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AMERICAN COLLEGE OF DENTISTS

Presents the proceedings of the American College of Dentists and such additional papers and comment from responsible sources as may be useful for the promotion of oral health-service and the advancement of the dental profession. The Journal disclaims responsibility, however, for opinions expressed by authors.

Published Four Times a Year — March, June, September, December.

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AMERICAN COLLEGE OF DENTISTS

Objects: The American College of Dentists “was established to promote the ideals of the dental profession; to advance the standards and efficiency of dentistry; to stimulate graduate study and effort by dentists; to confer Fellowship in recognition of meritorious achievement, especially in dental science, art, education and literature; and to improve public understanding and appreciation of oral health-service.” — Constitution, Article I.

Announcements

Next Meeting, Board of Regents: Miami—date to be announced.
Next Convocation: To be announced.

Fellowships and awards in dental research. The American College of Dentists, at its annual meeting in 1937 [J. Am. Col. Den., 4, 100; Sep. and 256, Dec., 1937] inaugurated plans to promote research in dentistry. These plans include grants of funds (The William John Gies Fellowships) to applicants, in support of projected investigations; and also the formal recognition, through annual awards (The William John Gies Awards), of distinguished achievement in dental research. A standing committee of the International Association for Dental Research will actively cooperate with the College in the furtherance of these plans. Applications for grants in aid of projected researches, and requests for information, may be sent to the Chairman of the Committee on Dental Research of the American College of Dentists, Dr. Albert L. Midgley, 1108 Union Trust Bldg., Providence, R. I. [See “The Gies Dental Research Fellowships and Awards for Achievement in Research,” J. Am. Col. Den., 5, 115; 1938, Sep.]
AMERICAN COLLEGE OF DENTISTS
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The Journal Forum:

Hospitals as Teaching Agencies in Dental Education

The Problem: Harlan H. Horner

Discussion: R. H. Groh, D.D.S. Frederic W. Webster, D.D.S.

American College of Dentists: Proceedings of the Meeting of the Board of Regents, Chicago, February 10-11, 1946

I. Research


B. Fellowship Board, 1944-45. Paul C. Kitchin, D.D.S., Secretary

C. Researches Aided by the American College of Dentists. Albert L. Midgley, D.M.D., Sc.D., Chairman


E. Action of Board of Regents on Above Reports. Otto W. Brandhorst, D.D.S., Secretary

Book Reviews
American College of Dentists

Greene Vardiman Black says: Remember also that the dental school cannot make all of its graduates efficient practitioners, nor can any state board sift out all incompetent men, or men who may rapidly become incompetent through careless or immoral habits. A student may, under the influence thrown around him in school, do fair work both in his studies and in his operations, and after the last cramming for the state board examination he may throw aside his books, fall into careless habits in operating, and within a few years become a thoroughly incompetent man. I have known such students to sell all of their books to the second-hand dealer the next week after passing these examinations. I wish to heaven they would sell their instruments also and seek other employment. *The professional man has no right to be other than a continuous student.*

Therefore, until we can have laws by which the licenses of such men can be rescinded, we may expect some men will be dishonest and others careless, no matter how well the dental schools and the examining boards may do their work.

*Italics not in the original.*
THE CREATIVE USE OF KNOWLEDGE
BY THE EDITOR
(A discussion of the February Meeting, Chicago, 1946)

Three simple words may have a great deal of meaning if properly considered: principle, practice, pattern. In the first of these lies the fact or the truth to be brought to the fore; through the second, machinery is put into operation making those facts applicable in the life of man; and thus the third is manifest as man adopts and adapts, resulting in the development of his personality, and he then becomes a pattern.

Within the dental profession we have many organizations, beginning with the American Dental Association, and all its constituent and component parts, including even standing committees, going on through Academies, study groups, fraternities, honor societies, and what have you? These all teach a principle, demand practice in accord with that principle and finally, we the persons comprising these bodies, reveal through our personalities both the principle and the practice, and become the pattern. As we put our best effort even our lives into the jobs assigned to us, recognizing that division of labor is always essential, yet always willing to take on the harder tasks, we find it true that personality does reveal both principle and practice. It is not difficult to tell what a man thinks and does by his personality.

The meetings recently concluded in Chicago were interesting and instructive. They were timely for we had not met for a far longer period than is customary. We have just concluded a war and little did we realize the effect upon us until we came together at this time. We have been through a period when all effort has been directed toward destruction. Is it any wonder then that we might have tended to be introspective, or even pessimistic?

Just one of this larger number of organizations constituting the American Dental profession will be considered in this discussion.
The interest of all of us lies in all of them, but space and reader's time will not allow consideration of all, in addition to the fact that each will be further considered in channels more particularly its own.

The American College of Dentists is one of the number above referred to—one of the honor groups and one full of activity. We have had no convocation for several years, nor is one in sight for this year, 1946; we have had no meetings of committees nor of the Regents for more than one year. The meetings held in Chicago in February of this year were then, of special significance and those of us who attended came away with renewed, even a new, hope. The story of the past several years might best be indicated in eras.

During the 1920's the people of the United States, including dentists, enjoyed a time of unequalled prosperity. During this time Bulletin No. 19, the Carnegie Report by William J. Gies, made its appearance. Great changes were brought about including increased activity of the College, organized in 1920. There was much to do and we did it. The depression years came on, beginning in 1930, ending in an upward trend in 1937 or 1938. During these years we acted accordingly, and much was accomplished. In 1941 came the war—then activities were forced down and there was less to do. No new work was initiated and finally we could have no meetings. Some of our Fellows did not believe there was a slackening in the work—there was, and with not many to do what was to be done. Help became a problem and we had our troubles.

Now we are in the first of the post-war years—we are going ahead again. Our place in the family of the University has been challenged and there is a job to do. Fellows of the College are active in this and are on the job. The time will never come when battles are unnecessary, but each era demands different tools. And so in this case, there is a difference and we hope effective tools are being used. President Sproul of the University of California, expressed himself recently in an address before the Dental Alumni Association, to the effect that dentistry was one member of the University family just as is any other college or field of learning. He further said that
to expect "integration under Medical School auspices, would be as likely of earthly consummation as the peaceful laying down together of the lion with the lamb."

A new project has in part been put into the hands of the History Committee. Some years ago data concerning the development of the American Association of Dental Schools was collected. This has not been corrected but the History Committee has now taken that over and will make it a first project for 1946. This is important and will be another good job of the College.

We are now in the post-war era—one of construction. We will pass on from that of destruction and ask ourselves in the beginning, how about our social relations, moral objectives and perhaps spiritual aspirations? Apparently, these are at low ebb or are at a new low. Is it any wonder then that as we sat together, the future looked very dim, if there were any at all.

The principle (the objective) of the American College of Dentists is that the truth about things shall be found out, laid in the lap or laps of the proper persons for further refinement (practice) that the people and the profession shall be benefitted, i.e., shall have their personal values increased, (personality) and thus new truths, new ways of living and new practices are revealed.

The American College of Dentists is at once both idealistic and realistic. It is idealistic in its proclamation of goals to be attained, but realistic in their attainment. Let those who think not much has been done take note. The Research Committee will serve as an example. When this Committee was called to order by its chairman, introspection prevailed for a while. But when it was pointed out that reports of work done and the report for the past year, now in the editor's hands, revealed the opposite, the picture changed immediately. Look back over the reports of the past years, then turn to the report in this issue. Stop to consider too, that it is not ours to finance but to promote research. Idealistically we shout for research and its benefits. Realistically, we do this by financing some projects. We have spent around $16,000.00 in this effort with the re-
suit that these projects started are now financed from other sources, and have grown to larger proportions. A sub-committee, (Medico-Dental Relations), of the Research Committee also felt that not enough progress had been made. But when a critical analysis of that undertaking was presented and the further fact of the big job done twenty-five or more years ago when the dental school situation was cleaned up with the consequent elevation of all that pertains to dentistry, again the picture looked different.

The work of the Prosthetic Committee also well serves as an illustration of the work of the College. For long years that Committee labored earnestly until the final job became that of the A.D.A. and by whose labors it is now being carried on. The same may be said of the Socio-Economics Committee. We have spent thousands of dollars in studies conducted by this Committee, but now it is time for authoritative action and that means the A.D.A. We give them our studies (facts) and they go on from there.

The Commission on Journalism concluded an exhaustive and an expensive study of this question years ago. This study has been continued through the years, but is now about to be finished up. A full accounting will appear in the June Journal.

So it may be said for many other committees—they have done their work and have disappeared. New ones have appeared, though the war years have precluded much advance work. Our members have been in the service and others at home have been overworked. We have been in an era of destruction and all we could hope to do, was to hold what we had. We did, and now we are set to go ahead—as men return they will be put to work and others will be relieved. Presently we will have a Convocation and we'll all see, even as we do not now. Meetings alone are conducive to more work and with no meetings, not much can be developed.

The address of President Carr in this issue will give the reader an idea of what we may expect. The address of the retiring President, Dr. Thomas, will answer many of your questions about the College and the times through which we have passed.
Some of us, grown weary with the chaos of the present have made many suggestions, even to a complete re-writing of the constitution and by-laws. Suggestions have been made relative to a greater use of the sections and as to other methods of securing members.

A first effort was made in 1930 to make greater use of sections. This has been tried since, even by the last President. (See Dr. Thomas’ address.) Sections have attempted to invite new members but without success. The American College of Dentists is an honorary organization and like all such, membership is attained only by invitation as the result of a possible candidate’s efforts along professional lines. It just doesn’t work when placed in the hands of the sections.

The American College of Dentists is a voluntary organization, insofar as we might think of organization as exemplified in the A.D.A. Ideally the plan is splendid, but practically, it won’t work.

The ideas of all of our organizations, both in our own field and the entire field of the American Republic, is that the life and the welfare of the people may be advanced, and through their cooperative efforts. This is true of all professional organizations and it is true in the dental field. Our aim must be to make life better for all the people, both dentist and patient.

This is being written enroute to San Francisco. In the bedroom next door is a sick baby. In conversation it has quite naturally been discovered that this writer is a dentist. Immediately, and with characteristic finger motion toward the mouth, came the statement, “I just had a beautiful bridge set.” The writer’s reply was, “I don’t know much about that—my life is spent with children.” This is not that the dentist will attempt to replace the physician in his labors, but it is that he is concerned with the specific disease, its possible cause, and its effect on the physical well-being, for this includes the teeth. The same significant relationship obtains in the older age group and in fact, through all age groups.

A further examination of the research report in this issue reveals a greatly increased knowledge of heredity, biochemistry, etc., in an
effort to find the cause of dental caries. Thus, we will make a contribution to the study of genetics and heredity. Dentists are studying the cause of cancer.

The fact of the matter is, we have accumulated and are accumulating a mass of knowledge. Some of it has been put to creative use while the remainder will be in due time.

Below is appended a list of our committees, real activity having begun in 1929. Some have completed their labors, and have been dropped. Some have been dissolved into smaller committees and some have been changed in name. Some are still at work, with their tasks possibly soon to be completed. Others are still in the heyday of their jobs and as we now enter an era of construction, still other committees will be developed.

It is no doubt the chaos of the present which affects us, but which will soon be calmed as we enter the cosmos of the future. Cosmos? Was there ever order and quiet out of which new knowledge and new material came? We must constantly emphasize in our minds the need of a history of dentistry that we can actually note our achievements. All that happens today is deeply rooted in the past. It is true that "historical forces exert a profound influence upon all of us," no matter what activity in particular, may be ours. We are ever on the alert for new knowledge that may find a creative use.

Standing Committees of the College:¹

1929-1933—Education, Research and Relations—one committee.
1934—Divided into two committees: (1) Education and Research, and (2) Relations.
1934-1937—Education and Research.
1938—Divided into two committees: (1) Education, and (2) Research.
1938-1946—Education.

Education Committee still functioning as such.

Research Committee as separate committee since 1938. In 1940, took on Research Fellowships and Grants-in-aid.

¹Personnel of Committees may be found in the Journal of each year, or it may be published presently.

Dental Prosthetic Service. 1933 to 1946. Very active, except in recent years, when this activity was turned over to A.D.A. Committee.

Hospital Dental Service, 1933 to date. Active in this field and probably responsible for progress to date—being studied now by A.D.A. Committee.

Socio-Economics, 1933 to date. Beck's Study "Cost of Dental Care for Adults Under Specific Clinical Conditions." Reference might be made to Sinai report on Health Insurance in Europe (about 1928).

Certification of Specialists, 1934 to date. About to make extensive report.

Oral Surgery, 1934 to date—active in field—setting standards. Oral Surgery Board now set up.

History Committee, 1940 to date.

Preventive Service, 1940 to date.
AMERICAN COLLEGE OF DENTISTS
INAUGURAL ADDRESS
RESPONSIBILITIES AND OPPORTUNITIES IN THIS CHANGING WORLD
MALCOLM WALLACE CARR, D.D.S.
New York City

I acknowledge with grateful appreciation your expression of confidence in conferring upon me an outstanding honor, the presidency of the American College of Dentists. In accepting this stewardship, I am deeply conscious of the attendant responsibilities and obligations of high office, and I bespeak your kindly tolerance and your generous cooperation, that this mantle which has descended upon my shoulders from my distinguished predecessors, be worn with no diminution of lustre.

This year is the twenty-fifth anniversary of the founding of the American College of Dentists. It has been said that an institution is but the lengthened shadow of a man. This College is now the quarter century-long shadow of a few dental leaders with visions of the future, who in Boston in 1920, first brought forward plans for its organization. The College “was established to promote the ideals of the dental profession; to advance the standards and efficiency of dentistry; to stimulate graduate study and effort by dentists; to confer Fellowship in recognition of meritorious achievement, especially in dental science, art, education and literature; and, to improve public understanding and appreciation of oral health-service.” (Constitution: Article 1.) The objects of the College have been well served. There was a need, and there continues to be the need now more than ever before in the history of dentistry, for dentists to band together for mutual support, for the elevation of the standards of dental practice and to declare their purpose to maintain dental education in its present university pedagogical posi-

1Prepared for and read at sectional convocations, in 1945.
tion; to improve methods and standards of teaching; to bring into
dentistry students qualified to become professional men; and, to
extend to the population increased dental care without any sacrifice
of quality of service or diminution of individual or professional
free enterprise.

