.

ORGANIST

Joseph Elwyn Ewing, Philadelphia, Pa.

