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Contributions, which may deal with any aspect of dental history or bibliography, are invited. The maximum length for original articles is about 5,000 words. Manuscripts should be typewritten with double spacing and wide margins. The Editor reserves the right to make literary corrections. All references should contain name(s) and initial(s) of author(s) and full title of paper or work. Journal articles should also include name of journal, year, volume number and complete pagination, in that order. With books, the city of origin, publisher, date and full pagination should be given.

Manuscripts as well as correspondence relating to the publication of papers should be addressed to the Editor, Bulletin of the History of Dentistry, 4 Bank Street, Batavia, New York, 14020.

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BULLETIN
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Volume 18, No. 1

June, 1970

"Tufts Centennial Issue"

Official Publication of
American Academy of the History of Dentistry
Dr. Louis J. P. Calisti, Dean 1965 to Present
A Tribute

One hundred and thirty years ago the first school in the world devoted to the professional training of dentists opened its doors in Baltimore, Maryland in the United States of America. Its faculty of four was outnumbered by the five students attending the prescribed course of sixteen weeks, and at the end of this time two students were graduated!

From this humble beginning American dental education has grown to the status it enjoys today as the leader of the world's dental educational systems. The reputation of our dental schools is deservedly great, with many of the most significant advances in the field of dentistry being developed by world-renowned researchers among their faculties. The quality of excellence which characterizes American clinical dentistry is a tribute to the painstaking and thorough teaching methods which have been innovated by our dental schools.

The path has not always been easy. The early years of this century saw the rise of proprietary dental colleges, operated strictly for monetary gain, with about 50 of the 60 schools existing in 1900 being of this type. A measure of their educational value can be gleaned from the example of one school which had an enrollment of six hundred and fifty and yet employed but a single instructor to teach three scientific subjects! Granted that this was an extreme case, but most of the other proprietary schools weren't a great deal better.

Nevertheless, a handful of schools sought to maintain high standards of instruction and practice for dentistry by means of competent and devoted faculties and university affiliations.

Foremost among these few schools was the Boston Dental College which was the forerunner of today's School of Dental Medicine of Tufts University. The growth and maturation of this school characterizes much of the development of dental education in our country to its position today. Thus a study of the history of this one school will help one to better understand the history of our profession in general.

The American Academy of the History of Dentistry is therefore proud to dedicate this issue of the Bulletin of the History of Dentistry to

TUFTS UNIVERSITY SCHOOL OF DENTAL MEDICINE.

The Editor
Isaac J. Wetherbee
President of the Boston Dental College
1868-1899
"It is our duty to transmit to those who shall come after us not only an honorable record as men, but, to make that record replete with evidences of professional excellence, which shall command the respect and admiration of all true lovers of science."

Isaac J. Wetherbee 1866
President of the Boston Dental College 1868-1899

The First One Hundred Years of Tufts University School of Dental Medicine

The historical development of Tufts University School of Dental Medicine during the past century is essentially the story of the development of the profession in America from a relatively crude craft to a highly sophisticated medical specialty within the general intellectual and scientific environment of the university and in the close cooperation with medical schools and hospitals of the medical centers.

In 1868, the Civil War had been over only three years. Although the country was at peace, it was in a state of economic chaos; President Andrew Johnson was being threatened with impeachment. The dental profession had only recently been born. It was only about a quarter of a century before this that the first dental school in the world was established in Baltimore. Dentistry was striving desperately for growth and direction. However, the shadow of the charlatan still cast a dark image over the emerging profession. There had been no rules, no regulations, no educational requirements for practice and little ethical precedent.

Nevertheless, by 1868, dentistry was in the early stages of organization into a respected profession. The Massachusetts Dental Society had been founded four years earlier, and in 1866 Isaac J. Wetherbee, (who was to become the first president of Boston Dental College, the precursor of Tufts School of Dental Medicine), addressed the Society on the "Past and Future of the Dental Profession". In eloquent prose, in keeping with his training as a minister, he spoke of the ordeal to the patient of dental operations and the fact that the acquisition of knowledge in order to relieve the "miseries of a professional hour, is an attainment realized by
comparatively few, and by them only as they have labored to become masters of the varied conditions and phases which are continually presenting themselves for their consideration."

Wetherbee pointed out that dentistry was really a specialty of medicine, but that its development was retarded. It was comparable to the early years of other specialties such as surgery:

"The history of the dental profession (which is the oldest of specialties) in its rise and progress, is not unlike other professions, for it has had its day of small things, in character, ability and success. We have but to refer to the historic repute of surgery in Europe, where it first took up the scalpel, to recognize a striking similarity. Being universally subject to the dictation of the medical profession, it was without character. And whatever of ability might be displayed, or success obtained, he was "only a surgeon." But how changed! For many years the professional surgeon has held rank second to none among all the liberal professions, either in Europe or America."

Paul Revere announces that he "carries on the business of a dentist" in an ad in the Boston Gazette in 1768.

Nitrous oxide gas apparatus — 1868

At this time some eight dental colleges had already been established and were to play a significant role in redeeming the profession from the condition of a mere handicraft. Wetherbee stressed the importance of a solid dental education, preferably with an initial medical and scientific background:
"Knowledge is power, however gained; but there are certain channels through which knowledge may be systematically obtained. I would therefore urge upon the consideration of every young man who contemplates entering upon the study of dentistry, the practicability of first graduating at some Medical College, and of attending a full course of instruction at some one of the Dental Colleges; that he may be thoroughly furnished unto every good work which appertains to his specialty. If he cannot graduate at more than one for want of means to pay his way, let the Dental College have by far the greater preference. I cannot too strongly urge the necessity of the latter course; for the time has come when every student of dentistry should feel the importance of establishing a public confidence in his ability to meet, in a scientific manner, the exigencies of every case which may come under his professional notice. It is due both to himself and patients that all proper insurances and guaranties be at hand, that the line of demarcation may be so obvious, that empirics and charlatans will find their occupation gone."

Wetherbee felt the need for the development of a dental school in Boston to serve the New England area, and spoke out for it strongly:

"As to the demand for, and the propriety of establishing a Dental College in the City of Boston, for the accommodation of students of the New England States and the British Provinces, there is at present a diversity of opinion. That such an enterprise would be attended with desirable results, provided it were commenced and carried through with untiring energy, no one will doubt. But harrassing fears of failure seem to hide from view the possibility of accomplishing so great a work. I trust the subject will receive from our hands that consideration which it so eminently deserves. Are there not men of wealth, in this community, who will gladly aid us in establishing, on a firm basis, a school of instruction, where young men may be fitted for all the practical duties belonging to our profession? Until an effort is made in this direction we shall never know how well, or how poorly, we might have succeeded."
Status of Dentistry in The Earlier Years

Although men of vision were to be found in the dental profession in the post-Civil War period, the road to that point in dentistry's history had not been an easy one.

Prior to 1840 when the first American dental school was chartered at Baltimore, dentistry in this country was just beginning to emerge from its low status dating back to colonial days. Dental practice in colonial America was significantly inferior to that of the more advanced European countries, and dental education was essentially non-existent at the time. Colonial dentistry was a technical craft, and its practitioners were artisans in gold, silver and other metals who devoted part of their time to the construction of prosthetic dental appliances. Their knowledge of medicine and anatomy was usually rudimentary and their lack of scientific training precluded an appreciation of pathologic entities in the mouth. Paul Revere was one of the more notable personalities who served as dental practitioners of colonial days and his practice was primarily the replacement of missing teeth, as advertised.

Following the founding of the Republic there was a gradual improvement in the level of dentistry as an art and science, with practitioners representing two different educational backgrounds: he was either a medical graduate specializing in dental surgery, or a practitioner trained in another dentist's office and then obtaining further medical knowledge. Dental instruments were becoming more
sophisticated. Periodontal scalers and surgical knives were particularly well developed in contrast to extraction instruments where the infamous 'key' was still widely used and produced excessive trauma to the alveolus. Crude cavity preparations were done primarily with hand instruments and hand operated drills. In 1840 the leading dentists in this country organized the first national association, the American Society of Dental Surgeons. Chapin A. Harris, Horace H. Hayden and their associates composed the first faculty of the Baltimore College of Dental Surgery in 1840. A number of other dental schools were founded in the next twenty-five years including three schools in Philadelphia, two in St. Louis and one in New York.

19th century periodontal knives (below) and mouth mirror (above)

Beginnings of Organization and Education

In New England, at this time, there was a large group of well qualified dental practitioners in Boston and this group in 1864 formed the Massachusetts Dental Society. At the time there were ninety dental practitioners in Boston. The founders of the society realized that in order to maintain and improve professional standards, it would be necessary to develop educational institutions so that formal education in dentistry could be obtained in Boston. In 1865 Nathan Cooley Keep, as president of the Massachusetts Dental Society, recommended the establishment of a chair of dentistry at Harvard Medical College and a committee of three was appointed to look
THE DENTIST'S MICROSCOPE.

into the matter, consisting of Dr. Keep, Dr. Isaac J. Wetherbee and Dr. Thomas Henderson Chandler. In 1867 the Harvard Corporation voted to establish the Harvard Dental School, after a resolution had been passed by the medical faculty which pointed out the need for this step so that "the crowd of dentists that will hereafter be in this city may not be of a lower quality than their predecessors". Nathan Cooley Keep became Harvard's first dental dean and the first professor of mechanical dentistry. Dental appointments to the faculty were to be limited to graduates of Harvard Medical School, assuring a high standard of instruction in the basic medical subjects. Among the eminent faculty members of the medical school who taught at the dental school were Oliver Wendell Holmes and Henry J. Bigelow, the latter being the surgeon who assisted Morton in the first successful demonstration of ether anesthesia at the Massachusetts General Hospital in 1846 and who wrote the first scientific paper announcing the discovery.

Since many prominent Boston dentists at this time were not medical men with an M.D. degree, they were excluded from holding professorships at the Harvard Dental School and questioned the fundamental purpose of this type of organization, where dentistry was to be taught as an extension of current medical education.

In 1865, a contingent of the membership of the Massachusetts Dental Society had withdrawn to form another organization, the Boston Dental Institute. This group soon announced its purpose of establishing a "practical" dental college. With pointed emphasis, this school was to be a "continuation of the best elements of the best traditions of the dental office". The members who were left in the Massachusetts Dental Society voted, however, to "deprecate this effort to establish a second college in Boston."
Thus, the original committee of the Massachusetts Dental Society was responsible for the founding and organization of two dental schools in Boston, with Nathan Cooley Keep developing the Harvard Dental School, and Isaac J. Wetherbee developing the Boston Dental College, later to become the Tufts College Dental School.

Six of the original founders of the Massachusetts Dental Society became intimately associated with Harvard. The other five supported the second school, the Boston Dental College, which was founded in 1868 with Dr. Wetherbee as its president.

**Beginnings of The Boston Dental College**

Ironically out of this bitter controversy within the Massachusetts Dental Society came two of dentistry’s outstanding schools — easily the society’s greatest contribution to the profession and to society as a whole.

The Boston Dental College was an outgrowth of the Boston Dental Institute, which had been organized in 1865 with seventy members and with Wetherbee as president. This group had monthly meetings in the old Tremont Temple building and secured the services of John A. Follett, M.D. to lecture to them on topics in anatomy and physiology. Dr. Follett was later to become the professor of anatomy and the first dean of the future Boston Dental College.