During the past quarter of a century the College has made notable
contributions to the advancement of the dental profession which
have had far reaching effects. Review of the executive proceedings,
the reports and recommendations of committees, the annual pro-
grams and the published literature of the College demonstrates
achievement in many directions, of which we may justly be proud.

I shall not attempt to describe the many accomplishments of the
College during this comparatively brief period of time—I leave that
task for future historians to catalogue and to evaluate. It is appro-
priate, however, to contemplate a few of the outstanding contribu-
tions which have had far reaching effects and to give credit to those
who have contributed with high purpose to the success of these
achievements. From its very beginning the College has championed
professional journalism and has forcefully and militantly pursued
its conviction in support of professionally controlled journals.

A report of the Commission on Journalism of the American
College of Dentists was published in 1932, under the title of, “The
Status of Dental Journalism in the United States.” This report
was a monumental contribution which presented the subject for
the first time in a complete monographic form and embraced the
results of an intensive three-year study. The impact of this report
upon dental journalism, and the changes brought about since its
publication may well reward the Commission on Journalism for its
heroic effort and the College for its encouraging leadership. In
1933 the Journal of the American College of Dentists was founded
and since its beginning this journal has been a living example of
dental journalism at its highest level.

In more recent years the College became aware of the many
un-met needs for more and better dental care which exist in all
parts of this country. It recognized also that really adequate and competent dental care are beyond the financial resources of an appreciable proportion of the population. Persuaded that these needs must be met and the conditions corrected, the College undertook to study the ways and means this may be achieved. Although the problem is acknowledged to be both enormous and complicated, the Committee on Socio-economics set out to initiate a study which would be helpful in understanding the fundamentals of the problem, and as the result of its efforts published in 1943 a volume entitled, "Cost of Dental Care for Adults under Specific Clinical Conditions," which was an exploration of general issues, on the basis of initial and maintenance care experience of 485 patients of the Dental Health Service in New York City. This volume was dedicated to the "fulfillment of the ideals of adequate dental care as a health service for the entire nation." It may well be remembered that it was Virgil who said, "The noblest motive is the public good."

These publications are but two specific examples of outstanding contributions made by the College to advance the standards and efficiency of dentistry and to promote public health. Recommendations contained in other committee reports and original articles published in the Journal have also had initial effects and influential results in advancing standards of the clinical practice of dentistry and its specialties, and in improving medico-dental relations.

The College assumed leadership more than ten years ago in recognizing the growing importance of dental service as an integral part of modern hospital organization, by publishing in the Journal the first complete monograph on the subject with a systematic plan of management, and later by the creation of the Committee on Hospital Dental Service. The continuous efforts of this committee, and the loyal support of others who have had an abiding interest in this mode of health service, have been largely responsible for official recognition recently given this subject. The Council on Dental Education and the Hospital Dental Service Committee of
the American Dental Association are now engaged in formulating minimum standards of hospital dental service required of approved hospitals, and essentials of an approved dental internship and of an approved dental residency. It is anticipated that in order for a hospital to be approved by the American Dental Association, that hospital shall be required to present evidence of its ability to meet the basic standards of hospital dental service and the essentials of dental internship promulgated by the American Dental Association, and that a list of approved hospitals meeting these requirements will soon be available.

It is not possible here to mention the many other contributions and accomplishments of the fourteen standing committees of the College, but it is certain that the present position of leadership which the American College of Dentists now occupies in American dentistry is due largely to the diligent and effective work of its standing committees and to the tireless efforts of the individuals who compose them.

During the past twenty-five years the College has indeed shown satisfactory growth in both strength and influence and it has not only reflected the progress of the profession but has contributed notably to the advancement of dentistry. We may, therefore, thoughtfully contemplate the philosopher's words that, "the heritage of the past is the seed that brings forth the harvest of the future." Dentistry has an honorable and a century-old heritage of truly great achievement and service, of which we of this generation are the grateful beneficiaries. We must guard this heritage for future generations to utilize for even greater accomplishment and make certain that our capacity for service remains unhampered and unobstructed by retrogressive experiments in education or by radical social change.

We now face a new era. The greatest and most destructive war of all time has come to a close, bringing to our country and to our profession, and to this College, increased responsibilities and obligations in new fields of endeavor—and new and greater opportunities
for service. American dentistry has served in every part of the world and everywhere it has met the challenge of a great and compelling opportunity. It shall play its part in the reorganization which is to follow and may well be an important factor in the many ramifications of the problems of reconstruction and rehabilitation, education and medico-dental relations, public health and the dissemination of information for the public. We must accept the challenge of the changing world and endeavor to lead the profession to ever greater heights of achievement in spite of the difficulties along the path. The magnitude of the problem may well serve as a stimulus to our best efforts, for as Browning so truly said—

“But a man’s reach should exceed his grasp
or what’s a heaven for.”

The revolutionary forces in society are demanding adjustments of public health agencies to the new order and it is proposed that the state assume responsibilities for the security of the individual, including complete medical and dental care, from infancy to the incapacitation of senility. Already we are embarked upon such a program and with little regard for the truism “that security at the hands of the state and freedom as we have known and valued it are incompatible.” We must realize also that as a nation we are without sufficient experience to enable us to proceed forthwith on any large and embracing medical and dental care program and that initial and maintenance costs for an all inclusive health security program would stagger the imagination.

It is apparent, however, that ere long we shall have to reckon with the problem as it affects our profession and, in consequence, the public health and welfare. The profession must meet the demands of the new social order with ever widening spheres of forceful influence, and with constructive recommendations and programs for extending and improving the quality of dental care to ever increasing proportions of the population. We must remember and strongly emphasize, however, the fundamental realities of cause and effect, the value of leisurely evolutionary progress, the danger
of abrupt and revolutionary change and the value of freedom. We inherit the right to speak when we sense any threat to our freedom or our freedom to serve the needs of man as we may determine. The time calls for candid, honest and courageous leadership—a leadership based upon truth, because dentistry has no small part to play in this changing order; it has the primary obligation of safeguarding to a certain extent the public health.

In contemplation of this problem the profession and this College must make provision to be informed on the nature, quality, and direction of the economic and social changes that are taking place now and that are clearly forecast for the immediate future; to define in particular how these changes are likely to affect dentistry in its various aspects; to determine how the best elements in the science of dentistry and in its services to the public may be preserved and embodied in whatever social order may develop, so that ultimately the best possible dental care may be made available to the largest number of persons at the most economical costs.

Many other problems confront us in this changing world but notably that of dental education. If American dentistry is to maintain that freedom of action which has given to our country the highest standards and quality of dental care anywhere in the world, we must guard against domination from any direction which may affect seriously many long established practices of proven value in dental education and practice. If perforce, dentistry should become the legally adopted stepchild of medicine and the dentist become the hireling of the state, with his future on the one hand entirely dominated, and on the other hand, dependent upon political favor, would not the scientific and humanistic qualities of the profession tend to shrink and perhaps wither away? To these problems the College cannot remain indifferent.

Dentistry is indeed an important mode of health-service, and the relation between medicine and dentistry and their mutual interest as servants of the public health imply an interrelationship and an interdependency of the two professions; it implies cooperation, effort
to understand the problems of each other, close affiliation and integration but not absorption or domination of one by the other. Scientific humanism is a term which has been used to describe the “sacredness of scientific progress in the promotion of the welfare of mankind,” and scientific progress has developed largely as the result of intellectual independence. Herrick stated that, “humanism has a two-fold meaning: on the one hand it implies a sympathetic approach to one’s fellow man and his problems, a sense of his needs, his inspirations, and his aspirations; it practices faith, hope and charity; on the other hand humanism includes that which may be termed culture, a knowledge and appreciation of the stored wisdom and experience of man.” These words are no mere overtones; they express a fundamental philosophy in the yet uncomposed symphony of medico-dental relationship. Dental education, practice and research have extended deeply into collateral fields, both mechanical and biological, and it is no wonder that today we find ourselves in a confused and transitional state. Our problem is both complex and difficult, but when a complex problem is broken down into its component parts and each part examined separately, the solution of the problem frequently is facilitated. The fundamental approach to the problem of medico-dental relations in both education and practice is a mutual appreciation and acceptance of the philosophy of reciprocal humanism on the part of both medicine and dentistry.

As the mist and fog of this transitional era, through which we are now groping, are burned away by the radiant force of truth and humanism a new horizon will be more clearly visible and horizons will ever extend as we endeavor with high purpose and earnest effort to unselfishly serve mankind.
This is the twenty-fifth anniversary of the American College of Dentists. During these years many progressive changes in dentistry have occurred in which the College has played a prominent part. Your admittance to membership is a recognition that you too have contributed toward the betterment of the dental profession. For twenty-five years the College has been symbolic of the best in dentistry. It is to be regretted that an annual convocation commensurate with this occasion could not be held. I am sure a historical sketch of twenty-five years of accomplishments of the College would fill us all with joy, and a recapitulation of individual contributions would make you have a feeling of pride in your selection for membership. No doubt the greatest accomplishment within our lifetime recently occurred on the battleship, Missouri, with the signing of the unconditional surrender document and the ending of world conflict. May the ending of this conflict again permit all good fellows to get together.

There is a vast storehouse of talent within the membership of the College. This talent remains idle and unused, a condition not conducive to attainable progress of the College or of dentistry and a condition which should not be permitted to continue. I have long felt that a closer contact between the sections and the parent organization should exist, thus affording a broader distribution and use of this talent. A section, as a whole, could be appointed as a sub-committee to assist the main committee, or could be appointed as the main committee to study a chosen subject and render a report at the annual meeting.

With the above thought in mind, letters were written in De-

1Prepared for and read at Section Convocation, December, 1945.
cember, 1944, to the secretaries of the sections requesting their cooperation in this movement. They were asked to supply a list of subjects in which they would be interested and through which they would make a study and report at the annual convocation. Two very cooperative responses were received enclosing a long list of important subjects. Not satisfied with two responses, I again addressed a letter in February, 1945, to the secretaries and sent copies to the chairmen. Four additional replies were received; two were willing to participate and sent in a list of subjects. One was not interested but would make some effort if asked to do so. The other very plainly stated that his section was interested only in its own personal affairs and such as might pertain to the war effort, with no time for other activities. No response was received from the remaining fourteen sections. This should not be construed as indicative of a lack of interest. Four years of war, with its accompanying horrors, have resulted in severe mental and physical strain from which no one has escaped and under such circumstances the spirit may be willing—but the flesh just cannot respond.

Year after year, hours and hours of hard labor are spent upon the assembling and formulation of committee reports. The reports contain material of inestimable value, not only to the members of the College, but to every dentist. Too often the College has been unjustly criticized for unwillingness to share the results of its study. The prestige of the College could be enhanced and its shining light removed from under the bushel if this material could be made available to all dentists. The reports are read at the annual meeting, published in the Journal, and copies filed in the office of the secretary. The objectives of the College would be more completely fulfilled if this material could be catalogued and this catalogue placed in the library of the American Dental Association for the use of everyone who may desire it.

One of the objectives of the College is to enhance the progress of the dental profession. History will clearly reveal that the College has been a potent factor in adhering to this obligation, but let us
not rest there as long hours of hard labor are yet needed. The College should continue to make thorough, careful studies and when the results are completed they should be turned over to the proper authorities of the American Dental Association for further consideration and action. In all its investigations the College should keep in mind that the American Dental Association is the parent and spokesman for organized dentistry and at no time should these prerogatives be encroached upon. We should also bear in mind that as individuals we are members of the American Dental Association and being a member of the College does not preclude us as individuals from pressing for action against inactive stewards holding positions of trust and authority in the American Dental Association.

As a result of the war, the annual convocation has had to be temporarily discontinued. This necessitated placing the responsibility of induction upon the sections, oftentimes resulting in a burden upon some sections. While this method of procedure was not entirely satisfactory and the solemnity of the occasion could not be maintained as well as at the annual convocation, yet the sections are to be commended upon their spirit of acceptance of this responsibility. Likewise, because of war restrictions, no fall meeting of the Board of Regents for the transaction of the business of the College could be held. This function had to be carried on through correspondence which procedure did not permit comprehensive discussions; however, it was the best possible solution at the present time.

Dentistry in this country has developed, under its own autonomy, from an infant into a mature profession. This progress has been made solely through the efforts of dentists, thus dentistry has earned—the hard way—the inalienable right to stand on its own feet. This war, we were told, was fought to preserve freedom. If we believe in that statement the College should be prepared to fight for the preservation of the freedom of autonomy of dentistry without outside, intolerant interference from any source.

Peace has again come to the world. Will we be as successful
with the problems of peace as we were with the problems of war? While the post-war problems will be numerous, I wish to call to your attention only three, because these three, to become operative, would require a change in the present structural form of dentistry.

(1) Accelerated Dental Curriculum: The accelerated program was ushered in as a war emergency to supply quickly the needs of the Armed Services. Now that the war is over and the hysteria is subsiding, will history prove this action beneficial? Has this plan become an established policy and will it remain a permanent fixture? With the content of the field of dentistry enlarging so rapidly, can dentistry be successfully taught in a three-year period? Can the instructors properly prepare their courses of instruction on a day to day basis and can students receive the most benefit when under such time pressure? Will this pressure result in a lowering of the dental educational level? These questions need serious study and analysis. The College could render dentistry an invaluable service through a careful study of this subject, and basing its findings upon facts, determine whether or not the plan of acceleration has shown enough merit to remain as a permanent structure in dental education.

(2) Location and relocation of dentists now in the Armed Services: The trends are already under way for a vast migration of the population, with some states gaining in population and others losing in varying degrees. This condition is not only internal, but is on a world-wide basis. While this country carries in its statutes an immigration law, nevertheless, there has been a large increase in the population during the war period and no one can forecast what will be the future policy of the government after this war. Dentists have gone directly from graduation into the Armed Services and some have not obtained a license to practice in any state; others have entered the Services from established locations. After spending time in the service and being transferred from one place to another, some of these dentists have found places which to them are more desirable than their former locations and, according to reports,
about twenty-five per cent of these men will desire a change in location after discharge from the Service.

There is an expression by dentists in the Armed Services that any dentist with a service record should be permitted to locate in any state or territory without the formality of the licensure examination. It should be clearly indicated that we would be dealing with state statutes and the policy of state rights. Too often the belief is expressed that the Boards of Examiners are a law unto themselves and can establish their own procedure; that belief is not true. The Boards of Examiners are bound strictly by the literal wording of the law and have no other discretion unless so specified in the law. The laws under which the Boards of Examiners operate were formulated and presented to the legislatures by the organized profession. In other words the Boards of Examiners merely carry out the mandates of the profession. The privilege of practice over a period of years has been established upon the foundation of licensure derived through state rights. While this basic plan has not proved perfect, and it contains many imperfections, yet it has stood the test in both medicine and dentistry better than any plan so far devised and has operated with a fair measure of success. Another point that has been gained from the experience of the Boards of Examiners should be cited and that is, there can be no discrimination between any of the citizenry. What applies to one citizen applies to all, and all dentists, whether in or out of the service, are citizens under the law.

Do not construe these remarks as an argument for or against the proposal of granting to service men the right of licensure without examination. I am merely attempting to point out that to do so would require the erection of a new foundation upon which the practice of dentistry is to be established. The present foundation should first be declared weak and unsatisfactory before destroying it and the stability and the soundness of the new, proved beyond doubt before its erection. This is a serious proposal which should not be shifted upon a handful of men comprising the Boards of
Examiners for a decision It is a matter for the entire profession to decide, because this proposal deals with a change in the basic structure of dentistry. The College should give this its earnest consideration.

(3) Dental Service for all the people: This is a subject with many ramifications and one which I am not competent to discuss. However, I would like to refresh your memory by calling to your attention some of the facts revealed during the examinations for induction of men into the services. It is not pleasant to face the fact that thousands upon thousands of men, supposedly in the prime of life, were rejected for physical defects remediable through treatment, and that so large a number of those defects were dental. Will those in authority permit this condition to continue? I do not know the answer and I do not know the solution, but I do know that dentistry should give it study before some unworkable plan is fostered upon the dental profession by some political machination. With this study, the College could make a worthwhile contribution.

In conclusion, may I express my sincere appreciation to all officers and committeemen for carrying on their assignments under extreme difficulties, and especially, to Dr. Otto W. Brandhorst for his assistance and for the splendid manner in which he conducts the office of secretary.

May I again close with the quotation used in closing my inaugural address, because it is in keeping with the sentiment, expressed or unexpressed, of this address:

"It ain't the individual
Or the army as a whole,
But the everlasting teamwork
Of every bloomin' soul".

To solve the peace and all our problems properly will require the teamwork of each and everyone.
DENTAL EDUCATION: ITS PHILOSOPHY, ITS SUPPORT AND ITS FUTURE AS SEEN THROUGH THE EYES OF THIS UNIVERSITY

ROBERT GORDON SPROUL, B.S., Ph.D.
Berkeley, President

It is a rather unaccustomed pleasure to speak freely before a dentist, a pleasure multiplied, of course, when I can so speak before hundreds of dentists, and especially before the cream of all dentists, our own home product, the graduates of the University of California, College of Dentistry. In fact, the only time when I do not enjoy the company of a dentist is when I am unable to speak to him, because he "has me down" in a vigorous demonstration of professional efficiency. This condition of professional gag rule is not as complete and distressing now as it used to be in the heyday of the rubber dam, but there are still very definite limitations on free speech in a dentist's chair. Besides, most of the things I think of to say on such occasions are certainly not printable.

Some of my colleagues in the College of Dentistry faculty, who have much more confidence than I have in my knowledge of the problems and needs of the dental profession, and especially in my command of the essentials of dental instruction have suggested that I speak to you today on the philosophy of dental education, on adequate support for colleges of dentistry, and on the future of the University of California College of Dentistry, as it celebrates its Golden Jubilee, and looks forward to the next fifty years of the first hundred years which are said to be the hardest. Any one of these professional colleagues, or even the Dean of the College, could speak with more authority on these subjects than I. I say "even the Dean" because it is common knowledge in universities that a dean is a man who knows too little to be a professor and too much to be

1An address delivered by President Sproul of the University of California, at the fiftieth annual meeting of the Alumni Association, College of Dentistry, University of California, held in San Francisco, January 20 and 21, 1946.
a president. Most of you could speak with more assurance, yet here I am, on my feet and committed to the exposure of my ignorance, as, indeed, a university president often must be in the present general state of public misinformation regarding his omniscience, so, here goes!

Perhaps the basic problem of dental education, as of all higher education with which I am acquainted, is how and how far shall it be financed. As Dr. Horner, Secretary of the Council on Dental Education, American Dental Association, said recently, “Time was when proprietary dental schools met all of their operating expenses from their receipts from tuition, fees and clinics, and yielded a handsome profit to their owners. Time was also, a little later in the evolution of dental education, when dental schools organized as non-profit institutions still expected to maintain themselves from their receipts—and to build up a reserve for capital expenditures.” And time still is, I might add, when excellent dental schools such as our own, depend in very large measure, upon the traditional sources of support.

The University of California College of Dentistry is spending this year of 1945-46, $221,876.46: $177,440.4 for persons on the salary roll; $6,626.00 for general assistance; and $37,810.00 for expense and equipment. Of the total sum, $89,097.52 is provided from general University funds, including endowment income, and $132,778.94 is earned by the College from its students and its clinics. Being quick at arithmetic, you will immediately see that these figures represent 40 per cent subsidy and 60 per cent earnings. The comparable figures, when in 1930 I first sat down in the highest and hottest seat in the University were: total expenditure, $142,827.17, of which 4 per cent came from University funds and 96 per cent was earned income. In other words, all of the $79,049.20 increase in the budget of the College of Dentistry during my presidency has come from increased appropriations by the University out of its general funds. With this additional money, it has been possible to increase the number of full-time teachers from eight in
1930-31 to fourteen this year, in spite of the war and shortage of manpower, and to increase funds available for research from $13,514 to $35,155.

As a result of these changes in faculty structure and opportunity, our College of Dentistry has the largest number of faculty man hours per student of any similar college in the United States, which is to say, it gives more individual instruction to each student. I do not need to tell you how important this is in a program of professional education. The foregoing statement seems to me, though I try hard to preserve a proper modesty, an almost sufficient answer to the charge leveled at the University by one of its alumni, at the annual meeting of the California State Dental Association in April, 1944, that there is a general disinterest on the part of the University in the dental welfare of the public. The quoted financial figures, by the way, meet with a comfortable margin the finding of the Council on Dental Education that “the law of diminishing returns begins to operate in those schools which depend upon tuition, fees and clinics for 75 per cent or more of their income.”

Not only has the budget of the College of Dentistry been increased 55 per cent in the past fifteen years, with no comparable increase in enrollment, but also other reforms, all significant and many of them expensive, have been instituted, some of the best of these at the instigation of this alumni association. For example, the privileges of tenure, sabbatical leave, and retirement pay are now extended to clinical as well as academic members of the staff provided they give not less than 50 per cent of their time to University duties. All members of the staff, academic and clinical alike, are encouraged to engage in research, with University support, including University contribution to the expense of attending scientific meetings. These changes, made in 1943, have greatly heartened, I am sure, the practicing dentists of high professional calibre who make up our part-time faculty, and who bring to the College an indispensable knowledge of the practical aspects of dentistry. Ours is, by the way, the only College of Dentistry in the world, so far as I
know, that thus recognizes its clinical staff members. The changes have also stimulated research activity and productivity to an amazing degree, with virtually all members of the faculty participating. In the past two years some have taken part in research projects (55), or carried on clinical investigations (23), some have offered courses (18) before professional groups, and many have published papers or presented them at scientific meetings (89).

But defensible, and even praiseworthy, as University support of dental instruction may have been in the past fifteen years, especially as 60 per cent of all dental schools in the country are still self-supporting, we are by no means satisfied, and we plan to do much more. If the health and welfare of the people of this country require the services of well-trained dentists, and it seems to me axiomatic that they do, it is clearly the duty of a State University to offer dental education of the highest quality to those students who give promise that they will become servants and conservers of the public health, at a cost which will be within their means. This duty we are determined to discharge, fully and faithfully, by adding even more full-time teachers to our faculty, by supporting more research of high quality, by providing constantly improved facilities and equipment for both staff and students, and by reducing even further the percentage of income derived from student fees. Thus we propose to achieve, even more fully than we now do, which is virtually 100 per cent, the ideal of the Council of Dental Education, as expressed in this quotation from the Journal of Dental Education (February, 1942):

"The Council will not be satisfied with the nominal or casual affiliation of a dental school with a university, but will expect its administration, its teaching and its research to be conducted in harmony with the purposes and methods of higher education. This view contemplates the recognition and acceptance of a dental school by the university of which it is a part on equal terms with the university's other professional schools, and anticipates that the dental school shall live up to the traditions, and shall sustain the standards of scholarship, the exactness and thoroughness of scientific endeavor, and the true university spirit of its parent institution."
Assuming, then, that the University will achieve in a reasonable
time this ideal of financial support and faculty quality, and I am in
the habit of establishing for myself and in the activities under my
direction only realizable ideals,—What philosophy is to be the basis
of our dental education? In what I say on this subject, those of
you who diligently read your journals will recognize many of the
ideas, and even some of the words, perhaps, of Dean Willard C.
Fleming, and for this I offer no apologies whatever. Having
selected for our College a dean par excellence, outstanding among
his colleagues nationally, a worthy successor to Sharp and Millberry,
I should be a foolish president, indeed, if I did not lean heavily
upon his knowledge and experience, and proceed almost invariably
in accordance with his recommendations. Dean Fleming is my man,
and I am both proud of my selection, and grateful for the loyal and
highly intelligent aid that he constantly gives me. Obviously, he is
not one of the deans I was thinking of when to an invitation from
an organization inviting me to speak at its annual banquet, which
said, “If you can’t come yourself, please send a substitute, but
nothing lower than a dean,” I replied that in universities there is
nothing lower than a dean. I only wish that Dean Fleming would
not criticize my errors, my sins of omission and commission, as he
often does, in doggerel verse that is even worse than that which I
sometimes attempt myself.

Dean Fleming has shown me a chart depicting the changing
objectives in dental practice, and the increased demands that these
changes have made upon dental education over the past century.
This chart is part of a paper that he is preparing, and I hope that
what I have to say about it will not be regarded by him as a breach
of confidence, or by you as an excuse not to read the paper when it
is published. The Dean’s chart shows that the first objective of
dentistry was the relief of pain, and the preparatory requirement
was development of the biceps. The second objective was the
restoration of teeth or parts of teeth, and educational requirements
for this accomplishment could be met by apprenticeship—at least.
they were so met. The third objective, the elimination of infection, was consequent upon the discovery of the relation of diseases of the teeth and oral cavity to the rest of the body, and, for its attainment, professional education on the college level, together with some knowledge of the basic sciences became a necessity. The fourth and current objective is the control of dental disease, and educational requirements have accordingly been expanded to include the biological framework of the basic sciences, and a background of the humanities, sociology and economics. Clinical investigations and laboratory research are an integral part of this educational pattern. The fifth objective, still somewhat utopian, is the prevention of diseases of the teeth and oral cavity, and dental education will have to include much more of the biological and basic sciences, as well as suitable offerings from the discipline of Public Health, the great domain of the preventable diseases.

This fifth objective, which is now challenging the interest of all forward-looking institutions everywhere, will undoubtedly bring the College of Dentistry into closer alignment and cooperation with the School of Medicine. That is why some universities of the finest quality and highest prestige have replaced their colleges of dentistry with divisions of their medical schools. We do not think that this is the path to follow, although we advocate and enjoy, here in the University of California, the best of relations between the School of Medicine and the College of Dentistry. After all, important as is the prevention and care of dental disease, dentistry has other functions equally essential to the public wellbeing. It must still restore teeth, eliminate infection, and perform other tasks which call for high degrees of technical and clinical skills. Broaden the dental curriculum as you will, the instruction that results in the attainment of these skills is imperative. In other words, the dental college must continue to prepare its graduates not only to meet the present demands of a dental practice, as well as to assume a new responsibility: the prevention and care of dental disease—preventive dentistry. Our California plan calls for the coordinated
integration of an independent dental curriculum with other independent curricula, not in medicine alone, but also in nursing, pharmacy, public health, and their auxiliary services. Such integration, under Medical School auspices, we believe, is as likely of earthly consummation as the peaceful lying down together of the lion with the lamb. Besides, there is little to prove that medical education offers the pattern for dental education, or for the other disciplines I have mentioned. But, with general policies and objectives established, under university auspices, for the whole science of health service, the eventual achievement, as yet neither brightly visible, nor quickly to be consummated, nevertheless takes on a substance and reality, which may in time commend it even to the practicing dentist.

However, elsewhere, it may be integrated with related disciplines—and we are glad that other universities are following paths different from ours, we at California believe, as we know they do, that the design of the future dental college curriculum will depend upon the contemporaneous advance of science and of our evolving social and economic structure, at least as much as upon the best laid plans of dental teachers and university administrators. Whatever the curriculum is going to be, all believe that it must be less crowded with subjects and teaching hours than it now is. There are three ways to relieve the congestion.

(1) Lengthen the course to five years; this, however, we believe would be too expensive in time and money.

(2) Add an intern year, in which may be gained the clinical experience and technical skill for which we now try to make opportunity in the junior and senior years.

(3) Devise more efficient teaching methods.

It is to the third of these alternatives that we look most hopefully, and our studies and efforts thus far have given us reason to believe that our hopes are not wholly illusory. In our continued exploration of this major problem, we intend to enlist the help of the School of Education, thus breaking down perhaps the most watertight of the bulkheads which separate university departments.
One outgrowth of our curriculum study, with which you may all be familiar but which I mention because it interests me so much, is the Honors Curriculum, specifically planned to meet the need for properly prepared men and women in the fields of dental research and teaching. Exceptional students in dental colleges, who may be attracted to the life of a university professor, have hitherto been given pitifully little opportunity anywhere to follow this lead. On the contrary, they have been held rigidly to the requirements set for students of average ability. They have not only not been encouraged to prepare themselves better in fundamental science, and to undertake investigation, but, consciously or unconsciously, they have actually been deterred and prevented from doing so. There, I believe, has been one of the most powerful forces driving dental education along the road which Harvard and Columbia are now following. The California Honors Curriculum is designed to meet the very real need for more well-trained professors and researchers of dentistry without at the same time causing the profession which they are to serve to “softly and suddenly vanish away.”