The charter of the Boston Dental College was granted by the State Legislature on June 3, 1868 and was composed of the following sections:

**SECTION 1.** I. J. Wetherbee, Jos. Story, R. L. Robbins, A. A. Frazar, H. F. Bishop, E. N. Kirk, Isaac Ayling, B. E. Perry, J. M. Daly, G. W. Copeland, J. B. Coolidge, J. A. Follett, Ammi Brown, their associates and successors, are

![The first home of the Boston Dental College at 5 Hamilton Place, opposite Park Street Church](image-url)
hereby constituted a body corporate by the name of the Boston Dental College, to be located in the city of Boston, for the purpose of teaching dental science and art.

SECTION 2. The said Corporation may hold real and personal estate to an amount not exceeding one hundred thousand dollars, and shall have the right to sue and be sued in their corporate name and to receive grants, devises, and bequests, not exceeding the afore-mentioned amount, to be held and appropriated by the said Corporation for the advancement of dental science and art, by means of lectures, clinical instruction, library and museum.

SECTION 3. The persons named in the first section of this act are hereby constituted trustees of said Corporation, with power to fill any vacancy in their board; to choose a President, Secretary and Treasurer; to appoint Professors, Tutors and Instructors, as the interests of sound learning may require, subject to removal by a vote of two-thirds of the members of said Board. Said Board of Trustees shall consist of not less than eleven, nor more than fifteen members.

SECTION 4. The Trustees shall have authority to confer the degree of Doctor of Dental Surgery upon candidates of adult age and good moral character, who have pursued their professional studies three years under competent instructors, and have attended two full courses of lectures in the College; provided, that a certificate of attendance upon one course of lectures in any respectable dental or medical college, or five years' reputable practice, may be considered a substitute for the first course of lectures hereby required; and provided, further, that candidates shall maintain a thesis, and undergo an examination to the satisfaction of the Faculty, and satisfy the Professors of Operative and Mechanical Dentistry of their ability to meet satisfactorily the requirements of their art.

SECTION 5. The Board of Trustees shall have power to make By-Laws for the government of said College, not inconsistent with this Charter or with the laws of this Commonwealth. Said By-Laws may be altered or amended by a vote of two-thirds of the members constituting said Board.

SECTION 6. Said Corporation may have a corporation seal, and alter the same at pleasure.

Isaac Wetherbee, Boston Dental College's First President

In retrospect, Isaac Wetherbee emerges as a remarkable personality commanding respect and admiration. He was born in South Reading, Vermont, on March 9, 1817. His father Rev. Josiah Wetherbee was a leading clergyman in the Free Baptist denomination and served with distinction in the War of 1812. Dr. Wetherbee received his early education in the country schools in Vermont and demonstrated considerable talent and interest in mechanical and scientific pursuits.

He studied for the ministry under his father, was ordained in 1841 and held pastorates at Kittery, Maine and later at Charlestown, Massachusetts. In 1846, he decided to leave the ministry because of ill health, and turned his attention to dentistry in which he had a deep interest. He already had carried out some limited practice among his friends while still a clergyman but now with time available he studied extensively from the texts of his time in 1850 received the honorary degree of D.D.S. from the Baltimore College of Dental Surgery. He established a practice in Boston and subsequently had one of the most distinguished careers in the early days of the profession. In 1868 after helping to organize the Boston Dental College, he was made president, a position he held until
1899, when Boston Dental College joined Tufts College and became Tufts Dental School. He was a pioneer dental educator who established enduring policies at a time when there was little precedent for him to follow. Dr. Wetherbee was one of the organizers and charter members of the Massachusetts Dental Society and served a term as president of the American Dental Association. He died in 1902 after an unusually distinguished career as dentist, educator, and author.

**Formal Structure of The School**

The first series of courses offered by the Boston Dental College covered a wide range of subjects for the times, and the first faculty consisted of the following teachers:

- **Wm. H. Atkinson, M.D.**
  - Professor of Hygiene and Dental Jurisprudence
- **A. Lawrence, D.D.S.**
  - Professor of Institutes of Dentistry
- **W.S. Miller, D.D.S.**
  - Adjunct Professor of Institutes of Dentistry
- **I. J. Wetherbee, D.D.S.**
  - Professor of Dental Science and Operative Dentistry
- **C.G. Davis, D.D.S.**
  - Adjunct Professor of Dental Science and Operative Dentistry
- **S. J. McDougall, M.D.**
  - Professor of Dental Art and Mechanism
- **H. F. Bishop, D.D.S.**
  - Adjunct Professor of Dental Art and Mechanism
- **R. King Brown, M.D.**
  - Professor of Anatomy and Physiology
- **J. P. Ordway, M.D.**
  - Adjunct Professor of Anatomy and Physiology
- **L. R. Sheldon, M.D.**
  - Professor of Pathology and Therapeutics
- **J. A. Follett, M.D.**
  - Professor of Principles and Practice of Surgery
- **F. W. Clark, S.B.**
  - Professor of Chemistry and Metallurgy

**The School Sets Forth Its Aims**

The approach and the curriculum of the school was presented in the first catalogue, which is reprinted here:

**First Annual Announcement**

A gradually increasing demand for dental instruction has daily become more and more apparent to the profession. Throughout New England no purely Dental College exists. To meet the demand of the many students seeking to enter its ranks, and to raise the standard of professional excellence to that of the most successful and skillful operators, an endeavor was made which resulted in the granting of a charter, by the Legislature of the State of Massachusetts, at the session of 1868, for the Boston Dental College.
Not an outgrowth of any body-corporate, but independent, its instructions will be purely dental. Each and every branch of the dental and collateral sciences will be taught, as far as they can be made available to the dentist. Every endeavor will be put forth to make the course scientific and practical, by demonstration and experiment. The College building is pleasantly and centrally located, and will be furnished with all the necessary and most approved modern appliances requisite for dental instruction, in its Lecture Rooms, Mechanical Rooms, Laboratory, Dissecting Room, etc.

These, together with the literary, scientific and artistic advantages of the city (how extensive is well known,) a corps of Professors, many of them well known to the dental profession of the whole country, devoted to their labors; an Infirmary, to be open for three or four hours daily throughout the year, under the charge of one of the Clinical Board, where every character of dental operation will be performed and demonstrated, and opportunities for the advanced student to operate, are inducements not excelled by any College in the country.

The Professors trust that their endeavors to give a thorough course of instruction will meet the high hopes of the many friends of the College.

**Course of Lectures**

**Hygiene and Dental Jurisprudence**

The lectures on Hygiene will embrace a knowledge of the healthy man, the objects used by him and their influence as especially exerted on the health.

The lectures on Dental Jurisprudence will set forth the laws relating to the practice of Dentistry, the duties of experts in dental testimony and investigation of dental questions in the law.

**INSTITUTES OF DENTISTRY**

This course will teach that part of the science which accounts philosophically for the many conditions of the teeth and oral cavity in health and disease, and the theory of the action of medicines.
DENTAL SCIENCE AND OPERATIVE DENTISTRY

From this chair will be given a comprehensive knowledge of Dentistry, referred to the general principles on which it is founded, with its bearings upon all other departments or sciences that can be made to offer tribute to our profession.

The most careful instruction will be given in the preparation of cavities of the teeth; the treatment of and means of restoring to their normal condition exposed pulps; the treatment and filling of pulp cavities; treatment of dead teeth; of periostitis; diseases of the alveolar processes, gums, and antrum; of salivary accretions. The most approved manner of extracting teeth, the use of anesthetics, the different theories and modes of correcting irregularities of the teeth, will be particularly dwelt upon. The various materials and systems of manipulating, the best forms and mode of constructing and tempering instruments, — all that can aid in perfecting our science, will be discussed.

The instruction from this chair will embrace the whole great outline of the field of Dentistry, drawing from knowledge, art and nature all that can be made to embellish the art.

DENTAL ART AND MECHANISM

By this course of lectures will be demonstrated the application of a systematic knowledge of Dentistry to practical purposes, and the true application of aesthetic taste in choice of color and form, so necessary to make or preserve a delicate and harmonious outline to the human countenance.

In this course will be taught also, in combination with instruction in the laboratory, all the modes of manufacturing teeth; forms of mechanism and their application for correcting deformities within the mouth, of the teeth, cleft palate, (by artificial palate,) etc., together with a knowledge of all mechanisms or methods useful to the dentist, the preparation of materials, making and tempering instruments, etc.

ANATOMY AND PHYSIOLOGY

Anatomy—This branch will embrace a thorough course of Descriptive and Comparative Anatomy, with the recent subject, anatomical preparations and diagrams. The anatomy of the head and its cavities will be demonstrated in a most thorough manner. Ample facilities are possessed for furnishing students with subjects at slight expense. No student of Dentistry should or need enter his profession without a thorough course in the dissecting-room.

The department of Physiology, so emphatically important to the dentist, will be more extensive than in most medical colleges. The varied functions — secretion, circulation, respiration, digestion — of living body, will be clearly and intelligibly set before the students by experiments on living animals. The nervous system, with its intricate actions, will be studied; the whole department of Physiology will be demonstrated in keeping with the rapidly increasing investigations of this branch. Special attention in this course will be paid to Microscopy. By fresh preparations, the elementary structure of the teeth, the minute anatomy of the nerves and other structures will be demonstrated.

PATHOLOGY AND THERAPEUTICS

These branches, so intertwined, are combined in one chair. The course will embrace the knowledge and treatment of disease in general, and of those special diseases that interfere with the growth and development of the teeth or induce change and decay of structure, whether hereditary, constitutional or acquired. A comprehensive examination of the Materia Medica will be given, with their action on the system and the indications for their use.

PRINCIPLES AND PRACTICE OF SURGERY

The lectures on Surgery will consider the elements of general surgery and surgical diseases, the etiology, pathology, and treatment of all structural changes of the tissues within and around the oral cavity. Clinical surgery will be taught in the operating-room, on subjects of interest to the dentist.
CHEMISTRY AND METALLURGY

The principles of the science will be fully developed. The subject of inorganic chemistry will be fully treated, and organic chemistry so far as practicable and necessary for the practical dentist or the student intending to pursue the investigation of the science.

The separating and working of metals will form a prominent part of the course. Chemistry, as illustrative of Physiology, will be carefully studied. The Adjunct Professors, aided by selections from the Clinical Board, will have charge of the mechanical and operating rooms, and be present to demonstrate to students at such hours as will not interfere with the regular lectures.

A Clinical Board, consisting of twenty-four practitioners of Dentistry, with a president, will have charge of the Infirmary, one of which will be present daily throughout the year. Here operations will be performed for the poor, free of charge; every form of dental operation and dental surgery will come under the eye of the student, and opportunities to those advanced in the study to acquire practical experience.

The Infirmary is on a foundation unlike and superior to that of any other in the country in rendering aid to the poor and advantages to the student.

REQUIREMENT FOR GRADUATION

The candidate must have passed a satisfactory examination by the Faculty; must be of good moral character, and twenty-one years of age, must have devoted three years to the study of Dentistry with a practitioner of Dental Surgery who shall be approved by the Faculty; or must have been in the practice of Dental Surgery for a period of not less than eight years including two full courses of lecture, the last of which in this College. A course of medical lectures will be considered as one course. He must deliver to the Dean, six weeks before the end of the term, a thesis, written by himself, on some subject pertaining to Dentistry, and be prepared to defend the same at his examination; also a specimen of Mechanical Dentistry, which properly labelled, shall be preserved in the Museum.