But however excellent may be the faculty, facilities and financing of the dental college, however progressive and scientific the curriculum and the teaching, it cannot be a true success unless it has an adequate number of students of high quality. Student potentialities determine not only most of what the teacher can do, but also in large part what the profession will become. Dentists respected both by their colleagues and their patients have come out of proprietary, profit-making schools, staffed with mediocre instructors. But the best teachers in the world cannot do much with sub-standard students. In the field of education it is still true that you cannot make a silk purse out of a sow’s ear, whatever miracles may be achieved in the realm of plastics. Therefore, we are hoping to create conditions that will bring us an increased number of applicants for dental education, from among whom we can make a much better selection than is now possible. Chief of these improved conditions will be lower fees and lower expenses, for the surge of applicants
under the Government-sponsored programs of the A.S.T.P. and the G. I. Bill convinces us that money or the lack thereof, is the root of most of our evil. Students confronted by a possible expense of $1100 in one year, exclusive of board and lodging, simply look elsewhere for a career. If we can once change this current, once get the applicants coming toward us, we are sure that, with modern methods of testing and interviewing, we can select with reasonable accuracy those qualified to become the most competent students.

Our high ideal and our lowly, practical aim are one and the same, namely, to attract young people who have shown an interest in dentistry; to select from a large group those who show the most signs of the best prospects for professional advancement; to offer the successful applicants a well-rounded curriculum which will prepare them not only for the practice of the best dentistry today, but also for lifelong learning and pioneer advances into the better dentistry of tomorrow; and, finally, to select out of each batch those outstanding students in the more theoretical phases of the profession, who bid fair to become its finest teachers and its leaders in research. We yield to no school in our ambition “to lay the foundations for a broader understanding of the implications of oral disease and dental anomalies, to prepare students to meet the problems of the future.” In these ideals and aims the College of Dentistry differs in nowise from the rest of the University of California, which seeks on every one of its eight campuses and in all of its hundreds of departments and divisions to teach well, to discover if possible, and to serve the people of its State, its nation, and the world. In this never-ending quest it is heartened daily by the achievements, the confidence, and the encouragement of its alumni. With your aid it cannot fail!
WOULD I STUDY DENTISTRY IF I HAD IT TO DO OVER AGAIN?

CHARLES F. BROWN, D.D.S.

Denver, Colo.

This question is not entirely new. Quite frequently dentists express themselves along this line, though it is possible that they give little serious thought to the matter because so far as we know it isn’t in the realm of possibility. As a matter of speculation, in order to sum up one’s experience and to give expression to one’s view of the outlook of the profession the subject becomes well worthy of consideration.

The profession of dentistry, due to its glorious past, its growth and achievement certainly suggests a future that is deserving of optimism. These facts coupled with the great need for dentists should encourage the best young men and women we have to enter into the study of dentistry as a profession. Such a step should be considered with all seriousness before it is undertaken. The ways of dentistry are hard. The profession is not a utopia for the lethargic individual who dreams of large privilege and small responsibility. It is however a broad field for service in which a fair return is the spoil for honest effort. Let no one think that dentistry is easy. Bending over a chair with eyes fixed on an almost inaccessible surface of a tooth for hours each day, and often six days each week is to be considered a major task. Let us take into account some of the factors that constitute our present day dentistry.

One of the most difficult tasks with which a dentist has to contend is dealing with patients. The broad range of dispositions and temperament on the part of those visiting the dentist makes it necessary for him to be skilled in the use of tact. Many people have very sensitive teeth. Others are unwilling or unable to stand even moderate pain. These and others who are the victims of whims and fancies unnumbered are on the dentist’s regular program. To be able to successfully set these people right, and to be able to smooth out their difficulties and put them at ease requires a keen under-
standing of human nature, and an inexhaustible supply of patience.

The years of a dentist's professional activity are variously estimated at about thirty. Some of the early years are spent in acquiring a paying practice. The really fruitful years are not too numerous and the last years are often hampered by age and infirmity.

The financial side of dentistry is a worthy consideration in contemplating the desirability of repeating one's professional experiences. The average annual income estimated in a survey conducted in 1929 was slightly in excess of four thousand dollars. It will be recalled that 1929 was still a prosperous year. Beginning with the depression that followed, the average income dropped until in 1937 it was estimated to be less than three thousand dollars. While the figures are not flattering, they are comparable to those of other professions. If they seem too small they should at least furnish an incentive for the individual dentist to strive to rise above average. As has been said, "There is plenty of room at the top."

Professional standing in the community should be a factor for the prospective dentist to consider. The dentist has the right to be considered as one of the first citizens of his community. His training, education, and ability should give him that position, but his real worth must prove his right to maintain such standing. The dentist should have an interest in civic affairs and should uphold the constructive influences in his sphere. The man who underrates himself or his calling deserves no sympathy.

The main aspects of dentistry in its present stage of development are technical and biological. The technical aspect was first developed and consisted largely of the restoration of form and function of lost or damaged teeth. In the early days these mechanical operations were few and simple. Gradually new and complicated techniques were developed requiring greater skill and accuracy on the part of the operator and improving the esthetics, function and comfort of the patient.

The biological aspect of dentistry deals with the diagnosis and treatment of disease in the dental field of service. The revelations
of Billings and Rosenow setting forth the part which focal infections play as causative factors of systemic disease greatly increased the obligations and responsibilities of the dental profession. This concept of the frequent origin of diseased conditions has found universal acceptance and has made it necessary that dental education include a comprehensive study of the basic medical subjects. Upon this foundation the therapeutic and operative treatment of the diseases of the mouth and teeth are considered.

Public health education as it is being presented today is making a valuable contribution to dentistry. With three-fourths of the population of the United States who have not had the benefit of dental service there is an urgent need for public education. As the results of the stimulus now being applied gradually takes hold and dental health consciousness is aroused, a new dental era will have been established.

Perhaps the greatest factor in making dentistry attractive is the dentist himself. The dentist must hold himself in keeping with the high standing of his calling. Honesty, integrity and sincerity are the cardinal points of a satisfactory dental practice. A personality that radiates friendliness and personal interest is of highest importance.

Should we choose dentistry again? I think so. Let us bear in mind variations in men, and remember that all persons can serve well in some capacity. The dentist is a public servant. His profession is a health service. Even the dentist working in a lowly mission may be rendering a service of great value to mankind.

The future of dentistry as a health service causes us to look forward to far greater achievement. It has yet to make its greatest contribution. When the public becomes fully aware of the consequences of dental neglect and its effect upon their physical health and well-being the profession will be in dire need of increased numbers.

One of our great dental educators says in part:

"I have great confidence in the future of dentistry, and I believe
that dental education and dental practice will move swiftly ahead to a finer service and to higher public esteem. My confidence in the future of dentistry may be indicated by the fact that I have one son who graduated at our School last September, now serving in the Army, and another in the Navy, who entered as a Freshman this October."

With the above prevailing sentiment among dental educators, let us recommend the study of dentistry in the interest of future generations.
In recent years clinical observations and pathological studies revealed a very interesting relationship between diseases of the kidneys and a systemic involvement of the skeleton occurring mainly in children. This clinical entity, observed in children, has been called “renal rickets” or “renal infantilism,” “renal hyperparathyroidism,” or preferably, and more accurately, “renal osteodystrophy with secondary hyperparathyroidism.”

Lately, some cases of renal osteodystrophy in adults, as a result of chronic glomerulonephritis or calculus nephrosis, have been reported.

In children, congenital anomalies of the kidneys and the urinary ducts (chronic interstitial nephritis) may lead to disturbances of the calcium-phosphorus metabolism, which, in turn, produce the enlargement of the parathyroids. An identical correlation between kidney disease and bone changes has been observed in the rare cases of cystine disease in childhood dwarfism.

Cystine is a sulfur-containing amino acid and is essential for normal growth. Animals fed a diet deficient in cystine showed arrested growth and disturbance of the normal metabolism. On the other hand, an excessive amount of cystine in the food results in damage to the kidneys and an increased retention of nitrogen in the blood. The cystine disease is hereditary and is supposed to be a disturbance of the splitting of a metabolic precursor of cystine. This results in an accumulation of cystine crystals in the reticuloendothelial cells, stunted skeletal growth, and disturbances of the kidneys (Hottinger)\textsuperscript{2}. Roulet described this cystine damage to the kidneys

\textsuperscript{1}Supported by a grant from the American College of Dentists.

as an interstitial nephritis such as is seen in renal osteodystrophy with secondary hyperparathyroidism or, but less often, in nephrosis. However, neither Roulet nor other authors, who described cases of cystine disease in children, found the parathyroids to be enlarged. This fact seems to be in contrast with the findings of enlarged parathyroids in renal osteodystrophy, yet Roulet wondered whether the cystine accumulation was not overlooked in the latter. This may happen due to the solubility of cystine in formalin, alkalies, and acids. Cystine can be demonstrated only in material fixed in alcohol.

Whatever the cause of a chronic renal failure may be, the growing bones respond with changes of a different nature and intensity. It is very likely that an intermediary acidosis with disturbances of the calcium-phosphorus metabolism plays an important role apart from other factors not fully understood. The growing bones of the cases reported revealed changes that indicated rickets and simultaneously signs as are seen in Recklinghausen's generalized osteitis fibrosa without the so-called “brown tumors” and cysts. This very startling combination of these two systemic bone diseases is being studied by the author and Dr. H. Anderson in a youngster who died of a congenital renal failure associated with osteodystrophy and secondary hyperparathyroidism.

None of the reports dealing with these diseases made any reference to microscopic studies of the changes in the jaws and tooth buds of the children, although they must have been present. Hottinger in his paper on cystine disease described the signs of this disease in a 21 month old boy, and he pointed to the decay of all the sixteen teeth associated with a “severe pyorrhrea.” It is very unusual to find all sixteen teeth of a 21 month old infant destroyed by caries as Hottinger reported, but it is even more startling to observe a “severe pyorrhrea” in this child. Hottinger did not explain what he meant to be a “severe pyorrhrea,” but I do believe that his diagnosis was based on an extensive resorption of the alveolar processes and the

looseness of the teeth. The boy died at the age of seven and one-half years. A careful autopsy and histologic examination of all organs and bones yielded very important findings, but the study of jaws and teeth had been omitted.

The present paper deals with the attempt to produce the cystine disease in puppies by excessive administration of cystine in order to study microscopically the involvement of the teeth with their surrounding structures and the skeleton.

Four six week old dogs of the same litter were employed for the experiment. One animal served as control while the other three puppies were fed cystine* which was added to the normal food that consisted of Purina Chow Cubes, milk, and water. It was necessary to interrupt the feeding of cystine only in the beginning of the experiments because of gastro-intestinal disturbances that led to loss of weight.

The dogs were kept on experiment about one year. They were killed by ether narcosis (Table 1). No interference with normal growth was revealed in the experimental animals.

<table>
<thead>
<tr>
<th>Dog No</th>
<th>Sex</th>
<th>Age at beginning of experiment in days</th>
<th>Weight at beginning of experiment in grams</th>
<th>Duration of experiment in days</th>
<th>Total amount of cystine in grams added to normal food</th>
<th>Weight at death in grams</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M</td>
<td>42</td>
<td>990</td>
<td>398</td>
<td>1104</td>
<td>6570.8</td>
</tr>
<tr>
<td>2</td>
<td>F</td>
<td>42</td>
<td>1200</td>
<td>350</td>
<td>975</td>
<td>6126.4</td>
</tr>
<tr>
<td>3</td>
<td>M</td>
<td>42</td>
<td>1418</td>
<td>330</td>
<td>768</td>
<td>7025.2</td>
</tr>
<tr>
<td>4</td>
<td>F</td>
<td>42</td>
<td>1000</td>
<td>330</td>
<td>Control</td>
<td>5785.6</td>
</tr>
</tbody>
</table>

Roentgenograms of the skeletons of the experimental animals failed to show any differences from the control dog.

At autopsy all the long bones, ribs, parts of the cranium, the jaws, kidneys, liver, spleen, endocrine glands, and some lymph nodes were removed for histologic examination. The soft tissues

*Cystine was purchased from the Van Camp Laboratories, Terminal Island, California.
were fixed in alcohol, the bones in 5% formaldehyde, they were decalcified and then embedded in celloidin. The sections were stained with hematoxylin-eosin.

The microscopic examination of the soft organs and bones of the young dogs yielded negative results in contrast with the findings of Curtis and Newburgh\(^4\) and Beumer and Hueckel\(^5\) in rats which were fed cystine. These authors observed in their experiments with young rats very severe damage of the renal parenchym associated with degenerative changes of the liver but failed to investigate the bones and teeth. Curtis and Newburgh\(^4\) stated that 4% of cystine added to the food is sufficiently injurious to interfere with the growth of young animals, in addition to producing necrosis of renal tubules.

The studies presented in this paper will be continued on other animals.


THE JOURNAL FORUM
Conducted by HARLAN H. HORNER
Chicago
THE PROBLEM: HOSPITALS AS TEACHING AGENCIES
IN DENTAL EDUCATION

The Requirements for the Approval of a Dental School issued by the Council on Dental Education contains the following statement with reference to hospital relationship:

"It is the opinion of the Council that an effective working relationship with an approved general hospital is essential to satisfactory instruction in a dental school. This relationship should be such as will afford the student opportunities for viewing conditions not usually common to the clinic of the dental school and for broadening his knowledge of oral and systemic relations in health and disease, thereby adding emphasis to the significance of dentistry as an important health service.

"If the university of which a dental school is an integral part also conducts a medical school, the Council will be especially solicitous as to the cooperative relationships between the medical and the dental faculties, and will expect to find the dental school enjoying freedom of access to the university or affiliated hospital."

In its survey of the dental schools, the Council was gratified to discover that all schools recognize in some measure the significance of hospital contacts in the maintenance of a satisfactory program of dental education. Happily, the opportunity for effective hospital relationships prevails in connection with all the schools. The Council found, however, that the effective use of hospitals varies greatly.

Objective criteria were taken into account as far as possible. Inquiry was made as to the proximity of dental schools and hospitals; the type, size and character of the hospitals with which schools were affiliated; the working relationships between dental teachers and hospital authorities and staffs; the services in hospitals for which schools assumed responsibility; the nature of the assignments of students to hospitals; and the supervisions of students in hospital contacts.

More important than these objective considerations was the degree of enthusiasm and zeal displayed by faculties and administrative heads of

1Secretary, Council on Dental Education, American Dental Association.
dental schools in the use of hospitals as teaching agencies. When all data were assembled and all attitudes and objectives were observed, the school with the highest number of points in hospital relationship was assigned 100% for the purposes of comparison and others were ranked in proportion. A basic weight of 5 out of 100 covering all areas of the survey was given to hospital relationship.

Eleven schools were given comparative ranks of 100 to 76 per cent and their hospital relationship may be regarded as Excellent.

Eight schools were given comparative rankings of 74 to 50 per cent and their hospital relationships may be regarded as Good.

Twelve schools were given comparative rankings of 48 to 26 per cent and their hospital relationships may be regarded as Fair.

Seven schools were given comparative rankings of 24 to 12 per cent and their hospital relationships may be regarded as Poor.

It is thus seen that much remains to be done in the establishment of thoroughly effective hospital contacts. I have asked Dean Groh of Buffalo and Dr. Webster of Nebraska to report upon the programs in operation in the University of Buffalo and the University of Nebraska.

THE BUFFALO PLAN
R. H. GROH, D.D.S.²
Buffalo

In recent years there has been increasing realization, by dental educators and the profession at large, of the importance of hospital relationships in the training of undergraduate dental students. From the beginning of formal dental education up until relatively recent years the training of students in clinical dentistry has been centralized almost entirely in the school infirmary. With our newer concepts of dental health service the use of hospitals, as teaching agencies, is now recognized as an essential adjunct in a well rounded program of instruction.

The problem of correlating the students' basic knowledge of the medical sciences with clinical practice has been a constant challenge to dental faculties. An early impression is created on the mind of the young dental student of the aims and responsibilities of dentistry as a health service and he is fully aware of the importance of acquiring a basic knowledge of the medical sciences. Through his associations in the science laboratories he develops a broad perspective as to the place of dentistry in the health picture. But by the time he reaches his senior year, the student schedule has become

²Dean, School of Dentistry, University of Buffalo.
so crowded with technical procedures of one kind or another and his devotion to his work so intensive, in order to meet specified requirements, that we are conscious of a narrowing perspective. In the school infirmary, too often, there is a tendency for the student to view each patient as a medium for acquiring certain credits in this or that type of restoration instead of viewing each patient as a problem in health service.

At the University of Buffalo we have endeavored to keep the student alert to the relationship between the basic sciences and the disease processes as applied to dentistry by offering extensive hospital instruction in the senior year. In the hospital clinic, an environment is created which constantly keeps before the student the health factor rather than the routine technical or mechanical procedures necessary in the development of his skills and the acquisition of a number of quantity points. In the hospital clinics the student encounters many more cases in which treatment of dental diseases is complicated by the general physical condition of the patient. Here, the student has the benefit of the patient's chart, following a complete physical examination and he also has the benefit of consultation with staff members of all of the departments of the hospital. There is an increase in his ability to evaluate symptoms in the mouth with relation to systemic conditions present because he often sees the end result of low-grade chronic infections.

We have constantly expanded our program of hospital instruction since 1930 when the first step was taken to offer actual clinical experience to the student in the dental department of the Buffalo City Hospital. At the present time, each Senior student spends approximately eight weeks in hospital service. The dental school is closely affiliated with two general hospitals, a children's hospital and a State Institution for the Study of Malignant Diseases. At one of the general hospitals and also at the children's hospital the dental service is completely under the supervision of the dental school. A combined visiting or attending staff of about thirty-five dentists gives ample supervision to our hospital program. At the City Hospital a half-time Director of Dental Instruction supervises the teaching activities and coordinates the work of the dental service with the other services at the hospital. At the children's hospital a full-time faculty member directs the activities of the dental department.

Students are assigned to the hospitals in groups of four or six and for periods ranging from four days to one week. These services are constantly rotated with Infirmary practice at the dental school. During the hospital service some of the time is spent in actual performance of dental operations.
on hospital and out-clinic patients and some of the time to observation of
patients in special clinic such as dermatology, orthopedics, oral surgery,
arthritis, oral pathology and malignancies. Students also participate in ward
walks in the medical, pediatric and contagious wards, observing patients
suffering from systemic diseases. In each case the dental relationship, if
present, is stressed and the possible effect of dental treatment on the prognosis,
is discussed.

During his period of service in the general hospital, the student is required
to do two complete histories of patients, diagnose the condition and outline
the treatment. The work includes bed-side history, palpation, oscultation,
blood pressure, smears and cultures of the mouth and intraoral radiographs.
Urine analyses and blood studies are taken from the patient’s chart. Upon the
completion of all tests, the student retires to the medical library to procure
additional information regarding the type of disease with which he is dealing
and to prepare his diagnosis and treatment outline. The case report is later
presented for critical review to the resident physician of the service to which
the patient is assigned and the case freely discussed before the group of
students.

Great care is taken in the selection of the cases to be studied in order to
insure a dental relationship. Persons with diabetic, orthopedic, chest, hepatic,
renal or infectious heart condition are generally chosen.

Each student is given opportunity to assist members of the attending
staff of the oral surgery division in the operating room. Here the student
is made familiar with operating room technique and he learns how to conduct
himself without contaminating the field of operation.

During the time of his service in the hospital, the student is expected to
witness any autopsies that may be performed.

In a hospital score book, which each student keeps, is recorded all operations
performed, clinics attended and cases and autopsies observed. Each entry
must be signed by the dentist or physician in charge of the case or clinic
concerned. This gives us a complete record of the student’s hospital activity
throughout the whole year.

In carrying out the foregoing plan we have experienced complete coopera-
tion from the various medical services of the hospitals involved and the
dental departments are accorded equal recognition with other services. Not
the least important in this hospital program is the opportunity afforded for
the exchange of ideas between the dental students and the medical students
which should result in a better understanding and closer cooperation when
both groups are in practice.
When Dr. Hooper was appointed Dean of the College and assumed his duties in 1939, this writer was appointed Chairman of the Department of Oral Surgery and Oral Pathology. The purpose of associating pathology with surgery was to attempt a better correlation between the surgical clinic and pathological laboratory. The idea being of course, that pathological tissue as removed in the operating room by the student assigned to the particular case would then be taken to the laboratory and the student would have the opportunity to examine the material microscopically. Also, the other laboratory examinations such as blood count, etc., would give the student a much better concept of clinical pathology and help to dispel the common inference in the practice of dentistry that dental operations are limited to tissues only remotely associated with the general system.

To carry out this idea it seemed necessary that a much better set-up for the surgical procedures be instituted than had heretofore been carried out in the extraction clinic in this college and in other ways. With this idea in mind that surgical procedures, though generally classed as minor and major, carry the same responsibility and that minor surgery quite often leads to major surgery. It seemed that a thorough operating room set-up for all types of surgical procedure in and about the mouth should be instituted. This would mean supervision of the student's conduct in the operating room, and in scrubbing up, and that an absolutely sterile set-up of linens, gloves, etc., be required in every case. Since the fall of 1940 there has been a surgically trained Registered Nurse on duty and all operations that come under this head are carried out under strict surgical-room procedure. We appreciate the fact that this rather complicated set-up for a simple operation such as the removal of a deciduous tooth would occasion some criticism. However, after five years experience we are increasingly impressed with its importance from a teaching standpoint.

In the fall of 1941 we had arrived at the conclusion that if our students could be given the opportunity of actually following hospital procedures by a residency in such institution itself for a period of time as an undergraduate, it would be a tremendous aid to the very fine didactic instruction they were being given by the medical members of the faculty. We were working

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*Professor of Oral Surgery and Pathology in the College of Dentistry of the University of Nebraska.*
on this idea at the time of Pearl Harbor which made it seem to be of much more importance due to the fact that many dentists serving in combat areas with the armed forces would be better qualified to serve.

No concrete or definite procedure could be worked out and we were still attempting to devise ways and means whereby such a plan could be set up when we received a letter from one of our graduates who was attached to a hospital ship at Pearl Harbor in which he made a plea for the school to give the students more instruction in first aid and the handling of the injured. With this as an argument, the matter of having a Senior dental student serve for a period in the hospital as a Junior Intern was submitted to the executive staff of the Bryan Memorial Hospital and was very enthusiastically endorsed. The two other hospitals in the city, St. Elizabeth’s and Lincoln General, were then approached and we received like reception. With the hospitals available it was possible to give each of the Senior students only two weeks of this type of instruction as time was short before graduation. However, with the succeeding classes each Senior student has had four weeks. The student enters the hospital two days before he assumes his duties in order to become oriented. Thereafter he functions as a Junior Intern living at the hospital and under hospital rules and is relieved of all college class and clinic responsibilities.

The success of this has been far beyond our expectations. What the student actually gets out of such instruction depends to a large extent upon the student himself, and each student before going to the institution to which he has been assigned is so informed. The month’s training which these young men and women receive has not in any instance diminished their interest in dentistry but in most instances they have returned with an increased interest and a very much better appreciation of the importance of dentistry.

This procedure which probably became possible as a war emergency has now become an established part of our curriculum and we hope will never be rescinded. The very favorable comments received from the superintendents of the various institutions and the medical and surgical staffs have been very gratifying. There are of course some problems which arise that make the program difficult in that the plan has to conform to the school year. This means that during the summer vacation period there is an interruption. This we have so far been able to arrange because of the accelerated program and, in addition the hospitals have retained students who were interested, for the full vacation period.
In many respects this was the most interesting meeting this committee has had. In the beginning pessimism appeared to dominate many if not all. There had been no meeting for more than a year, we had not been able to talk things over together, and therefore no plans had been made, nor had any projects been proposed. But we soon realized that we had only recently concluded an era of destruction, and that now we are actually ready to begin an era of construction. Immediately the atmosphere changed to one of optimism and we began to “count our blessings,” realizing that much had been accomplished as evidenced in the reports published herewith, and further, that the future offered opportunities not before realized. We began to promote researches a few years ago—we have done a good job. The future is ahead of us and plans are now well anticipated, if not actually laid. Read these reports in their entirety, they will do you good. [Ed.]

A. Report to Regents, Oct., 1945
ALBERT L. MIDGLEY, D.M.D.
Providence, R. I., Chairman

A meeting of the Committee on Research of the American College of Dentists was held in Chicago, February 12, 1945.

All of these reports, A. to E., were submitted to the Regents, Chicago, Feb. 10, 11, 1946.
Plans, requirements and regulations pertaining to the William John Gies Award, Fellowships and Grants-in-Aid have been formulated, with the mechanism assembled and in motion. And so, nothing remains to be done in this relationship, except to meet situations and conditions that may arise through everchanging environments and the transforming power of time.

Most of the time of the five-hour session was devoted to a discussion of the medico-dental relationship problem. It was the consensus of opinion that the medico-dental relationship was not what it might or should be; and, as a result, a survey was suggested. The question was how to go about it.

The chairman announced that the personnel of the sub-committee on the medico-dental relationship was as follows: Dr. Brekhus, Chairman, Drs. Blauch, Luckhardt, McQuarrie, Fr. Schwitalla and Dr. Midgley, ex-officio.

At the October, 1944, meeting of the Research Committee, consideration was given to the suggestion presented in the article on medico-dental relationship, which appeared in the August, 1944, issue of the Journal of the American Dental Association, i.e., that representatives of the organizations named in that article assemble for the purpose of deciding what an acceptable medico-dental relationship should be, and how it might be attained.

At that meeting, the Research Committee requested the Regents to instruct the Secretary of the College to extend an invitation to these organizations, expressing the hope that they would be interested and willing to assist in the solution of the problem. The committee also suggested that the Secretary enclose with his letter a copy of the article above mentioned.

The responses to the invitation were gratifying and, to say the least, most encouraging.

The question was raised: What constitutes medicine and dentistry? It was suggested that we try to find a common denominator of the
two health services that could well be a uniform basis of procedure in the attainment of the objective. In the discussion of this item, it was emphasized that the plan should in no way be a propaganda effort but rather an objective analysis from a research point of view.

It was stressed that such a study would reveal the defects of medicine in its relations to dentistry and vice versa, and that an impersonal survey of the medico-dental relationship should not be sponsored by the American College of Dentists or any other interested group.

The intrinsic sameness of medicine and dentistry was emphasized, as was also the view that problems of differences do not exist. It was the consensus of opinion that the professions could not be adequately judged from a lay viewpoint.

It was suggested that an objective study of the development of medicine and dentistry from the very beginning be made in order to see how the changes in their individual curricula have arisen and the present situation brought into being.

An initial survey of the historical background on the evolution of dentistry as an autonomous profession has been prepared by Dr. Arno B. Luckhardt, one of the members of the subcommittee on the Medico-Dental Relationship of the Research Committee of the American College of Dentists. We hope to have Dr. Luckhardt continue this splendid piece of research which will be of inestimable value in promoting the work of the committee.

The unity of purpose, content and responsibility between medicine and dentistry was brought out, and it was stated that the proposed study should be a challenge to both dentistry and medicine.

It was agreed that a study and survey of the medico-dental relationship would be of value to University administrators by indicating to them a correct attitude toward their medical and dental problems.

It was also proposed that the exploratory work be done by dentistry, and with the problem defined it should then be presented to a Foundation for further consideration.
It was emphasized that the survey be proposed by the Research Committee of the American College of Dentists and sponsored by the American College of Dentists, but operated under the supervision of the American Dental Association. It was agreed that the preliminary work should be done by the sub-committee from the Research Committee.

Further discussion emphasized the role of hospital internships for dentists in improving the relationship between medicine and dentistry.

No action was taken on any of the ideas, proposals or suggestions offered in this report that pertain to the medico-dental relationship.

It was resolved, however, that the sub-committee undertake to formulate the problem and problems underlying the medico-dental relationship with the view of taking further steps in the extensive and objective investigation of the question.