TEXT-BOOKS

Harris' Principles and Practice of Dental Surgery
Taft's Operative Dentistry
Gray's or Leidy's Anatomy
Kirk and Paget or Dalton's Physiology
Tome's Dental Physiology
Bond's Dental Medicine
Beale on the Microscope
Fownes' Chemistry
Harris' Medical and Dental Dictionary

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SESSIONS

The regular sessions will commence on the first Monday in November, and continue four months. Lectures, daily.

A special session will be given, to Dentists of eight year's standing or three years' pupilage, to continue ten months. Said session to constitute two courses, of five months each, commencing, respectively, the first Tuesday in September, (Sept. 1) and the first Monday in February.

Students, on coming to the city, should report to the Dean at once, and register their names.

For further information, address
J. A. FOLLETT, M.D.
Dean of the Faculty
798 Washington Street, Boston.
The First Graduating Class

The first graduation took place in 1869 and the first two graduates of the school were Edward Griswald Barton and Albian Manley Dudley. Dr. Dudley later became a member of the faculty of the school and had a distinguished dental career. His biography is typical of many of the outstanding dental practitioners of his time.

Dr. Dudley was born in Boston in 1845, received his early education in the public schools of Boston, Provincetown, and Wilbraham, Massachusetts. He later studied at Harvard University Medical School and Boston University.

In 1862 he left school while at Wilbraham and enlisted as a private in Company D of the Thirty-Third Massachusetts Infantry Regiment, later joining the Fifty-Eighth Massachusetts Regiment. He served until after the battle of Petersburg, winning a lieutenancy and distinguishing himself for bravery.

After the war he decided to undertake the study of dentistry and was on one of the first two graduates of Boston Dental College in 1869. Upon graduation he joined the faculty of the College, serving as Professor of the Institutes of Dentistry and Dental Therapeutics in 1870 and 1871.

He set up practice in Salem and had a distinguished career until his death in 1899. He became a member of the Massachusetts Dental Society and served as vice president in 1875 and 1876. He was a member of many other organizations and also held the post of Corresponding Secretary of the American Dental Association.
In 1899 the Boston Dental College became an incorporate part of Tufts College, under a special act of legislature and was then called the Tufts College Dental School. The reasons for the Boston Dental College seeking affiliation with a college and a medical school were varied, but one outstanding factor was the increasing difficulty at this time of obtaining cadavers for anatomical study. The need for a reorganization of the dental curriculum and the need for a new building with improved facilities were major factors in the desire for a complete reorganization of the school or affiliation with a medical school. There were 35 operating chairs for 200 students and the overcrowded and unsanitary conditions in the infirmary of Boston Dental College were lowering the morale of students and faculty alike. Dr. Edward Branigan was deeply concerned, lest the academic standards decline to such a degree that the excellent reputation of the school would be lowered.

Although the envisioned curriculum was an excellent one, it was nevertheless poorly designed so that students had an excessive amount of free time, and facilities were not available for beneficial use of that time. A new building and new curriculum were essential and it was felt that Tufts College would be able to offer the guidance and the academic environment necessary for the advancement of the dental school. Some relationship already existed prior to the actual affiliation in 1899, since John L. Hildreth and Harold Williams who were both to become Deans of Tufts Medical School, were elected to the Board of Trustees of Boston Dental College, Dr. Hildreth being elected in 1893 and Dr. Williams in 1897.

By 1896 the lingering problem of adequate anatomical specimens had become acute and the dental school requested permission
SESSION OF 1877-78.

Second home of the Boston Dental College at 485 Tremont St.

to have its students receive their anatomical training in Tufts Medical School. As a result, the medical faculty in 1897 voted to admit the second year class dental students who had completed one full course of lectures. In 1898 a number of the Trustees of the dental college suggested that it would be wiser to have the dental students receive instruction at Tufts Medical School in all the basic sciences, rather than duplicating teaching efforts by the building of a new facility for this purpose.

Tufts College Expands Its Dental Program

In 1900 the dental school program was extended to four years. This step was first taken by the University of Michigan Dental School and Tufts was the second school in the United States to increase the length of the dental course from three to four years.
Charles F. Painter, M.D.
Dean 1913 to 1917

William Rice, D.M.D.
Dean 1917 to 1933

Howard M. Marjerison, D.M.D.
Dean 1933 to 1941

Basil B. Bibby, Ph.D., D.M.D.
Dean 1941 to 1946
Joseph F. Volker, D.D.S., Ph.D.
Dean 1947 to 1949

Cyril D. Marshall-Day,
B.D.S., D.M.D., Ph.D.
Dean 1949 to 1959

John W. Hein, D.M.D., Ph.D.
Dean 1959 to 1962

J. Murray Gavel, D.M.D.
Dean 1962 to 1963
The curriculum at Tufts Dental School was modified so that the first two years of study were essentially similar for both medical and dental students. The added year also made possible the introduction of new courses in embryology and physiology as well as more intensive presentation of pathology, orthodontics and other specialized topics in clinical dentistry. The leadership of Tufts at this time did not stimulate the profession adequately, and the new curriculum was apparently ahead of its time. The National Association of Dental Faculties reversed its initial support in 1903 of four year programs and returned to a three year program. Tufts maintained the new four year comprehensive curriculum but was also forced to provide a three year optional course in order to maintain its relationship to the National Association.

Following the merger of Boston Dental College with Tufts College, and the introduction of the new curriculum in 1900, the degree given at the dental school was the Doctorate of Dental Medicine (D.M.D.) rather than the Doctorate of Dental Surgery (D.D.S.). The post-graduates and holders of the D.D.S. were to be given the opportunity in 1905 of earning the D.M.D. by taking a postgraduate course. The D.M.D. had first been introduced in 1869 by Harvard Dental School in order to indicate that dentistry was a true specialty of medicine with comparable training. Tufts also felt that the new type of degree was important in order to impress the community with the fact that the practice of dentistry was built on a medical base and that dentists were solidly grounded in the medical sciences. In fact, President Capen explained to the Trustees of Tufts College that dentistry was "only a branch of medicine after all".

It was felt that a single building for both the schools of medicine and dentistry would be appropriate since they shared so many common interests and shared the same faculty in the basic medical sciences.

A new building was constructed on land purchased on Huntington Avenue, across from the Fenway. The assets of the old Boston
The Medical and Dental Schools on Huntington Avenue
from 1901 - 1949

Dental College of $50,000 were applied toward the total cost of some $110,000. The building was designed by J. Philip Rinn and was completed in 1901. The medical school moved to this building from its previous location, a reconstructed Baptist church on Shawmut Avenue.

Boston Dental College, Tufts College,
The Beneficiary of The Merger

In the merger with the Boston Dental College, Tufts College received an established dental school with an illustrious history and many prominent alumni. Two outstanding members of the faculty of the Boston Dental College who came to the new school helped to smooth the transition. Dr. Edward Branigan established and organized the Tufts College Dental School Infirmary, and Dr. George Bates continued as professor of histology. In his annual report to the president of Tufts College, Dean Harold Williams predicted that the Dental School would soon be one of the outstanding ones in the nation:

Report of The Dental School

To the President: —

In submitting to you for the first time in the history of the College a report from the Dental School, an historical and explanatory note may be of interest. The Tufts College Dental School, formerly the Boston Dental College, was founded in 1868, and had pursued a course of uneventful success up to the year 1898, when, under the Act of Anatomical Science, it found itself precluded from obtaining the material for carrying on the instruction in practical anatomy.
Saturday morning clinic for children 1907

required for dental students by the American Association of Dental Faculties, of which body the Boston Dental College was a member. Temporary arrangements were accordingly made with the Tufts College Medical School whereby the students of the Boston Dental College were enabled to prosecute their anatomical studies. The Trustees of the latter institution, after mature deliberation, decided to consummate the plan they had long had under consideration, and to transfer their school to Tufts College. In arriving at this conclusion they were influenced not only by the anatomical question, but also by the constantly increasing requirements of the necessities of dental education. Among such increased requirements may be mentioned the demands of the studies of Organic Chemistry, Bacteriology, Physiology, and Pharmacology, branches which have expanded so greatly in recent years as to require special laboratory facilities. The Boston Dental College in its rapid growth was fast overflowing its laboratory accommodations, and a new building had become an imperative need. The equipment of such new laboratories as were contemplated being essentially the same for a dental and for a medical school, it was felt by the Trustees that these branches could be more economically and judiciously carried on combined under a single head. Consequently, looking only to the eventual welfare of the College, strengthened by the support of leading alumni, and sacrificing their feelings of personal pride in the institution they had so ably administered for so many years, the Trustees of the Boston Dental College formally voted to transfer their school to the management of Tufts College. Steps were accordingly taken to bring about this result, and in 1899 the Boston Dental College, by special Act of Legislature, became the Dental School of Tufts College.

By this transfer the College has received into its fold a dental school in which upwards of one hundred and sixty students annually receive instruction leading to the profession of Dentistry. It has assumed a dental infirmary in which twenty-four thousand treatments are annually made. It has assumed the direction and control of a Faculty and Board of Instruction consisting of thirty-five teachers, all of whom are distinguished in their various departments. With such material, and with the ambition to aim only at the highest standard, it is reasonable to predict that this new department of the College shall be regarded
as one of the leading institutions of its character in the country. Respectfully submitted,

Harold Williams
Dean.

Tufts College Dental School
formerly Boston Dental College
Boston, Massachusetts
September 20, 1899

Preclinical technique circa 1910

In 1900 with the Dental College an established school of Tufts College, the dean was Harold Williams, M.D. who also served as dean of the medical school. The faculty of the school at this time consisted of:
Charles Paine Thayer, A.M., M.D., Professor of Anatomy
Henry Jabez Barnes, M.D., Professor of Hygiene
Charles Alfred Pitkin, A.M., Ph.D., Professor of General Chemistry
Samuel Augustus Hopkins, M.D., D.D.S., Professor of the Theory and Practice of Dentistry
Edward Walter Branigan, D.D.S., Professor of Clinical Dentistry
Frank George Wheatley, A.M., M.D., Professor of Materia Medica and Therapeutics
George Andrew Bates, D.D.S., Professor of Histology
Joseph King Knight, D.D.S., Professor of Prosthodontics
John Cummings Munro, A.B., M.D., Professor of Oral Surgery

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Frederick Mortimer Hemenway, D.D.S., Professor of Prosthetic Dentistry
Timothy Leary, M.D., Professor of Pathology and Bacteriology
George Van Ness Dearborn, M.D., Ph.D., Assistant Professor of Physiology

Among the new subjects in the curriculum were Theory and Practice of Medicine and Orthodontia.

Expansion of both dental and medical schools was rapid. In 1910 the building was remodelled and a fourth floor was added. The dental infirmary was the major area of contact between the dental school and the community. Fees were nominal and large numbers of patients were treated free of charge. Approximately four-fifths of free dental service in the state of Massachusetts was being carried out at Tufts Dental School.

Expansion of Faculty and Curriculum Over The Years

In 1920 the teaching staff at the professorial level consisted of:
Raymond Harrman Ashley, M.D., Ph.D., Chemistry
George Andrew Bates, M.D., D.M.D., Histology and Biology
Walter George Bridge, D.M.D., Prosthetic Dentistry
Curtis William Farrington, D.M.D., Clinical Dentistry
Alfred Levy Johnson, D.M.D., Orthodontics
Timothy Leary, A.M., M.D., Pathology, Bacteriology
Charles Madden Proctor, D.M.D., Oral Surgery
William Rice, D.M.D., Operative Dentistry
Andrew Howard Ryan, M.D., Physiology
Walter Edward Sullivan, A.M., Ph.D., Anatomy
Frank George Wheatley, A.M., M.D., Pharmacology

A one year required predental course was instituted in 1920 with Physics, Chemistry, Biology and English listed as required courses.