The sub-committee voted to meet early this summer, but failed to do so chiefly because of restrictions on travel by the Office of Defense Transportation.

Dr. Kitchin presented the report of the Fellowship Board for 1943-1944 which was approved, as were also the requests of Drs. Armstrong and Wylie for extension of time.

It was voted that the Research Committee recommend to the Board of Regents that a minimum of 10% of all future initiation fees and dues in the American College of Dentists be allocated to a fund for research.

It was also voted that the committee request the Board of Regents to set aside $500 to be granted to Drs. Hunt and Hoppert in 1945-1946 in case they need to carry on their work on inheritance of rat caries.

It was voted that in the future copies of requests for research grants from the American College of Dentists be sent to the members of the Research Council of the International Association for Dental Research for consideration and comments. And also, that
representatives of that group be invited to attend all Research Committee meetings.

It was voted to request the Board of Regents to grant up to $1000 during the coming year to finance an investigation on the use of penicillin as a treatment for Vincent's infection, if and when a suitable individual could be interested in the problem. Also, it was voted to request the Regents to finance a Sigma Xi program at their Chicago meeting.

A request to confer with the Regents was granted. And, after the Research Committee adjourned, a conference was held with the Officers and Regents of the College covering many of the items presented in this report.

B. Research Fellowship Board (1944-45)

PAUL C. KITCHIN, D.D.S., Secretary

Columbus, Ohio

This report is concerned with the period from July 1, 1944, to July 1, 1945. During that time the Research Fellowship Board was authorized by the Board of Regents to make the following research grants:

To H. R. Hunt and C. A. Hoppert, Michigan State College, East Lansing, Michigan, the sum of $500.00 for a continuation of a study of inheritance factors in rat caries.

To Bernhard Gottlieb, Baylor Dental College, Dallas, Tex., the sum of $300.00 for a histological study of dental caries.

To Wendell L. Wylie, College of Dentistry, University of California, San Francisco, California, the sum of $400.00 for a study of the craniofacial skeleton and teeth of monozygotic twins. This grant was to be increased by $100.00 if and when the need of such increase became apparent.

During this same period an older grant was also active. The 1942-43 grant of $1200.00 to Dr. Wallace Armstrong of the University of Minnesota, after one continuation in 1943-44, still had on July 1, 1944, an unused residue of $145.08.

Dr. Armstrong requested, and the Research Fellowship Board
permitted, the continuation in 1944-45 of this grant for the purpose of investigating the value of the topical application of fluorine in the reduction of dental caries experience.

At the termination of the period for which these grants were given, June 30, 1945, the grantees submitted reports on the work accomplished and the financial officers of the institutions at which they worked have rendered financial statements showing how the funds had been spent and have returned any unused parts of the grants.

The year’s report from Drs. Hunt and Hoppert of Michigan State College on their work on inheritance factors in rat caries indicates that they are steadily progressing toward their goal of determining the hereditary factors of susceptibility and immunity to tooth decay in white rats. They have now studied a total of 4357 animals. They have reached the 15th generation of susceptible and the 13th generation of immune animals. It now seems certain that heredity is a factor in producing rat dental caries because the average time necessary to produce it in the 14th generation of susceptible rats averages only 18 days, while in the 9th generation of immune rats, caries fails to appear until about 339 days.

The susceptible rats are now quite uniform in this respect indicating that they are homozygous for the genes concerned with bringing about tooth decay. The caries resistant rats are not as uniform as they should be in their resistance. In searching for a reason for this it has been noted that the hard rice particles in the caries-producing diet cause a mechanical breakage in the upper molars of the resistant rats and with the loss of these molars the opposing lower molars take an extra long time to show any evidence of decay. Thus another factor, rather than heredity, may be causing the non-uniformity in the caries resistant rats. Hunt and Hoppert plan to test this possibility by extracting some of the upper teeth of caries susceptible rats and see if the opposing lower molars go markedly longer without signs of caries than the 18 days now characteristic of these animals. If it proves to be true that the ab-
sence of upper molars reduces the caries in the opposing lowers a softer caries inducing diet will be supplied. In this way more rapid progress toward uniformly caries resistant animals may be secured.

This project deals with an important and fundamental question. It is being conducted in a sound scientific manner by competent investigators. It deserves continued support within the limits of our research grant principles. There have been two publications resulting from this grant.

1. Harrison R. Hunt, A.M. Ph.D., and Carl A. Hoppert, M.S., Ph.D., Inheritance of susceptibility and resistance to caries in albino rats (Mus. norwegicus); *J. Am. Col. Den. 11, 33-7; 1944, Mar.*


An abstract of the second of these articles will be published by Dr. Midgley in his review of 1944-45 publications of researches aided by the A.C.D.

The grant of $300 to Dr. Bernhard Gottlieb was made for supplies and equipment to aid a project already under way, a histological study of dental caries. The money was requested especially for photographic aid and supplies and help in preparing histologic specimens. The usual procedure of depositing the fund with the official financial agent of the University (Baylor) was carried out. However, there seemed to have been considerable misunderstanding between all parties concerned at Dallas and Waco which the Secretary of this Research Committee endeavored to straighten out. This grant did not do Dr. Gottlieb as much good as we had hoped that it would. Perhaps this may have been due to a lack of understanding on the part of the grantee as to how the grant was to be handled or it may have been a lack of cooperation between the Dental School in Dallas and the University in Waco. Only $243.17 of this grant was used, the remainder, according to the report from Baylor University, having been returned to the A.C.D. Treasurer.
In spite of the above, Dr. Gottlieb has published two articles crediting the grant from the A.C.D. with aid. They are:


Summaries of the papers published by Dr. Gottlieb will be printed in Dr. Midgley's annual report of researches aided by the A.C.D. for 1944-45.

The grant of $400 to Dr. Wendell L. Wylie, University of California, for a study of the cranio-facial skeleton and the teeth of monozygotic twins has been returned in its entirety to the Treasurer of the College. Dr. Wylie found it impossible to proceed with his work and so informed the Secretary of the Research Committee on June 13, 1945. He expressed his appreciation to the College for their willingness to assist him in his project.

Dr. Wallace D. Armstrong of the University of Minnesota has utilized the small residue of his 1942-43 grant in a second year study of the carry over effect of topically applied sodium fluoride on dental caries experience in 7-15 year old children. The results of the first year's study carried on without A.C.D. aid were published in *Public Health Reports* 58: 1701-1715 (1943). At the end of the first year the teeth treated topically with sodium fluoride showed 40% less caries than the untreated controls. At the end of the second year carry over results were the same. In connection with this work careful analyses of treated and untreated teeth showed no evidence that the fluoride content of the teeth was increased by topical application of sodium fluoride. Two papers, in addition to the three already published by Dr. Armstrong with aid of the A.C.D., will presumably be published in 1945-46. They will deal further with the results referred to above.

Through the interest and aid of Dean Ernest G. Sloman, a report on the work done by Dr. June Schamp at the College of Physicians and Surgeons, San Francisco, with the aid of a 1941-42 grant from the A.C.D. (Grant No. 9—$1200) as recently been sub-
mitted for publication in the Journal of Dental Research. It is entitled, “Variability of the Pain Threshold in Man,” by June R. Schamp and H. M. Schamp. The authors found a significant variation in the pain threshold in different persons and in the same person over a period of time.

Three grantees of 1942-43 have published the first results of their work or added to previous publications in 1944-45. These articles are as follows:


Abstracts of the contents of these articles will be published by Dr. Midgley in a review of publications for 1944-45 of researches aided by the A.C.D.

As shown by the accompanying tabulated summary of A.C.D. grants since 1940, there has been expended to July 1, 1945, the total of $10,506.65. As a result of this aid to research there have been published to that date twenty-three articles dealing with research in dentistry. Your Research Fellowship Board believes that this is an excellent showing for this most worthwhile activity of the American College of Dentists. While there is no way of reliably assessing the value of research work, one of the ways of judging the results achieved by such an activity is the cost per research article published. In our case that unit cost now stands at $456.80 and four future and additional publications from this expenditure are practically assure for the year 1945-46. It is a common basis on which large foundations work that a reasonable cost of a research project resulting in an acceptable publication is $2,500. The Research Committee of the A.C.D. has a record to date which is less than one-fifth of that cost.
## SUMMARY OF A.C.D. GRANTEES, GRANTS AND PUBLICATIONS THEREFROM

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Total Grants 1940-45, $10,506.65.
Cost per publication, $456.80.
Our first report on “researches aided by the American College of Dentists,” for the years 1940-44, included the following comment, which applies also to the researches that were published in 1944-45 and are listed in Section II of this report:

“Among the Committee’s chief procedures has been the promotion of dental research by awarding grants-in-aid to applicants for assistance. Thus far this has been done by supporting projects that had been successfully initiated, and could be carried to completion with the aid of relatively small grants. All of the funds for this purpose, to the present time, have been appropriated by the Regents from the treasury of the College.

“The first grants-in-aid were awarded in 1940: some have been awarded annually since 1940. The grantees for the fiscal year beginning July 1, 1944, are:

“Dr. Bernhard Gottlieb, Baylor University (Dental School), Dallas, Texas.

“Dr. Wendell L. Wylie, University of California (Dental School), San Francisco, Calif.


Dr. Wylie, among the grantees in 1944-45 named above, was unable to begin the contemplated research for which the grant-in-aid had been awarded. The unexpended grant was returned to the treasury of the College.

Section II presents a complete list of the eight publications,
during 1944-45, in which grantees described researches aided by the American College of Dentists. The following grantees, to whose work support has been given during one or more years since 1940, have not yet (June 30, 1945) published reports or papers descriptive of their researches:

Dr. William H. Bauer, School of Dentistry, St. Louis University, St. Louis, Mo. (Researches completed; two papers descriptive of them have been presented to the *J. Am. Col. Den.*, for publication during 1945-46.)

Dr. June R. Schamp, College of Physicians and Surgeons (Dental School), San Francisco, Calif. (Research completed; a paper descriptive of the findings has been presented to the *Journal of Dental Research* for publication during 1945-46.)

### II. List of Publications of Researches, by Grantees in the Fiscal Year of 1944-45; and Corresponding Abstracts

The appended list of publications, by the grantees named below (and their associates), is complete for the fiscal year of 1944-45 (ending June 30), some of the described researches having been completed before July 1, 1944:

- Dr. Wallace D. Armstrong, University of Minnesota, Minneapolis, Minn. (C)
- Dr. Michael S. Bales, Tufts College, Boston, Mass. (E)
- Dr. Bernhard Gottlieb, Baylor University, Dallas, Tex. (F)
- Dr. James Nuckolls, University of California, San Francisco, Calif. (B)
- Dr. Morris Steggerda, Carnegie Institution of Washington, Cold Spring Harbor, Long Island, N. Y. (D)

The abstracts of the respective publications have been reviewed and approved by the corresponding authors.

The bibliographic groups have been placed in the chronological

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4Each terminal capital letter in this list of names and addresses of grantees indicates the group sequence of the corresponding publication(s) in the succeeding bibliography.
order of the initial awards to the grantees. The year numerals following the name of the grantee(s), at the head of each group of publications, indicate the fiscal year or years in which grants-in-aid were received. The sequence numeral preceding each bibliographic unit facilitates cross references, here and in the general summary (Section III).

(A) **Grantees:** Harrison R. Hunt and Carl A. Hoppert (1940-45)

(1) **Paper:** H. R. Hunt, C. A. Hoppert, and W. G. Erwin. Inheritance of susceptibility to caries in albino rats (*Mus norvegicus*): *J. Den. Res.*, 23, 385-401; 1944, Oct. [Presented at the 22nd General Meeting of the International Association for Dental Research, Chicago, Ill., March 18 and 19, 1944. Items 2 and 3, in the list of publications in 1940-44 (*J. Am. Col. Den.*, 11, 298; 1944, Sep.) were preliminary reports of the findings in this paper.]

Under favorable conditions and by adequate methods that were fully described, the authors—in accord with advanced procedures in this field of research—produced, by continuous experimentation since 1937, a caries susceptible strain (12 generations) and a caries resistant strain (7 generations) of rats by selection, progeny testing, and close inbreeding. Heredity is therefore an important factor in the development of rat caries. In this research a highly susceptible type of rat has been evolved, which is excellent material for collateral studies on the chemical prevention of caries (as by topical applications of fluoride solutions) now in progress.

The science of heredity has established the fact that inherited differences are caused by definite stable units—the genes—each of which is located at a specific point on a chromosome. It is now generally recognized that an organism is the resultant of the activities of its genes and of the environmental factors to which it has been subjected during development. The authors suggested that multiple factors are responsible for differences in caries resistance in their rats, and that additional research is required to test this hypothesis, to identify the number of gene-pairs involved, and to discover the physiological and anatomical effects of these genes.
In noting that caries is influenced by a variety of factors, such as bacteria, nutrition and heredity, the authors stated that a "complete picture" must include the physical characteristics of the diet, to which they gave special attention. The conclusion of Hoppert, Webber and Canniff, that a diet of coarsely ground rice, powdered whole-milk, alfalfa-leaf meal, and sodium chloride induces caries in rat molar teeth was repeatedly confirmed. When the rice component of this diet was ground to the fineness of flour, caries was at least delayed. The general discussion by the authors included this comment:

"This investigation has provided a good example of the determination of a trait both by the genes and by the environment [in this case, physical nature of the diet.] The appropriate genes delay, or even prevent, dental caries. Grind the rice to flour fineness, and a similar result is usually obtained even with highly susceptible rats.

"Do our results prove anything concerning the role of heredity in human caries? The answer is obviously, 'No.' The rat is a rodent and man is a primate; they are only distantly related phylogenetically. Nevertheless, the pathologist experiments with guinea-pigs, rabbits, and dogs [and rats] so that he may formulate hypotheses as to what may be true for human beings, and these hypotheses often prove to be correct. At least our results lend strong support to the idea that there may be hereditary differences in man with respect to dental caries. Such a hypothesis must be tested by critical observations on human beings before any conclusions are drawn."

(B) Grantee: James Nuckolls (1940-41 and 1942-43) University of California, San Francisco, Calif.