Pyorrhea Alveolaris and Roentgenology were now listed among the departments of instruction.

In 1930 the teaching staff at the professorial level consisted of:

Felix Percy Chillingworth, M.D., Experimental Pharmacology
James Haslow Daly, D.M.D., Clinical Pathology
Curtis William Farrington, D.M.D., Clinical Dentistry
Frank Eugene Haskins, Ph.G., M.D., Pharmacology,
  Physical Diagnosis
Charles Elliot Hatch, D.M.D., Dental Anatomy and Operative Technic
William Hayes Hoyt, D.D.S., Prosthetic Dentistry
Tracy Burr Millory, M.D., Pathology and Bacteriology
Francis Patrick McCarthy, M.D., Oral Medicine
Arthur Linwood Mosse, D.M.D., Orthodontia
Charles Madden Proctor, D.M.D., Oral Surgery and Exodontia
David Rapport, A.B., M.D., Physiology
Frederick Reis, M.D., Biological Chemistry
William Rice, D.M.D., D.Sc., Operative Dentistry
Frederick Wilbur Thyng, A.M., Ph.D., Anatomy
By now two years of predental courses were required for admission, with prerequisite courses being Organic Chemistry as well as General Chemistry, Biology, Physics and English. Oral Medicine, Periodontia, Children's Dentistry, and Dental History were listed among the departments of instruction.

Dr. Francis P. McCarthy in 1969 had instituted the first course in Oral Medicine in an American dental school. Dr. Philip Kelley had started a Department of Periodontia in 1922 and Dr. H. H. Piper presented a course of lectures on the History of Dentistry in 1921. Dr. Edward F. Sullivan had started instruction in Pedodontia in 1925.

In 1940 the teaching staff at the professorial level consisted of:

Benjamin Spector, M.D., Professor of Anatomy
Charles E. Hatch, D.M.D., Professor of Operative Dentistry
Frederick Reis, M.D., Professor of Biochemistry
H. Edward MacMahon, M.D., Professor of Pathology and Bacteriology
David Rapport, M.D., Professor of Physiology
Francis P. McCarthy, M.D., Professor of Oral Medicine
William H. Hoyt, D.D.S., Professor of Prosthetic Dentistry
Richard H. Norton, D.M.D., Professor of Oral Surgery and Anesthesia
Arthur L. Morse, D.M.D., Professor of Orthodontics
Henry H. Piper, Professor of Dental History

A separate department of dental pathology had been started in 1932 under the direction of Francis H. Daley, D.M.D. and in 1940 a separate department of Root Canal Therapy was established under Bernard Berg, D.M.D.

By 1950, under Dean Cyril David Marshall Day, the major faculty of the School of Dental Medicine had grown to include the following:

Benjamin Spector, M.D., Anatomy
L. Walter Brown, D.M.D., Preclinical Technic
Halvor N. Christenson, Ph.D., Biochemistry and Nutrition
H. Edward McMahon, M.D., Pathology and Bacteriology
Ralph E. Wheeler, M.D., Bacteriology
David Rapport, M.D., Physiology
Attilio Canzanelli, M.D., Experimental Physiology
Byron B. Clark, Ph.D., Pharmacology
Irving Glickman, D.M.D., Oral Pathology and Periodontology
Francis P. McCarthy, M.D., Oral Medicine
John Haddin Barr, D.D.S., Clinical Dentistry
Arthur H. Wuehrmann, D.M.D., Oral Diagnosis and Roentgenology
Helmut A. Zander, D.D.S., M.S., Oral Pediatrics
Irving R. Hardy, D.M.D., Prosthetic Dentistry
Daniel J. Holland, D.M.D., Oral Surgery
Philip E. Adams, D.M.D., Orthodontics
Herbert I. Margolis, D.M.D., Graduate Orthodontics

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The new emphasis on teaching in the field of public health was indicative of developing trends in dentistry, with the inclusion of Dental Public Health as one of the dental specialties.

In 1965, when Dean Louis J. P. Calisti assumed leadership of the school, the major faculty consisted of the following:

- Larry F. Cavazos, Ph.D., Anatomy
- Alton Meister, M.D., Biochemistry
- Morris E. Friedkin, Ph.D., Pharmacology
- James T. Park, Ph.D., Microbiology
- Walter L. Hughes, Jr., Ph.D., Physiology
- H. Edward MacMahon, M.D., Pathology
- A. Albert Yurkstas, D.M.D., M.S., Complete Denture Prosthesis
- Arthur H. Pearson, D.M.D., Endodontics
- Philip Williams, D.M.D., Graduate Prosthodontics
- Peter P. Dale, D.M.D., M.S., Operative Dentistry
- Gerald Shklar, D.D.S., M.S., Oral Pathology
- Frederick Shiere, D.D.S., M.S., Oral Pediatrics
- Hristo Doku, D.M.D., M.S., Oral Surgery
- Everett Shapiro, D.M.D., Orthodontics
- L. Walter Brown, Jr., D.M.D., Partial Denture Prosthesis
- Irving Glickman, D.M.D., Periodontology
- John H. Barr, D.D.S., B.Sc. (Dent.), Radiology
- Donald B. Giddon, D.M.D., Ph.D., Social Dentistry
- Orrin Greenberg, D.D.S., Dental Materials
- Joseph H. Kronman, D.D.S., Ph.D., Orthodontics

Innovations Within The Teaching Program

The Department of Social Dentistry was developed in 1961 with Louis J. P. Calisti as chairman, and in 1964, when Dr. Calisti became Dean, Donald Giddon accepted the chairmanship of the department. The Department of Social Dentistry has by now become one of the largest in the school. It is pioneering in many innovations in the teaching of dentistry, and has as its primary concern the creation of a dentist aware of his environment, which necessarily includes the doctor-patient relationship, the relationship of the dentist to allied health professions and institutions, as well as the dentist’s responsibilities to society. To implement these goals, courses are offered in the social, psychological, legal, economic, historical, and political aspects of the practice of dentistry.

Special programs have been developed in dental assistant utilization, dental care in a Neighborhood Health Center (Columbia Point), preventive dentistry as well as in other areas.

In 1968 George Mumford was appointed as Professor of Restorative Dentistry and was given the responsibility of combining the areas of operative dentistry, crown and bridge, partial denture prosthesis, preclinical technic and materials science. The purpose was to ensure a better coordination of instruction in these areas and
make for a smoother transition from preclinical technic to clinical restorative dentistry. Gradual curriculum improvements also led to earlier exposure of the student to clinical teaching in periodontics and oral diagnosis as well as restorative dentistry.

The beginning of the second century sees much promise for the future. An application was submitted for Federal matching support of a new Dental Health Sciences building. This project would provide for improved clinical facilities and would also include teaching facilities for the faculty of the New England Medical Center Hospitals. The changing curriculum will bring a greater cooperative teaching venture between the dental and medical faculties at Tufts, with the dental students receiving increased grounding in clinical medicine. A formal affiliation agreement has been entered into between the New England Center Hospitals and Tufts University. Funding was approved by the Department of Health, Education, and Welfare and the construction of the new dental building will be the fulfillment of years of planning.

Student activities are highlighted today by the advanced concept of the role of the student in the determination of overall policy. Dental undergraduates have been elected with voting privileges on all committees of the School of Dental Medicine with the exception of the Executive Faculty Committee.

**Forsyth Dental Infirmary**

The faculty of Tufts Dental School played a significant role in the establishment of the Forsyth Dental Infirmary for Children, an institution that was to develop into a major research center with close ties to both Tufts and Harvard Dental Schools.

The endowment came from four brothers who were manufacturers of vulcanized rubber products in Boston. James Bennett Forsyth lived alone in his later years at the Hotel Touraine. One day, in the early years of this century when Dr. Ervin A. Johnson of the Tufts faculty had been called to Mr. Forsyth's hotel room to look after his dental needs, he was asked what he would do if he had a sum of money to leave for philanthropic purposes. Dr. Johnson advised Mr. Forsyth of the great need for a dental clinic for children so that care of their teeth could begin at any early age and serious dental problems and loss of teeth would be avoided in later life. Dr. Edward W. Branigan of Tufts was called for further consultation since the concept of preventive dentistry was one of his particular dreams and he had attempted, in vain, to secure funds for a children's clinic.

James Forsyth and his brother Thomas were apparently deeply impressed by the humanity and sincerity of Drs. Johnson and Branigan and in 1909, following James Forsyth's death, the two Tufts faculty members were told by Thomas Forsyth that a sum of two million dollars was available and that they could get to work on a dental institution for children. A tract of land was purchased fronting the Fenway and close to Huntington Avenue and a dignified marble building designed by Edward T. P. Graham was erected on the site.

The Forsyth Infirmary was chartered in 1910 and the building was dedicated in 1914. On the original Board of Trustees were
Forsyth Dental Infirmary

Thomas Forsyth, Dr. Ervin Johnson, Dr. Edward Branigan, Dr. Timothy Leary, Dean Harold Williams, President Hamilton of Tufts University, and Sumner Robinson, a Tufts Trustee since 1891. Dr. Leary, who was Professor of Pathology at Tufts Medical and Dental Schools, had prepared a handsome booklet for the trustees setting forth tentative plans for the institution. This was also sent to dentists and dental schools throughout the country and considerable advice was offered concerning this pioneer enterprise.

The Forsyth Infirmary developed as an independent dental institution and became associated academically in many ways with both Tufts and Harvard dental schools. Dr. Edward Branigan, one of the outstanding dental teachers and a person of great vision in the dental field, was one of the driving forces in this innovative accomplishment. In 1916 the Forsyth-Tufts Training School for Dental Hygienists was established and became one of the leading schools of dental hygiene in this country.

Extra-Institutional Undertakings

Recent developments have involved a closer relationship between Tufts Dental School and related teaching institutions, as well as the gradual development of a full-time faculty at the Dental School. Dean Marjerison had stressed the importance of a sound basic science curriculum comparable to that of the medical school, and this was furthered by Dean Bibby, who desired a closer relationship between dentistry and medicine.

In 1942 an agreement was reached with the Oral Surgery Clinic of the Boston City Hospital and in 1945 this affiliation was formalized so that Tufts students would have exclusive access to the outstanding educational opportunities offered by the Department of Oral
Surgery in the Boston City Hospital. Through this affiliation, a graduate program in oral surgery was to develop in later years.

In 1944 a cooperative teaching venture which was initiated with the Boston Dispensary Dental Clinic, was developed into an integral program of the dental school in 1949.

Graduate Teaching

Graduate training in dentistry was a significant development which led to the creation of dental teachers with improved skills and greater scientific backgrounds, and in these programs Tufts took a lead. In 1943 a degree program was initiated in the dental school leading to a Master of Science degree in the medical sciences. In 1950 the Master of Dental Science degree was created and offered in a variety of clinical dental fields.

The degree program was essentially a two-year course of graduate study with the presentation of a thesis based upon original research. The Division of Graduate and Post Graduate Instruction was built to a position of national prominence by Dr. John T. O'Rourke and his successors.

In 1968 there were 63 full time graduate students enrolled in the various clinical programs, with the majority of the group studying periodontics, orthodontics and prosthodontics. Other students were enrolled in graduate oral surgery, pedodontics, oral pathology, radiology and endodontics. The graduate dental students at Tufts
have represented all parts of the world and many have returned to their home countries to become deans of dental schools and department heads. Close relations have been maintained between many of these teachers and the staff at Tufts.