Changes in the intercuspal area similar, except in orientation, to those in the cuspal region result in the development of a corium and the formation of an organized epithelial plug with a connective-tissue core. Closely following the appearance of the blood vessels along the outer walls of the follicle, new vessels invade the intercuspal stellate reticulum, breaking up the outer enamel epithelium which remains as isolated groups of cells or rests. The invading
vessels lay down along with them a connective tissue, similar in appearance to the dental follicle, within the condensed stellate reticulum which replaces the epithelial cells—with the exception of the single row of the stratum intermedium. Within the intercuspal area the cells of the stratum intermedium, adjacent to the reducing ameloblasts, show transition from their characteristic flattened form to that of young epithelium and exhibit great mitotic activity. After several layers of cells have developed through this proliferative activity, an organization takes place to form a basal layer and basement membrane. The old cells and those nearest to the formed enamel undergo a keratinization away from the central connective-tissue core which now functions as the corium. The cells of the basal layer continue to proliferate in a manner similar to that occurring in the epithelium overlying the intercuspal region, sending out strands of epithelial cells into the connective-tissue core. With the eruption of the tooth and the almost complete keratinization of the intercuspal tissue, the blood supply is cut off; and the tissue is shed, without hemorrhage, in the form of a plug keratinized on all surfaces.


This comprehensive paper demonstrates the existence of a complete organic matrix in the enamel of adult human teeth, describes a method for the recovery of that matrix, indicates the factors which influence its preservation after the exhibition of decalcifying agents, shows that the structure of the adult matrix retains the essential morphology of that laid down during development, and illustrates the relationship of the matrix to the histopathology of caries and the effects of bacterial invasion. The authors believe their data demonstrate, for the first time, the mechanism of the pathology of caries of enamel and place the problem on a sound experimental
Normal enamel matrix. An organic matrix is distributed throughout the entire structure of the adult enamel of both man and other animals, and may be recovered from teeth of any age group. In the teeth of adults the early structural characteristics of the matrix are identical with those of the developing stages. The staining reactions of the various elements are similar but less precise than those of the developing structure. The histologic demonstration of the matrix substance is dependent on full denaturation and selective decalcification, to avoid its total destruction by acids necessarily employed in the process.

Each rod presents a cortex, core and sheath. The rods are connected by the inter-rod matrix which possesses staining reactions similar though less intense than those of the rod itself. The course of the enamel rod matrix from the dentino-enamel junction to the surface of the tooth varies considerably with the area from which the section is taken. In sections from axial surfaces, the rods are almost parallel with one another; in areas of grooves and fissures the rods turn and follow diversified courses. In precise cross sections, the rod matrix appears to be roughly hexagonal in shape and there is a constant relationship between inter-rod and rod matrix.

The markings of the enamel dependent upon the pattern of calcification, such as incremental and striation lines, have never been observed when the calcium salts were totally removed. The description of these features by others leads the authors to believe that the material examined by previous authors was insufficiently decalcified. The enamel matrix appears to undergo progressive maturation with increasing age. The present authors believe that this process is a continuation of that observed in the developmental period, that this continuing maturation is one of progressive dehydration or desiccation, and that it may be related to the increasing resistance of the enamel to the carious process with age. Based on tinctorial reactions, which are by no means conclusive, there was
some evidence in general agreement with other investigators that the matrix is protein in nature and may be closely related to the keratins.

The authors believe that immaturity of the matrix is important in providing pathways for dissemination of the pathologic process of caries, and that full development and maturation of this matrix— together with the formation of the enamel cuticle and its calcification—play significant roles in rendering the individual caries immune. During the process of fixation a more rapid penetration of the fixative occurs along definite channels far in advance of that in other parts of the structure. Two distinct types of penetration are observed. The first tract consists of organic material running from the dentino-enamel junction in a relatively straight course to the surface of the tooth. The second type is more clearly demonstrated in the carious tooth and pursues a variable and irregular course through the enamel.

Pathology of caries of the enamel: the plaque. With proper fixation and careful handling it is possible to retain a bacterial plaque in situ overlying the area of superficial carious enamel. The arrangement of the morphological types of organisms in the plaque is relatively constant. Thread forms appear to predominate in the superficial layers; spheroid forms are in greater abundance in juxtaposition to the deeper zone of active enamel erosion. The background of the plaque is amorphous and eosinophilic in reaction; small islands of enamel matrix occur in the deeper layers, which continue to break up and by liquefaction contribute to its appearance.

Superficial caries. The initial carious lesion on the surface of the enamel is probably associated with the formation of the bacterial plaque and the breakdown of the enamel cuticle, thereby uncovering the ends of the enamel rods and inter-rod matrix. The penetration of this calcified homogeneous cuticle may be due to removal of the more readily soluble inorganic constituents from this layer by acidogenic bacteria. Acid action may therefore account for the opening up of the rods and inter-rod matrix for the invasion by
spheroidal Gram-positive microorganisms. Possibly the protection by fluoride is related to the substitution of the more readily soluble calcium carbonate of the surface layer by the harder and relatively insoluble calcium fluoride, with ensuing alterations in permeability.

Once the cuticle is destroyed, the essential and primary pathologic lesion is one of proteolysis of the matrix. The extension of this proteolytic process and liquefaction of the matrix frees the less soluble basic tricalcium phosphate from its organic bond, thus favoring its solution by products of acidogenic bacteria which secondarily penetrate along widening pathways of ingress.

The earliest pathologic change observed in the matrix is an increasingly intense acidophilic reaction to stains immediately underneath the surface plaque. Closely following the acidophilic reaction in the matrix, there is progressive loss of structural detail in the enamel elements and, when advanced in development, the matrix becomes almost homogeneous, and the affected area eventually undergoes solution. In the early stages these areas are devoid of organisms. This process is one of proteolysis and is probably produced by extra-cellular enzymes. Continued proteolysis results in the exposure of individual rods or groups of rods which have not as yet undergone so complete a change, and project beyond the area of liquefaction. In this manner the rod-core and inter-rod matrix are opened up, thus establishing portals of entry for invasion by other organisms.

Gram-positive spheroidal organisms, having penetrated the lysed surface-matrix, advance far into the matrix well beyond the general area of decomposition. Depending on the mode of ingress, the organisms are either within the core of the rod or in the inter-rod matrix, and changes in the staining reaction may be observed in the immediately surrounding matrix. Superficial carious areas other than those of active penetration appear to be remarkably resistant to further solution, expansion of the cavity being purely a surface phenomenon. It has been regularly observed that such portions of
the cavity lie always in relationship to areas where the threadlike and mixed organisms predominate.

Following the opening up of the rod-core and the inter-rod matrix there is an invasion of Gram-positive spheroidal organisms. The process extends through the full thickness of the enamel, leading to the establishment of foci at the dentino-enamel junction. The pathways of penetration are narrow and irregular tracts, and may resemble the classically described lamellae. Under the higher powers of the microscope, and with the use of bacteriological stains, these tracts are found to consist of one or several isolated rods whose cores are packed with organisms. The organisms in these tracts are invariably of similar morphological types: Gram-positive spheroidal forms.

Invasion along the so-called lamellar tracts, having reached the dentino-enamel junction, establishes a secondary focus of the carious process, the ensuing proteolytic changes extending laterally along the junction and opening up the dentinal extremities of the rod and inter-rod matrix. In the earlier stages the foci are small and the organisms are exclusively Gram-positive and spheroidal in form. With expansion of the tract, secondary organisms of diverse morphology make their appearance, and cavitation and lysis of the matrix elements result. From such dentino-enamel foci, retrograde spread into the overlying enamel matrix proceeds. The frontal areas of attack present the same picture as that observed in superficial caries.

*Extensive caries.* The production of extensive caries of the matrix, through the development of multiple irregular channels of dissemination, results from a different penetration by the pathologic process. This process has its inception as a surface lesion, the pathologic features of which in nowise differ from those described above for superficial caries. Islands of healthy matrix become isolated by fusion of the spreading channels and the entire matrix is broken up. When the breakdown nears completion, the process leads to rapid and extensive cavitation. The newly invaded periphery of these areas shows relatively few organisms—all of the spheroidal type—
and the margins of the lesion are acidophilic in reaction. Secondary invaders present a variety of organisms of heterogeneous morphology and in great profusion.

These histo-pathologic findings demonstrate that caries is more than a simple decalcification and removal of the inorganic salts. The underlying organic structure is fundamentally related to the pathological process. The authors suggest as a working hypothesis that, with the establishment of the lesion, caries of the enamel is primarily a proteolysis of the organic matrix resulting from the enzymatic action of microorganisms, followed by the subsequent dissociation of the inorganic constituents.

(C) **Grantee:** Wallace D. Armstrong (1941-44)
University of Minnesota, Minneapolis, Minn.


Teeth extracted from the mouths of children, who had received two to six topical applications of 2.0 percent sodium fluoride solution to the teeth of the right side of the mouth—and to those on the left side in alternate subjects—were examined for content of fluorine in the enamel. There was no evidence that the content of fluorine in the *entire* (non-carious) enamel was increased by the fluoride applications, but whether there is an increase in that content in the *superficial layer* of the enamel under such conditions remains to be determined.

(D) **Grantee:** Morris Steggerda (1942-43)
Carnegie Institution of Washington, Cold Spring Harbor, Long Island, N. Y.

(5) **Paper:** Morris Steggerda, Ph.D. Anthropometry and the eruption time of teeth: *J. Am. Den. Assoc.*, 32, 339-42; 1945, Mar. [This paper was mentioned in the Committee’s report for 1940-44 (*J. Am. Col. Den.*, 11, 296; 1944, Sep.) as “research completed, paper in press.”]

It is often stated, about a particular child, that he is taller and heavier than the average for his age, and he is said to be “precocious.” If he is below average in height and weight, he is said to be “re-
The assumption that a large child develops earlier and a small child later than the average is not necessarily correct, since size is determined by inherent genetic factors which may be independent of the genes that determine the speed of growth. Individual size in a given population is exceedingly variable. A tall boy of 11, who is destined to become a taller-than-average man, may have progressed no farther in his development than a very short boy of the same age, who will become a shorter-than-average man.

The author showed that, for subjects selected at random, the teeth erupt in tall and heavy boys both earlier and later than the average for the population; and that the same is true for boys who are below the average in height and weight, and also for boys who are very close thereto. He described procedures and results of related statistical correlations for males and females of four racial groups, based upon stature and dental age, and also for one racial group based upon development of the face and head. The general result was indicated by this deduction: “There is no correlation between the dental age of a child and the amount of his deviation from the average anthropometric measure for his racial stock.” The author’s concluding comment follows:

“Anthropometrists and all other students of human growth should be exceedingly careful in using the term “precocious.” The fact that an individual is large does not mean that he has developed earlier or faster. It merely means that he belongs to a breed different from that of his smaller companions. If a population were homogenous and destined to be of the same adult size, any individual attaining adulthood earlier than the average might be said to be precocious; but with populations as variable as they are, size is not necessarily an index of precocity. Our data emphasize this fact by demonstrating the very low statistical correlation between individual size and eruption time of teeth.”

(E) Grantee: Michael S. Bales (1942-43)
Tufts College Dental School, Boston, Mass.

Defective dental structure, particularly hypoplasia, has been a subject of observation and discussion by dentists from earliest times, and different types of enamel defects (gross hypoplasia) have been recognized and their causes variously explained. The exanthematous diseases of childhood have come under particular suspicion as causative factors, some writers having attributed different types of hypoplasia exclusively to specific eruptive disorders. While no credence can be given to the idea of specific causation, the related observations were important because they indicated that sickness in early life adversely affects the structure of teeth. The published reports do not indicate which types of systemic affections are most conducive to defective enamel structure, or whether such structural defects invariably follow general metabolic upsets.

The authors, after a study of teeth from children for whom detailed life-long medical histories were available—by methods that are described and results that are tabulated—concluded that there is a more or less definite correlation between the occurrence of formative defects in the enamel and contemporaneous systemic ailments; also that the pattern of enamel structure offers a permanent record of deleterious influences acting on the enamel organ during the period of amelogenesis. Compared with nutritional deficiencies, the exanthemata play only a minor part in the causation of enamel defects and, contrary to common opinion, are not a major cause. It is uncertain what the observed enamel defects mean in terms of metabolic dysfunction; but it is apparent that amelogenesis is a delicate process which can be disturbed either by deterioration of the ameloblasts themselves, or by deficiencies in the supply of the materials from which the ameloblasts produce their calcific secretion—both of which results can be caused directly or indirectly by systemic disturbances. The summary at the end of the paper is appended:
“Ground sections of 95 teeth from 34 patients with detailed medical histories were examined microscopically to determine whether defects in the enamel structure were related to the occurrence of systemic ailments. In more than 70% of the cases there was a positive correlation between the time of formation of a band of definitely defective enamel and the existence of some systemic disability. In 23% of the patients there were definite defects in the enamel of patients who had no histories of systemic conditions which might have produced enamel defects. In 6% there were [no] enamel changes in patients who had histories of disabilities which had produced enamel changes in other patients.

“Deficiencies of vitamins A, C, D and also of calcium and phosphorus were the commonest cause of defective enamel formation. Enamel defects were also noted in relation to chicken pox, measles, pneumonia, pertussis, intestinal and gastric disturbances and upper respiratory infection in the children and toxemia of pregnancy in their mothers, but in practically all instances these conditions were superimposed upon an inadequate nutritional state.”

(F) Grantee: Bernhard Gottlieb (1944-45)
Baylor University, College of Dentistry, Dallas, Tex.


The findings were illustrated with seven histological figures (decalcified sections). Carious enamel is more resistant than intact enamel to the action of acid. In routinely made histological serial sections, through human jaws, pieces of carious enamel often persist while surrounding healthy enamel has been dissolved. This difference is due apparently to increase in the protein content caused by the invading microorganisms. The carious process progresses primarily along the organic roads of the prism sheaths, which cement the more calcified prisms to each other. In excessively fluorosed enamel, there are transparent strips in which the prism sheaths also are apparently calcified. This might be the reason why such enamel crumbles easily; why the prism sheaths cannot then be invasion roads, being obstructed by the fluorized calcification; and why there is greater resistance to enamel caries in teeth formed in “high [though not excessive] fluorine areas.”
The carious process first invades the prism sheaths while the prisms appear to be intact. Later the process invades the prisms and increases their resistance to acid. In the advanced stage the prism sheaths become black (in decalcified sections) and finally disappear, apparently being digested. The prisms remain visible, separated, and, no longer connected by prism sheaths, finally also becoming necrotic. General conclusion:

"Thus four stages can be differentiated in the progress of enamel caries: (1) the organic framework is thickened; (2) the process invades the prisms, making them more acid resistant while the prism sheaths turn black; (3) the prism sheaths disappear while the isolated prisms are still present; (4) a necrotic mass replaces the enamel structure."