In 1965 a Ph.D. program for dental graduates in anatomy and biochemistry was instituted through a Federal training grant to Tufts Dental School. This program is serving to develop dental teachers and investigators with expertise in the basic health sciences as well as fulfilling some of the educational needs for the development of a biologically oriented dental practitioner.

Contributions by The Tufts Faculty

Members of the Tufts Dental faculty are eminent in their fields and have contributed extensively to the dental literature. In addition to hundreds of scientific publications, a number of books have been published in recent years by teachers at Tufts:


Dr. Thomas Murnane, oral surgeon and electron microscopist
Members of the Tufts faculty have also contributed chapters to many other books in the dental field.

**Research**

Tufts University School of Dental Medicine has had a distinguished record of dental research, and in recent years the scope and diversity of research carried out at the dental school have been particularly impressive. In 1963 the annual report of the dean emphasized the research activities of the faculty and pointed out that Tufts University School of Dental Medicine had again presented more papers at the annual meeting of the International Association for Dental Research than any other single institution.

Research carried out at the dental school has consisted of both clinical and experimental studies. Studies on dental pulp and its reaction to operative procedures and to various filling materials were carried out by Helmut Zander, Robert Glass, and Vincent Lisanti while they were members of the Tufts faculty. The experimental pathology of periodontal disease was studied extensively by Irving Glickman and his associates. Dr. Glickman has also studied the dynamics of occlusion, and in 1968 Dr. Glickman was awarded the
annual prize for periodontal research by the International Association for Dental Research. Extensive studies on enzymes of dental plaque and on dentifrice abrasion have been carried out by Richard S. Manly. Dr. Manly's research was honored by his being awarded the 1970 prize in Oral Therapeutics of the International Association for Dental Research. Salivary enzymes and the histochemistry of salivary glands have been investigated by Howard Chauncey. A variety of studies in experimental carcinogenesis have been under way by Gerald Shklar, Edmund Cataldo, and their associates in the Department of Oral Pathology. Basic studies on masticatory efficiency were carried out by Richard Manly and Algiradas Yurkstas. This work was further developed by Krishner Kapur, with Dr. Kapur also studying the effects of dentures on the oral mucosa. Oral mucous membrane diseases have been investigated by Philip L. McCarthy and Gerald Shklar. Irving Meyer has investigated radiation necrosis and the effect on tissues of Cobalt 60 radiation. Abraham Nizel has gone into the effects of various nutrients on experimental caries and Donald Giddon and associates have researched the relation of oral responses to psychological factors. M. Michael Cohen has studied craniofacial deformities in experimental animals with a variety of systemic abnormalities. Milton Hodosh, working at both Tufts and at Brown University has developed the polymer implant tooth concept based on his extensive work with plastic implants in monkeys and baboons.

Emphasis in recent years in fact, has been on the training of dental researchers. A new breed of research man is developing — one with a dental degree and a doctorate in one of the basic science disciplines. Thus, Joseph Kronman is both an orthodontist and an anatomist. His research involves both projects in orthodontics and in the histochemistry of bone and salivary glands. Thomas Murnane is both a board certified oral surgeon and an anatomist. His research involves electron microscopic studies of temporomandibular joint in health and disease. Leonard Corman, William Feagans and Frank Susi also hold double doctorates and carry out highly specialized research projects on the cellular level.

The research carried out in a university is a reflection of the role of that institution in the advances made in that field. The following is just a partial listing of some of the research papers by Tufts workers published in 1968 alone:

- Oculoauriculovertebral dysplasia (Goldenhar's syndrome). Oral Surgery, Oral Medicine, Oral Pathology.
- Organizing a program for dental care in a neighborhood health center. Public Health Reports.
- Intraoral occlusal telemetry, a multifrequency transmitter for registering tooth contacts in occlusion. Journal of Prosthetic Dentistry.
Periodontal fiber attachment to the plastic tooth implant. Journal of Periodontology.
Polymer methacrylate coated vitallium pins as endosteal dental implants in papio and gelada baboons. Oral Surgery, Oral Medicine, Oral Pathology.
A critical evaluation of cephalometric ‘A’ point and proposal of a more significant landmark. Angle Orthodontist.
Morphologic and histochemical comparison of the zygomatic, lacrimal and sublingual glands in the female golden hamster. Journal of Dental Research.
Metabolism of levan by oral samples. Journal of Dental Research.
The effect on gingival wound healing of dietary supplements of zinc sulfate in the syrian hamster. Periodontics.
Uptake of thorium dioxide by synovial lining cells. Anatomical Record.
Intraoral occlusal telemetry; registration of tooth contacts in chewing and swallowing by intraoral electronic telemetry. Journal of Prosthetic Dentistry.
Erosive and Bullous oral lesions of lichen planus-histologic studies. Archives of Dermatology.
Patterns of keratinization in oral leukoplakia. Archives of Otolaryngology.
Studies of cellular renewal and protein synthesis in mouse oral mucosa utilizing H3-thymidine and H3-cystine.
Keratinization in the mucosa of the ventrum of chicken tongue. Anatomical Record.

**Fulfillment of A Prophecy**

When the Boston Dental College was about to be founded, Isaac Wetherbee admonished his colleagues to leave "an honorable record . . . replete with evidences of professional excellence, which shall command the respect and administration of all true lovers of science". Today, a century later, the accomplishments of the Tufts University School of Dental Medicine provide abundant and com-
pelling evidence of the fulfillment of his prophecy. Yet his prophetic words do even more. They provide a trustworthy lamp, now proven by a century of experience, for the uncharted future.

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ANNUAL REPORTS OF THE PRESIDENT OF TUFTS COLLEGE, 1898-1899.
NOTICE TO CONTRIBUTORS

Contributions, which may deal with any aspect of dental history or bibliography, are invited. The maximum length for original articles is about 5,000 words. Manuscripts should be typewritten with double spacing and wide margins. The Editor reserves the right to make literary corrections. All references should contain name(s) and initial(s) of author(s) and full title of paper or work. Journal articles should also include name of journal, year, volume number and complete pagination, in that order. With books, the city of origin, publisher, date and full pagination should be given.

Manuscripts as well as correspondence relating to the publication of papers should be addressed to the Editor, Bulletin of the History of Dentistry, 4 Bank Street, Batavia, New York, 14020.

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The martyrdom of Saint Apollonia. (From the Book of Hours of Etienne Chevalier)
Saint Apollonia and the Miracle Plays of the Middle Ages

—MALVIN E. RING, A.B., M.S.L.S., D.D.S.,
Batavia, New York

Saint Apollonia, the patron Saint of dentistry, has been the subject of much study and of numerous books and monographs. The manner of her martyrdom at the hands of the Romans in Alexandria in the year 249 A.D., by having all of her teeth brutally extracted has been depicted in fresco, stained glass and mosaic in churches and cathedrals throughout the western world. One of the newest additions to the literature, for example, is a recent monograph by one of the members of the American Academy of the History of Dentistry which discusses and illustrates the use of the image of St. Apollonia in sacred vestments (chasubles, dalmatics and altar cloths) in countries ranging from Spain to Sweden.¹

It is as a result of one painting of the martyrdom of this Saint, however, that scholars have learned much about the miracle plays of the Middle Ages and have garnered much knowledge of the early theatre. The painting, a miniature by the Frenchman Jean Fouquet painted about the year 1450, in which the elaborate depiction of the torture of St. Apollonia serves as the theme of a medieval religious theatrical production, is probably the only contemporary representation of a miracle play to have come down to us.

ORIGIN OF THE MIRACLE AND MYSTERY PLAYS

Drama, as we know it today, was highly advanced in the culture of ancient Greece, with their great playwrights such as Euripides, Sophocles and Aristophanes having seen their masterpieces staged for presentation to the multitudes. Ancient Romans, too, were inveterate theatregoers, with specialized theatres devoted to the showing of either comedy or tragedy. With the coming of the dark ages, however, staging of plays all but disappeared from the European scene. What few performances remained were those enacted in the churches during the several holidays to depict to the illiterate peasant masses the stories of such happenings as the Nativity and the Crucifixion.

Sometime in the twelfth century plays began to be performed outside of the church, with the first certain instance occurring in 1204. Why the performances were moved is difficult to determine, although it is likely that the church fathers felt that they were interfering with the church services. It is also probable that they had developed as far as they could indoors, and were moved out-
doors to give them greater range and scope. Therefore the transition from simple liturgical drama to elaborate outdoor plays, divorced from the church services, came about sometime between the years 1200 and 1350.

Although the names are sometimes used interchangeably, each of the three major types of religious production was specifically representative of one category of religious subject.

The mystery plays dealt specifically with the Scriptures. The mystery cycles would portray such popular themes from both the Old and the New Testament as the Temptation of Eve, Noah and the Flood, or, from a later period, the birth and death of Jesus.

The miracle plays dealt principally with the "miracles" of the saints and consequently departed from Scriptural authority. Sometimes they related to the cult of the Virgin, but more commonly they treated of the adventures of local saints. It was this type of religious drama which was developed to the highest degree in medieval France.

The third type was called the morality play in which the characters, instead of being Scriptural or saintly figures, were abstractions of one kind or another, such as sloth, evil, avarice, etc. These plays were primarily intended to bring out some moral teaching relating to the never-ending struggle between good and evil, and tended to reinforce the church's teachings.2

Thus the performance depicted in the Fouquet miniature under discussion would correctly be identified as a miracle play.

WHAT WERE THE PERFORMANCES LIKE?

By the fourteenth century these religious dramas had become such elaborate spectacles as to require the services of many actors, sometimes numbering in the hundreds, as well as dozens of stage hands and technical personnel.

The plays were generally sponsored by guilds or other companies of artisans. Thus we read of plays being produced, for example, by the "Worshipful Company of Coopers." They were financially supported by these organizations, the plays being put on by them as a means of discharging their religious obligations.

In the earlier days the performances were given in the streets, and in order to enable as large a number of people as possible to be spectators, each play was repeated several times in different parts of the town. For this purpose moveable scaffolds, called pageants, were constructed, and these were drawn from point to point by teams of horses. (It should be noted that the word "pageant" was originally applied to the moveable scaffold on which the play was acted, and only later came to be applied to the performance itself.)

A good deal of our knowledge concerning the medieval theatre comes from early accounts of the performances. From an often quoted contemporary account of an English mystery play comes this description written in 1594 by Archdeacon Rogers of the Whitsuntide
plays at Chester:

"Every company had his pagiant or parte, which pagiants weare a high scafole with two rowmes, a higher and a lower, upon four wheeles. In the lower they apparelled them selves, and in the higher rowme they played, beinge all open on the tope, that all behoulders mighte heare them and see them. The places where they played was in every streete."³

In different areas, however, the plays were presented in more fixed locales such as inn courtyards. The feature of upper and lower tiers persisted, however, and was used to good advantage both for seating and for production of the plays.

**INFLUENCE OF THE MYSTERIES UPON ART**

The artists of the Middle Ages and early Renaissance were unquestionably influenced by the religious dramas they had seen, especially since these plays spared no effort to be as realistic, frightening and awe-inspiring as possible. Several art historians have studied the similarities between paintings and the texts of these medieval plays as they have come down to us. One of the leading authorities in this field explains how the tendencies of the theatre inspired the course pursued by artists:

"The artists actually saw on the boards Jesus and His Disciples, His miracles and the Last Supper, Mary Magdalene, Lazarus, Martha and her humility, the Paralytic and his distress, and the whole picture of their worldly life; they witnessed the Flagellation, were present at the Judgment of Pilate, felt wrath at the acts of Herod, were overcome in their hearts as believers [all the more because of the acuteness of their vision]; they even saw the spectacle of Jesus stumbling under the cross and bleeding under the crown of thorns, his feet and hands pierced by nails — were they not moved by these very scenes to create with their own brush or chisel or burin all these benifent scenes and miracles, all these indescribable sufferings?