Six histological sections (ground or decalcified), showing the findings, were discussed in detail. The histopathology of dental caries demonstrates that the process is an invasion by proteolytic microorganisms and is characterized by the production of yellow pigment. These proteolytic microorganisms are associated with a second group, which produce acid, dental caries thus resulting from action by at least two kinds of microorganisms. Two types of undermining dentin caries were ascribed to the action of two kinds of microorganisms, the type of dentin caries depending upon the group that first arrives in the dentin. One group develops a spread of yellow pigment beneath an intact enamel layer; the other group induces shrinkage (of dentin) that is caused by action of acid.

In the form of dentin caries that is accompanied by yellow pigmentation, proteolytic microorganisms reach the dentin by way of a lamella and no change in structure associated with the yellow pigmentation can be demonstrated with the x-ray. In the second form, shrinkage of the dentin is caused by acid-producing microorganisms spearheading along the prism sheaths. The dentin, by shrinkage, produces a vacuum into which dental lymph is aspirated from the dentinal tubules and coagulates, this coagulum being an ideal nutrient medium from which microorganisms may further
invade the dentin and enamel. In an x-ray picture, a dark shadow at the dentino-enamel junction indicates the creation of a vacuum by loss of solid material due to acid decalcification.

III. General summary of main published findings

Caries: dentin; undermining. (8) Two types of undermining dentin caries are caused by two kinds of microorganisms, the type of resultant caries depending upon the group that first arrives in the dentin. One group—proteolytic, that reach the dentin along a lamella—develop a spread of yellow pigment beneath an intact enamel layer. The other group—acidogenic, that spearhead along the prisms sheaths—induce shrinkage of the dentin, thus producing a vacuum into which dental lymph is aspirated from dentinal tubules and provides nutrients for further extensions of the carious process.

Caries: enamel; detailed description (3). With the establishment of the lesion under acidogenic conditions, caries of enamel is primarily a proteolysis of the organic matrix resulting from the enzymatic action of microorganisms followed by subsequent dissociation of the inorganic constituents.

Caries: enamel; histopathology (7). There are four stages in the progress of enamel caries: (a) the organic framework is thickened; (b) the process invades the prisms, making them more acid resistant while the prism sheaths turn black; (c) the prism sheaths disappear while the isolated prisms are still present; (d) a necrotic mass replaces the enamel structure.

Caries: enamel; organic matrix relationship (3). In enamel caries, after the primary cuticle has been penetrated under acidogenic conditions, the essential pathologic lesion is proteolysis of the matrix. The extension of this proteolytic process and liquefaction of the matrix frees the less soluble basic tricalcium phosphate from its organic bond, thus favoring its solution by products of acidogenic

5The numerals in parenthesis, after marginal headings, refer the reader to the corresponding units in the preceding bibliography.
bacteria which secondarily penetrate along widening pathways of invasion.

Caries: inheritance; important factor (1). Heredity is an important factor in the development of caries in rats. Experiments in continuous progress since 1937—in which susceptible (12 generations) and resistant (7 generations) lines have been obtained—indicate that by selection of individuals, progeny testing, and close inbreeding, a caries-immune strain may be evolved. The results lend strong support to the idea that there may be hereditary differences in man with respect to dental caries, but this hypothesis must be tested by critical observations on human beings before any conclusions can be drawn.

Caries: physical nature of food; causative factor (1). The described experiments are a good example of the determination of a trait (increased susceptibility to dental caries) both by the genes and by the environment (physical nature of the diet in rats).

Enamel: fluorine content; after topical applications of fluoride solutions (4). Topical applications of fluoride solutions to teeth of children did not increase the content of fluorine in entire (non-carious) enamel. The effect on the superficial layer has not yet been determined.

Enamel: microscopic defects; relation of children’s diseases (6). There is a more or less definite correlation between the occurrence of formative defects in enamel and contemporaneous systemic ailments. The pattern of enamel structure offers a permanent record of deleterious influences acting on the enamel organ during the period of amelogenesis. Compared with nutritional deficiencies, which are the chief factors, the exanthematous diseases of childhood play only a minor part in the causation of enamel defects.

Enamel: organic matrix; distribution (3). An organic matrix exists throughout the enamel of adult human teeth. A method has been developed to assure the recovery of the matrix, including control of the factors that tend to destroy it in the application of decalcifying agents for its separation. The structure of the adult
matrix retains the essential morphology of that laid down during development.

*Teeth: eruption time; anthropometry* (5). There is no correlation between the dental age of a child and the amount of his or her deviation from the average anthropometric measure for his racial stock. There is a very low statistical correlation between size of the individual and eruption time of his or her teeth.

*Teeth: first molar; eruption and shedding of intercuspal tissue* (2). A preliminary histological study of these processes in rats.

D. REPORT TO THE REGENTS

PAUL C. KITCHIN, D.D.S., Secretary

Columbus, Ohio

The meeting was called to order by Chairman Midgley at 2:30 p.m. following a dinner tendered the members by the Chairman.

The minutes of the previous meeting were not read owing to the fact that they had been distributed to all the members soon after the 1945 session and approval signified by lack of criticism following receipt.

There was a general discussion of the accomplishments and what should constitute the plans for the future of the Research Committee.

The question of how to improve relations between the dental and medical professions was discussed largely between Dr. Midgley and Dr. Gurley. The former advocated the idea that such an improvement was basic to the advancement and continued autonomy of dentistry, while the latter advanced the idea that improvement in relations with medicine would and could better be brought about by a better understanding, individually and collectively, of the general problems of health in relation to dental conditions on the part of dentistry itself.

Mr. Joseph Lohman, sociologist now completing work for the doctorate degree at the University of Chicago, discussed the views of Drs. Midgley and Gurley and commented to the effect that he
considered them equally interested in a better medico-dental relationship but differing as to how to go about obtaining this result.

Mr. Lohman who has been studying the social aspects of the health professions stated that he believed in order to get the best results for the public the professions must be prepared to direct the expenditures of public funds which were certain to be made available for more widespread health service in the near future. Failing this he predicted that such expenditures would be made by persons and agencies whose prime purposes could be political and certainly would not be professional in concept. He discussed the problem of proper organization of dental health service and pointed out that it must accomplish (1) a more adequate extension of services, (2) an accumulation of more real information concerning dental ills, and an adequate allocation of services to be rendered by the dentist and by the physician. This last was something which would be clarified only through research.

Mr. Lohman predicted that more collective action in health service is coming and that the professions involved must lead off in their respective fields or become secondary factors in the movement.

Initiating a discussion of what the Research Committee could plan to do, Dr. Hodge proposed three things: (1) that the Committee back the legislation proposed in Senate Bill 190 (to establish a National Institute on Dental Research); (2) that the committee initiate a long range, large scale plan to raise funds by appeal to the public for research purposes, and (3) that the committee attempt a dramatization of dental research by a well publicized award to an outstanding researcher in dental problems. As an example he cited the work of H. T. Dean on fluorine in relation to dental caries.

Dr. J. Wilmer Souder presented what he considered should be the attitude of the Research Committee and the American College of Dentists to the changing conditions in our social relations. Presuming that we wish to progress, continue to be a professional group, and to command the respect and confidence of the public, we must not close our eyes to difficulties and unsolved problems which stand
between the profession and perfect dental service to patients. Dr. Souder felt that the A.C.D. was the pre-eminent dental group to recognize, admit the presence of, and to seek solutions of these problems. To shun such responsibility places dentists in the class of tradesmen. Research must be advanced in all fields and research should be stimulated and supported in every possible way.

Dr. Souder referred to the recent accomplishments in nuclear physics as an example of how cooperative effort, guided by vision and willingness to undertake the seemingly impossible could solve a difficult problem and popularize a field of research previously considered by the layman as abstract and mysterious. It was pointed out that dentistry has the difficult problem of tooth decay and that its answer is imperious. The dental profession must be confident that it can be answered. The profession must be guarded against exploiters. Dr. Souder mentioned the vitamin and mineral sellers who claim to stop dental caries and the makers of denture reliners whose product is ruining patients' dentures because dentists recommend using these things without knowing what they will and will not do.

The proposals of National legislation in the health fields denote that the professions have not advanced as fast as the nations' needs demanded and also that they could not advance fast enough without aid. There is costly confusion in organization of health services, just as there has been in the past, confusion in such generally used entities as weights and measures and law enforcement. These were solved by government action which fortunately was directed by intelligent agencies and men.

Assuming that National legislation on dental health is not far in the future, Dr. Souder raised the question whether dentistry will be in a position to take the lead in such a program or will the administration of the funds and direction of researches be seized by opportunists who are even now setting up programs in order to get the appropriations. In Dr. Souder's opinion, the hour is late even now and the dental profession through their research men and such
groups as the A.C.D. should have an outlined plan for the investigations of dental problems that will command the respect of those in places of governmental authority.

Dr. Gurley recommended that the Research Committee should consider revamping their plans for research in the light of our past experiences and possibilities of the future.

At a meeting at 9:00 a.m., February 11, 1946, the Research Fellowship Board voted to recommend to the Board of Regents the granting of the following requests for research funds for 1946-1947.

To Drs. Hunt and Hoppert of Michigan State College, for the continuation of their work on inheritance of rat caries, the sum of $500.00 with a recommendation that the Fellowship Board feels that this amount if granted should terminate the assistance to this project.

To Dr. Morris Steggerda of the Hartford Seminary Foundation, Hartford, Connecticut, for an investigation of dental caries and the eruption time of the teeth of various racial groups located in Africa, India, China, and Latin America, the sum of $500.00.

In a consideration of several plans for the future, the Research Fellowship Board requested that the Regents allocate for research purposes the sum of $2500 annually to be used for grants-in-aid for projects recommended as heretofore by the Fellowship Board and that any unused residue of these annual grants be set aside and allowed to accumulate for the use of the Research Fellowship Board in granting aid to research.

The Research Fellowship Board recommended that the Regents appoint a suitable committee to study proposed legislation relative to federal grants for research and that it officially actively support or repudiate bills of this nature according to the recommendations of such a committee.
E. Action of the Board of Regents on Above Reports

Otto W. Brandhorst, D.D.S., Secretary
St. Louis

Research Report received. Moved, seconded and carried, that matters pertaining to finances be referred to the Budget Committee.

Moved, seconded and carried, that the Research Committee be designated to make suitable study of pending legislation relating to research funds and recommend to the Regents which legislation should be supported by the College and which opposed. The Committee is to have the privilege of calling in aid in its study and to consult freely with other committees and agencies.

It was moved, seconded and carried, that when the report of the Research Committee on Federal legislation relative to research is available, and approved by the Regents, it shall be made available to the members of the College for whatever use they may wish to make of it.

The request for $1,000 by the Research Committee for grants-in-aid for this fiscal year was approved, this being within the amount provided for in the budget.

It was voted that the budget for grants-in-aid and Fellowships for the year July, 1946, to June 30, 1947, be limited to $1,000.

Action on the request to earmark $2,500 annually for research and to make it cumulative was deferred. It was felt that a balanced budget needed to be maintained.

The desirability of a possible increase in dues or membership fee was referred to the By-laws committee.
BOOK REVIEWS

Year Book of Dentistry; Diseases of the Mouth, Pathology and Research, by Lester Cahn, D.D.S., Chairman, Division of Oral Pathology, Columbia University; Operative Dentistry, by George W. Wilson, D.D.S., Professor of Operative Dentistry and Dean, Marquette University Dental School; Oral Surgery, by Carl W. Waldron, M.D., D.D.S., Professor of Oral Surgery, University of Minnesota School of Dentistry; Prosthetic Dentistry, by Stanley D. Tylman, D.D.S., Professor of Prosthetics, University of Illinois College of Dentistry; Orthodontics, by George R. Moore, D.D.S., Professor and Head of the Department of Orthodontics, School of Dentistry, University of Michigan. Published by Year Book Publishers, Inc., 304 So. Dearborn St., Chicago, 4, Ill. Price $3.00 post-paid.

Public Health Economics: A monthly compilation of events and opinions. This is a thirty-eight page publication with index, mimeographed and designed for those interested in Public Health Work. Volume one has been completed, Vol. 2, No. I, being the issue for Jan. 1945, and which volume is now complete. It is published monthly by the School of Public Health, University of Michigan, Ann Arbor, Mich., Subscription price, $2.00 per year.

Oral Medicine: This is the title of a new book under the authorship of Lester W. Burket, M.D. D.D.S., Professor of Oral Medicine, The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania. This book consists of 674 pages including a well prepared index. It is well bound, printed on good paper and should accomplish the purpose for which it is intended, namely the correlation of today's practice of dentistry and medicine. It contains 350 illustrations some of which are in color. It is arranged in 10 sections, including sub-sections as Medical-Dental Relations, Fusospirochetal, Other Infections, Oral Diseases of Dental Interests, the Endocrines, Vitamins, Oral Pediatrics,
Gerodontics, Aviation Medicine and others. The book covers very fully all those conditions that bear on the practice of medicine and of dentistry. A valid criticism of the book may be that it bears too heavily on the medical aspect. Published by J. B. Lippincott Company, Philadelphia. Price $12.00.


This book, designed primarily for students, is nonetheless valuable for the general practitioner. The pages devoted to impression materials alone is sufficient reason for owning one. The scientific aspect of materials used is of real value to the dentist and here is an authority.

*The Dentist's Own Business:* by Arthur A. Campbell, D.D.S. (A practical study in the management of a dental practice with due consideration of its ethical responsibilities.) Illustrated. 113 pages. Wire-O binding. $3.50. (Published March 20, 1946.)

Some of the chapter headings are as follows: Records; Daily Appointment Card and Record; Patient's Record; One Chair Office; Dental Assistant; Observations.
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