It is common practice to refer to the realism of the art of the end of the XIV and the entire XV century. But is not this realism simply a very accurately worked out scenic realization? As a matter of fact, the parallelism is absolute and rigorous and the priority of the dramatic texts over sculptured or painted works cannot be contested."⁴

It is thus likely that Jean Fouquet was also influenced by these medieval plays, all the more so since the longest and most important mystery play of the 15th century appeared at about the same time as the miniatures were being painted. This was one written about 1452 by Arnoul de Greban, maître es arts and organist of Notre Dame de Paris. It contained 34,500 lines and took four days to perform, quickly becoming known throughout the land and viewed by many thousands of spectators.

**THE PAINTER, JEAN FOUQUET**

Jean Fouquet was born in Tours, France about the year 1420, the illegitimate son of a priest and an unmarried woman. In 1449 he appealed to the Pope to have his birth legitimized, which request was duly granted, and in the Papal brief to that effect he is described as a cleric of the Diocese of Tours. This probably meant that with the help of his father he had studied and taken holy orders.
Where he received his training in art is not known, but it is assumed that it was in Paris when he was about twenty years old. About the age of twenty-five, sometime between 1445 and 1447 he left for an extended visit to Italy, and this journey proved to be a very important stage in his career development. While in Italy he studied the work of, and was without a doubt influenced by, Pisanello, Fra Angelico, Masaccio as well as Piero della Francesca, all of whom were active at about that time.

In the years between 1450 and 1460 Fouquet produced his happiest creations; it was in this period that he gained the reputation as the foremost miniaturist of his day. And it was in the early part of this decade that he produced his supreme masterwork, the Book of Hours commissioned by Estienne Chevalier, and for which the miniature of St. Apollonia was painted.

**THE BOOK OF HOURS OF ESTIENNE CHEVALIER**

Books of Hours (hora sacrum) were frequently commissioned by wealthy members of the court and the nobility in order to allow them to know which prayers were required to be said on which days and at what times. Numerous examples of works of this type are extant, all of them illustrated to a greater or lesser degree. It was probably just after his return from Italy that Fouquet was commissioned by Chevalier to produce an illustrated prayer-book for him.

This book contained approximately 360 miniatures on themes ranging from the Scriptures to stories of the early church figures, and these illustrations undoubtedly take precedence over all other known miniatures by him. They are the crowning achievement of all his artistic endeavor, his Grand Testament as it were! "...In its original condition this prayerbook must have been of incredible splendor; with the Tres Riches Heures of the Duke of Berry and the prayerbook of Jan van Eyck at Milan, it was certainly the most beautiful manuscript of the 15th century painted in northern Europe. The miniatures, some of them cut down and framed in a most barbarous fashion, are each a small masterpiece. Although they were conceived as parts of an entity and composed to blend with the written text, they are each in themselves perfect and command our highest admiration."5

Estienne Chevalier, for whom the work was painted, was a middle-class court official who had gained great influence and prestige as well as great wealth. He was a native of Melun, a son of one of the King's secretaries. After moving up through a series of court positions, he finally rose to become Controleur General des Finances, and in that capacity was for many years a member of the select circle of the Great Privy Council which presided over the fate of the country. The majority of the principal financial decrees were drafted and signed by him, and in 1445 he was sent by the King to England to negotiate the treaty of peace. That this influential individual felt a justifiable pride of ownership in the beautiful prayer-book is testified to by the fact that not only his initials but also
his full name "Maistre Estienne Chevalier" are repeatedly displayed throughout the book.

The Chevalier Book of Hours also served in the advancement of artistic technique. Up to that time the art of perspective was unknown in France. Fouquet learned the technique of costruzione legittima or perspective construction of space by geometrical means from the Italian masters he'd studied, and in accordance with the details of this technique was enabled to find mathematically correct distances in his scenes and thus create an exact perspective in his paintings. This detail strengthens the belief that the Book of Hours for Chevalier was produced by Fouquet shortly after his return to France when his Italian recollections were still very fresh.

THE MINIATURE OF SAINT APOLLONIA

The painting is indeed a miniature, measuring only 6½ inches in height and 4¾ inches in width, yet crowded with action. It is divided into two portions, the upper being concerned with the mystery proper, while the lower seems to serve as a base, having within it not only the name of Chevalier repeated three times, but also representations of two primitive beings holding a sign bearing the word Pax and again repeating Chevalier's initials.

It is with the upper part of the painting that we are concerned, however. The background is a faithful representation of the stage of a miracle play. The various compartments ranged side by side served for the seating of spectators as well as for the setting of various scenes which were acted out during the course of the play.

These compartments, which were also used in tableaux vivants such as formed part of triumphal processions, were composed of two or even three platforms, raised one above the other and often hung with placards. That Fouquet knew of this construction is evident in the fact that in the autumn of 1461 he was busy along with two of his assistants making decorations and plans for the triumphal entry of the new King, Louis XI. Among them were to be settings for mystery plays or tableaux vivants of a similar character. But as the King let it be known to the city council "qu'il n'y prenoit nul plaisir," the festivities were cancelled and Fouquet was remunerated with 100 sols.

Dominating the center of the picture is the Saint tied with ropes to an inclined plank. Two men are pulling additional ropes tight around her legs, while a third is steadying her head by tugging on her hair. A fourth actor is engaged in pulling out one of her teeth with an extremely long-handled forceps. Adjacent to these is another prominent actor who is derisively making an obscene gesture by pointing to his derriere. Although the scene depicted is supposed to have taken place a thousand years earlier, there is no doubt that the actors' costumes are accurate portrayals of the fashion of Fouquet's time in men's wear.

In the center of the painting is a figure who possibly represents the King of the realm, who has descended from his seat in the cen-
ter section of the upper tier, along with his courtiers, in order to get a better view of the performance.

On the right, book in hand, is a person who has been frequently identified as the director or stage manager. This is an untenable supposition since the director, as the most important member of the theatre group had such a multitude of duties that it would have been unlikely for him to have actively participated in the play itself in such a fashion. Among his duties he was responsible for the erection of the stage and the placement of scenery; he sought out persons to construct and paint the scenery and to build seats for the audience; he saw to it that the goods delivered were of the proper amount and quality; he cast and rehearsed the actors; he disciplined the actors and set a system of fines for infringement of rules; he assigned persons to collect entrance money; he addressed the audience at the beginning of the play and after each intermission, giving a resume of the previous happenings and an indication of what was to come next. Would he have been bookholder too?

An additional argument against the person in the painting being the director is given by a noted theatre historian:

"Some historians have argued that the director was always on stage during performances, following the actors about, whispering their lines and giving directions. This theory, which seems most unlikely, is based almost entirely upon one anecdote of doubtful authenticity and a painting from a scene from a play about St. Apollonia in which a figure with a book and a staff stands in the middle of the stage. Some scholars identify this figure as the stage manager, although there seems no good reason to assume that he is not a character in the play. Considering the emphasis in the period on the learning of lines and the fines levied on negligent actors, it seems improbably that actors depended on the stage manager for their lines.

The tiers in the background are filled to the most part with spectators in typical medieval dress. However, a characteristic common to many stage sets of medieval mystery plays is here depicted also, and that is the presence of actors on the left dressed as angels and representing the heavenly host, while on the right are others garbed in weird, demonlike guise, representing the creatures of hell. In fact, to further the distinction, the "demons" on the right enter upon the stage from the wide open mouth of a huge animal’s head. It is these features that prove conclusively that this miniature is indeed a faithful representation of the mise en scene of a miracle play.

The colors in which the miniature is painted are for the most part subdued. The plank on which the Saint lies is done in gold, while her gown is white, the obvious symbol of purity. The four men engaged in torturing her are dressed in red jackets in violent color contrast to the white of the Saint. The man with the book is dressed in a royal blue robe, decorated with a red sash, while the remaining parts of the painting, the background and the lower portion, are done in various shades of brown and green.
SIGNIFICANCE OF THE MINIATURE AS REGARDS
THE HISTORY OF THE THEATRE

Mystery, miracle and morality plays flourished in Europe from the 10th through the 16th centuries, a span of six hundred years. Texts of innumerable plays of this nature have been preserved, some even with their stage directions and other indications of how the actors must have been dispersed on the stage. The actual appearance of the plays, i.e. the mise en scene, has for the most part been conjectural, and our knowledge of the stage settings, the seating arrangements and so forth has been garnered primarily from verbal descriptions, such as the one by the deacon quoted earlier.

In several of the European libraries there exist illuminated manuscript copies of those plays of Terence which survived to the medieval period. Terence was a renowned Roman writer of comedies who lived around 150 B.C. A codex of Terence in the Bibliothéque Nationale in Paris (cod. lat. 7907a) as well as one in the Arsenal library in Paris (cod. lat. Ars. 664) are illustrated with frontispieces depicting the presentation of his plays. They purport to be representations of Roman productions, in spite of the fact that all the participants, actors and audience alike, are dressed in medieval garb; and this fiction is strengthened by having everything marked with Latin names. The audience is labeled populus romanum, the theatre theatrum, and the actors are labeled ioculatores. This last designation gives the clue that what is actually being illustrated is a typical medieval mime show where the actors, known in the Middle Ages as jongleurs carry on their performance before the audience seated in the semi-circular theatre. These jongleurs were itinerant minstrels and entertainers who sang songs and told stories of their own composition. The word jongleur is a mispronunciation of the Old French word jogleor which was directly derived from the Latin word ioculator, meaning a 'joker'. Therefore, although these codices do show us what a medieval theatre looked like, the performance portrayed is not a mystery play.

Another Book of Hours of the 15th century, that produced in Paris in 1498 by Pigouchet for Simon Vostre, has a painting whose theme is the adoration of the shephards. Because of the disposition of the characters and the background which strongly resembles a theatre, the picture is accepted today as a portrayal of the stage setting of a mystery play dealing with the Nativity. However, no indication is given in the painting of an audience, let along the audience’s relation to the actors.

Thus the Jean Fouquet miniature of the martyrdom of Saint Apollonia stands almost alone as an accurate contemporary portrayal of a medieval miracle play. Saint Apollonia and the legends
which have been built about her have figured prominently in the history of dentistry. In this one exquisite painting her story has added immeasurably to our knowledge of the history of the theatre as well.

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Dentistry and the Encyclopaedia Britannica

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Today there is no doubt that dentistry is a profession of the healing arts. People automatically seek dental treatment from a licensed dental practitioner. The word "dentist" is commonplace in our society, and there is no confusion about the function of a dentist. He has a place of esteem in the community, and by his training and knowledge, together with a degree from a certified dental school, he merits, and rightly so, the title of a clinical doctor.

How long has this been so? How long, for example, have the words "dentist" and "dentistry" been taken for granted? How long have their meanings been understood and accepted by the public?

In order to answer questions such as these it was felt that a study of the coverage of the subject by a reputable encyclopedia would be of value, for when one wishes today to find a concise description of a topic, he usually turns to an encyclopedia. The Encyclopaedia Britannica has long been considered the best in the field, and it was felt that a careful search of the fourteen editions of the Encyclopaedia Britannica for references to dentistry might give some further insight into the progression of dentistry's status from 1768-1970.

The first step in the project was to obtain a Union Catalog listing for the Encyclopaedia Britannica. After this was done, each edition of the Britannica was examined for references to dentistry. The Houghton Rare Books Library at Harvard University in Cambridge, Massachusetts, houses the first, fourth, and fifth editions. The Boston Public Library owns copies of the seventh and eighth editions. The Library of Congress in Washington furnished the second, third and tenth editions. The Peabody Institute in Baltimore, Maryland has the ninth, eleventh, twelfth, thirteenth and fourteenth editions. The most difficult edition to obtain was the sixth. This was finally consulted at the American Philosophical Society in Philadelphia.

The next step was to devise some systematic method of searching the encyclopedias. A list of topics pertaining to dentistry was compiled, and these topics were consulted in the various editions of the encyclopedia. This procedure was followed until the word "dentistry" actually appeared. The wealth of information after the word "dentistry" did appear necessitated limiting the search merely
to "dentistry". The topics consulted in the earlier editions are as follows:

1. Anatomy (particularly tooth anatomy)
2. Dentistry
3. Doctor
4. Drawing (tooth drawing)
5. Extraction
6. Gums
7. Letting (tooth letting)
8. Medicine
9. Surgery
10. Teeth
11. Tooth

One significant fact did emerge from this project: that in spite of the growth of the Britannica over the years, with more and larger volumes, greater number of articles and more sophisticated treatment of the entries, little coverage was given to dentistry even though impressive strides were being made by the profession.

HISTORY OF THE ENCYCLOPAEDIA BRITANNICA

The first edition of the Encyclopaedia Britannica, completed in 1771, was a 3-volume work with over 2500 pages. It was printed in Edinburgh for A. Bell and C. Macfarquhar. The edition was published in 100 weekly numbers, and compiled, as the title page states, on a new plan:

"Instead of dismembering the Sciences by attempting to treat them intelligibly under a multitude of technical terms, they have digested the principles of every science in the form of systems or distinct treatises, and explained the terms as they occur in the order of the alphabet, with references to the sciences to which they belong".

Today it is not exactly known to whom the credit for this plan is due. It could have been due to William Smellie, the first editor, or Colin Macfarquhar. Arnold Constable, a man who figures prominently in the printing of the first edition, seems to give the credit to Macfarquhar.

The second edition was begun in 1776 and was completed, after 181 weekly numbers, in 1778. The number of pages increased to 8000 and the volumes to 10. The number and length of the articles increased, and one of the interesting features is an appendix, which, in itself, is a textbook on Botany. It is interesting to note that 38 pages were devoted to medicine.

The third edition was announced in 1787. It was to have 300 weekly numbers to be compiled into 30 volumes. Colin Macfarquhar was the editor as far as the article "Mysteries". He died, in 1793, in his forty-eighth year. George Gleig was hired to edit the remainder of the work, and, when the edition was completed, the copyright and remaining books were sold to Bell.
The fourth edition saw another tremendous increase in pagination—6000 pages in 20 volumes. Started in 1801, and completed in 1810, this edition also had a stormy financial crisis. Early in 1804, Bell offered Constable and his partner, Hunter, the complete copyright.

Bell died in 1809, and a fifth edition was started immediately after the fourth as a mere reprint. This edition had absolutely no new articles, and was also financially unsuccessful.

In planning the sixth edition, Constable felt it extremely unwise to reprint so large a book without correction. He hired Charles McClaren as editor, and a 25-volume edition was finished in July, 1828.

The seventh edition, reduced to 21 volumes, was completed in 1842. It was with this edition that the initialing of articles began.

The eighth edition was similar to the seventh. Completed in 1860 it contained 21 volumes. Its editor was Dr. Thomas Traill, professor of medical jurisprudence at Edinburgh University.

Perhaps the greatest issue of all was the ninth. Started in 1875, it was finally completed in 1889, with the twenty-fourth volume. Its contributors included the most distinguished scholars of the time. The English sales numbered only 9000 sets, but 45,000 sets of the genuine ninth edition were sold in the United States.

At that time, so far as the United States was concerned, there was no international copyright. Any enterprising American was at liberty to appropriate any literary work published abroad and reprint it in America. The ninth edition of the Encyclopaedia Britannica was a temptation to many publishers, and, consequently, brought about the sale of several hundred thousand fraudulent sets here in the United States before the high courts were able to intervene. Because of this intervention, the bogus plates were destroyed, and the fraud ended.

The tenth edition was merely a reprint of the ninth, with 11 supplementary volumes. This appeared in 1902.

In 1903, work was begun on the eleventh edition. This set was sponsored by Cambridge University and was issued from the University Press in 1910 and 1911 in 29 volumes. World conditions and financial difficulties increased the distribution problems of the eleventh edition. Arrangements were made with Sears, Roebuck and Company of Chicago to handle the sale of a reprinted, small-volume edition of the eleventh, to be sold at a considerably lower price than the regular edition. Sales at first were encouraging; but with the entrance of the United States into World War I, the Encyclopaedia Britannica was purchased by Sears, Roebuck and Company. This was largely because of the interest which the philanthropist, Julius Rosenwald, then head of that company, had taken in this work. Three supplementary volumes were published in 1922 under the editorship of Chisholm in London and Franklin Hooper in New York. This supplement attempted to record concisely the state of the world before, during, and immediately after World War I. These 3
volumes, together with the 29 volumes of the eleventh edition, eventually became the twelfth edition.

In 1926, 3 more supplementary volumes were compiled. These 3 volumes displaced those of the twelfth edition.

The original volumes of the eleventh edition and these new supplementary volumes became the thirteenth edition. The editorship had not changed, and these new volumes were designed to report the events that had occurred from 1910 to 1926. Among the contributors whose names gave international authority to the new work were Marshal Foch, Lord Cecil, Albert Einstein, Elihu Root, Dr. Gustav Stressmann, Madame Marie Curie, Lev Davidovich Trotsky, and President Thomas Masaryk.

However, the complete work was growing old. These last 2 editions were essentially the eleventh edition, which had not been revised, except for the supplementary volumes, for almost 25 years. It was imperative that a new edition be compiled if the encyclopedia were to maintain its standards. Two million dollars was invested in the publication of the fourteenth edition. Edited by J. L. Gavin in London and Franklin Hooper in New York, it was 3 years before the work was completed, with more than 4000 noted men and women, representing all nationalities, contributing articles. The eve of the "great depression" saw its publication.

**TREATMENT OF DENTISTRY BY THE ENCYCLOPAEDIA BRITANNICA**

The first edition, as mentioned previously, was composed of 3 volumes. The editors wrote a rather lengthy preface to the first volume, and some of their philosophy was reflected in this introduction. They felt that utility ought to be the principal intention of every publication, and to diffuse the knowledge of science was the design of their work.

The editors stated that "...they have had recourse to the best books on almost every subject, extracted the useful parts, and rejected whatever appeared trifling or less interesting."

With the purposes of this first edition of the Encyclopaedia Britannica as earlier stated in the preface in mind, the volumes were searched for references to dentistry; there were only 7 possible references. However, in none of these instances was "dentistry" or "dentist" defined. Dentistry was very definitely being practiced at this time, but the Encyclopaedia Britannica did not elect to include dentistry as a separate topic. Although Britannica was certainly in its infancy at this time, it was still the best reference text of the period, and other topics less obscure than dentistry, were given adequate coverage. It is interesting to speculate why there was so little mention of dentistry. It can best be expressed by saying that dentistry was undergoing a tremendous conflict. There were in the field men who had no official degree, yet called themselves dentists, but were regarded by most of the population as "quacks". Dentistry was also performed by the barber-
surgeon, the medical practitioner, and the local blacksmith.

The references pertaining to dentistry in this first edition of the Encyclopaedia Britannica follow:

DENTIFRICE
in medicine, a remedy for rubbing the teeth, and purging them from sores; and for cleaning and absterging the gums, when replete with humours. There are dentifrices of various kinds and forms; some in form of a powder composed of corals, pumice stone, salt, allum, egg-shells, crabs claws, hartshorn, others in form of an electuary, consisting of the same powders mixed up with honey; others are in forms of a liquor drawn by distillation from drying herbs and astringent medicines.

DENTISCALPRA
in surgery, an instrument for scourging yellow livid or black teeth; to which being applied, near the gums, it scrapes off the foul morbid crust.

DENTITION
the breeding or cutting of the teeth in children. (see medicine)

EXTRACTION
in surgery, is the drawing any foreign matter out of the body by the hand, or by the help of instruments. (see surgery)

DRAWING
denotes the action of pulling out, or helping along: thus we read of tooth-drawing, wire-drawing.

OF DIFFICULT BREEDING OF TEETH
among all the diseases that afflict children there are none that generate such grievous symptoms as difficult dentition. About five or six months after birth, the teeth generally begin to make their appearance: first the incisors or fore-teeth, next the canini, or dog teeth; and lastly—the molares, or grinders. About the seventh year there comes a new set; and at twenty-one the two inner grinders, called dentes sapientiae.

At the time of cutting their teeth, they slaver very much and have a diarrhoea, which is no bad sign, but when it is difficult, especially when the canine teeth begin to be in motion, and to make their out-way through the gums, gripes, inquietude, watchings, favers, difficult breathing, suffocating, aloofness, greenish stools, the thrush, convulsions, epilepsies, which often end in death.

It shows dentition is likely to be bad, if the child is perpetually crying, thrusts his fingers into his mouth and bites the nurse’s nipples; if unequal tubercles are perceived in the gums, both by the sight and touch, when the teeth are expected to appear; if there is heat in the mouth and the whole body; if they start without a cause, especially in sleep. These do not come out without great slavering, and sometimes a diarrhoea, as was mentioned above.

Harris observes that when an inflammation appears, the physician will labour in vain, if the cure is not begun by applying a leech under each ear. When the swelling of the gums shows, it is time to cut it, to make way for the tooth, he would have it done with a penknife, not with a fine lancet, lest the wound should heal, and form a cicatrix. The food he directs to be no more than luke-warm.

MEDICINE
medicine is generally defined to be, the art of preserving health when present, and of restoring it when lost.

TOOTH-ACHE
the toothache is caused by impure serum, which corrodes the ligaments, nerves and glandulous coats, by which the roots of the teeth are kept firm in their sockets, and wherewith they are invested.

It is a kind of a rheumatic disorder; for we have often observed the pains of the joints and shoulders have shifted to the side of the
head, and have invoked the teeth and gums with violent pain. On the contrary, pain of the head and teeth have fallen into the arms and shoulders.

The seat of the toothache may also be in the cavity or internal parts of the teeth themselves, that is, in the little vesicular cord composed of the nervous membrane, an artery, a vein, and a lymphatic vessel, which may either be disturbed by stagnatory serum, or be affected with a spastic constriction, especially if the tooth is carious, and the caries reaches the said cord.

As in the gout there is pain, redness, a tumour, and a little fever, so they sometimes appear with the toothache. There is also frequently a copious discharge of saliva, which proceeds from a painful spasm, which constricts the lymphatic and venous vessels.

As the rheumatism appears in temperate and a sudden change of weather, so it is with the toothache, especially when the weather is hot and cold by fits.

The whole intention of care consists in driving and delivering the impure scorbutic serum from the head, and thus carrying it off through proper emunctorie; and afterward in strengthening the part.

This is done by saline emollient, purgative clysters; by warm pediluvia of rain water and wheat bran, with soap, and used just before bed-time; by laxatives of manna and caffia dissolved in whey or asses-milk or mineral waters. If the patient is plethoric or full of blood, bleeders in the foot will drive the humours from the head.

Sudorific remedies are also grapes, but more especially an electuary made of rob of alder-berries, burnt hartshorn, diaphoretic antimony, and a few grains of nitre, which cannot be too highly praised. Or an ounce of rob may be taken in broth to promote a diarrhoea; and it may be used externally, dissolved in beet, in the manner of a gargle, which will yield immediate relief to the patient.

Outwardly may be applied bags, filled with paregoric an emollient species, such as elder, and camomile flowers, bay and juniper berries, carraway and millet seeds, and decrepitated salt. They must be laid on warm, and very soft.

A drop or two of oil of cloves, or box applied to a carious tooth with cotton, are medias not to be despised. Camphorated spirits of wine mixed with saffron, castor, and opium made into a linament, and laid to the gums, and hollow teeth, often gives the patient relief.

When the toothache proceeds from a rotten, hollow tooth, it will be best to burn the little nervous cord, which is the seat of the pain, with an actual cautery; and then the cavity may be filled with a mixture of wax and mastic.

If this cannot, or is not permitted to be done, the only remedy left is to have the tooth drawn. But if the patient is plethoric, it will be safest to bleed first, for fear of fatal haemorrhage.

A small pill, made of equal quantities of camphor and opium, and put into a hollow tooth, is often beneficial. Some greatly recommend a small plaster laid on the side of the face, or upon the temples.

It now becomes a practice, especially in France, upon drawing a sound tooth, to replace it in its socket where, with proper precautions, it will foster again. Musgroin is the first who recommends this practice. After the extraction of the tooth, he advises a gargle of honey, mixed with the juice of the herb mercury, common salt and spring water, and then to put it in its former place; and adds, it will become more useful than before.

The French have improved this hint; and when the tooth is rotten, or otherwise unfit to be replaced, they put another sound human tooth in the place of it, when it can be had: otherwise one of any other animal that is of a size suitable for the purpose.

De La Mathe, in the toothache, advises to make a small round stickey plaster, about the bigness of a silver pin, and to put a flat bit of opium in the middle of it, of the size not to prevent the adhesion of the other. This is to be laid on the artery near the cavity of the ear, where the pulsation is the most sensitive. He affirms, there are a few cases that this will not relieve.

It is interesting to note that toothache was regarded as caused by an impure serum—a theory that was very popular during the eight-
teenth century. Strange, too, was the belief that a change in the weather had an effect on tooth pain. Although a good knowledge of the tooth pulp was displayed, the treatment of toothache was not very sophisticated. For the most part it consisted of a laxative to drive the "impure serum" away. The use of cloves was probably the only rational method employed in the sedation of pain.

It should be noted that dentistry was not even recognized as a branch of medicine. In the excerpt on "extraction" no mention was made of the extraction of teeth, and in the excerpt on "surgery" there is no mention of oral surgery.

The second, third, fourth, fifth and sixth editions contained essentially the same articles as the first, with one notable addition. In the section on "medicine", under "medical electricity", a method for relieving the toothache was described:

The toothache, occasioned by cold rheumatism or inflammation, is generally relieved by drawing the electric fluid with a point, immediately from the part, and also externally from the face. But, when the body of the tooth is affected, electrization is of no use, for it seldom or never relieves the disorder, and sometimes increases the pain to a prodigious degree.

The article on toothache in these five editions did have some changes from the first edition; It was more organized and more sophisticated. Classifying it as "odontalgia", in the section dealing with "Medicine", it states that the disease is "...also a symptom of pregnancy, and takes place in some nervous disorders."

The section dealing with its cure is also enlarged over the previous edition, advising that "...when the affliction is purely rheumatic, blistering behind the ear will almost always remove it." Tipplers were probably elated when they read that it was good practice to relieve the pain by "...holding strong spirits in the mouth." And to complete its treatise, the article summarizes all of the various and sundry bizarre treatments with the admonition that "...very often all these remedies will fail and the only infallible cure is the extraction of the tooth."

The seventh edition, published 1830, and the eighth, an almost exact duplicate of the seventh, are significant in that they omitted the articles which the first 6 editions had included! No references to dentistry can be found in these editions.

Thus, one can see that very few references were made to dentistry in these first 8 editions. The words "dentist" and "dentistry" actually did not appear once during this 107-year period, in spite of the fact that advances of far-reaching importance were made in the field of dentistry, including the publication of Fauchard's classic text, as well as the great work done by such giants of dentistry as John Hunter, Joseph Fox, John Tomes and Hayden and Harris.

THE NINTH EDITION OF THE BRITANNICA

Begun in 1875 and finished in 1889, the ninth edition is considered by many to be the greatest of Britannica's editions. At the
time of its issuance it was universally acknowledged to be a masterpiece of scholarship.

It is in this edition that the word "dentistry" first appears under a separate heading. The man who wrote the article was Dr. John Smith who was considered by J. Menzies Campbell to be one of Britain's visionaries in dentistry, and of whom Menzies-Campbell wrote that he was "...benevolent, generous, altruistic, cultured and erudite...and whose) deeds far outlived their earthly span."3

Smith, who was born in Edinburgh in 1825, was the son of a dentist. He received an M.D. degree in 1847 from the University of Edinburgh. The death of his father in 1851 led Smith to take over his father's practice of dentistry, with his only training in dentistry being observation of his father's work. However, in 1856 he gave the first lectures on dentistry at the University of Edinburgh's Medical School. A further milestone in Smith's career was his appointment in 1857 as surgeon dentist to the Royal Public Dispensary. Feeling the need for founding a dispensary devoted exclusively to dentistry, he enlisted the support of Dr. Robert Nasmyth and opened the Edinburgh Dental Dispensary in 1860. It did not take long for Smith to secure recognition of the dispensary by the Royal College of Surgeons of England, and, in 1865, Scottish dental education was on its way to becoming equal to that in London.

After Nasmyth's death in 1870, Smith was appointed surgeon dentist to Queen Victoria, and in this position was most influential in securing passage of the Dentists Act of 1878. The remainder of his life, until his death in 1910, was spent as the reputed "Great White Father" of Scottish Dentistry.

Nevertheless, several aspects of Smith's Britannica article give one the impression that he is disparaging of dentistry. Perhaps this is attributable to the fact that the article was written at the height of the controversy over the Dentists Act. One cannot overlook the fact, however, that Smith is the same one who introduced his first lecture on dentistry in Scotland in 1856 with these words:

Gentlemen,
I must apologize for the comparatively unimportant aspect of this subject, upon which I propose to offer a few remarks.4

THE ARTICLE ON DENTISTRY

Smith's article appeared in Volume VII and ran on for five pages. It was divided into the following sections: Definition of dentistry; number of teeth; dentition; structure and form of teeth; diseases of teeth; extraction; regulation of tooth; stopping; mechanical dentistry. The authorities Smith consulted were Heath, On Diseases of the Jaws. (1868); Taft, Operative Dentistry. (1877); Salten, Dental Pathology. (1874) and Smith, Dental Anatomy and Surgery. (1864).

The article is classic in the way it so aptly describes the prevailing attitude toward dentistry. Smith presented the first definition of dentistry in the Encyclopaedia Britannica:
"The province of dentistry embraces the art of treating diseases and lesions of teeth, and supplying artificial substitutes in the place of these organs when lost".

In almost the same sentence, he went on to say that diseases of the teeth were not always local affections, but may arise from constitutional causes. In no uncertain terms he said that "...unless qualified as a surgeon or physician, the dentist is not in a position to deal with these diseases, except in so far as to repair or ameliorate the affection produced."

It was Smith's belief that the dentists of the time were more interested in mechanical rather than surgical proficiency, and whatever surgical knowledge the dentist did acquire was too limited to be of any value.

Apparently Smith investigated how many dentists of the period were actually qualified by law; he reported in an article in Lancet for June 1876 that "...only thirty-eight of all the numerous body of so-called surgeons or dentists of the United Kingdom possessed in reality any medical or surgical diploma."

To further explain the status of dentistry, Smith inserted a footnote which stated that it was

"...comparatively of late years that dentistry has occupied anything like a properly recognized position among the different departments of minor surgery; for long it was practiced to a large extent as a super-added means of livelihood by persons engaged in some other pursuits, and without any professional education whatever. The blacksmith, barber, watchmaker and others of the same class were the dentist of every village and country town; while even in some of our larger cities dentists of the kind were until lately to be found practicing under the very shadow of universities and medical schools."

Smith also had a few comments on dental education in America at the time. He discussed the colleges of dentistry "...each with what they designate as a faculty of professors", and went on to describe advertisements in the Dental Cosmos of the several different dental schools with their combined total of 78 professorships. The curriculum rather surprised him and he commented on the chairs in "...mechanical dentistry, operative dentistry, dental physiology, dental pathology, dental therapeutics." Smith reported that "...a diploma in dentistry—'doctor of dental surgery'—or of 'dental medicine' may be procured for a fee which seems to be $30.00'" However the candidate did have to "...fulfill the curriculum and pass the examination".

In spite of Smith's rather harsh dealing with the practitioners of dentistry, he did prophesize that

"...ere long practitioners devoting themselves to dental surgery will—like oculists, or aurists, or obstetricians, or any selecting a branch of practice in preference to another—be fully qualified medical men."

Nonetheless, time has proven him wrong in that dentistry, and not stomatology, is the accepted mode in the western world today.

The tenth edition, which appeared in 1902, was merely a reprint of the ninth edition with 11 supplementary volumes. There were no significant changes in the references to dentistry.
THE ELEVENTH EDITION—A NEW ERA

The eleventh edition began a new era in articles on dentistry in the Britannica. The article in this edition was the first to be written by an American dentist, Dr. Edward Cameron Kirk, one of the great figures in American dentistry in the late nineteenth and early twentieth centuries. He was also the author of the articles in the twelfth through the fourteenth editions.

Edward C. Kirk (1856-1933) was a constant contributor to dental literature from almost the beginning of his professional career. Most of his articles were published in the Dental Cosmos, and they came under the discriminating eye of Dr. S. S. White. This association of the two men led to the selection of Dr. Kirk as editor of the Dental Cosmos when Dr. White died in 1891.

In 1896, Dr. Kirk succeeded Dr. James Truman as Dean of the Dental School of the University of Pennsylvania. Although most of his time was devoted to the University, his interest in the Dental Cosmos did not wane. A biographical sketch of Kirk in the seventy-fifth Anniversary Issue of the Dental Cosmos said that it was felt that his dental ideals were ahead of his time. Kirk countered these criticisms by saying that "...his hopes and ambitions were to raise the heads to the level of his standards, rather than the lower the standards to the level of the heads." This, then, was the ambition of the man who described dentistry in 4 editions of the Encyclopaedia Britannica.

Kirk’s article, which ran for four pages was organized into the following parts: history; course of training; filling or stopping; research; dental therapeutics; extractions; and modern methods.

The authorities and their works cited by Kirk were perhaps the most important in the entire field of dentistry at the time: J. Tomes: Dental Anatomy and Dental Surgery; W. D. Miller: Microorganisms of the Human Mouth; H. Smith: Dental Microscopy; F. J. S. Gorgas: Dental Medicine; E. H. Angle: Treatment of Malocclusion of the Teeth and Fractures of the Maxilla; G. Evans: A Practical Treatise on Artificial Crown and Bridge Work and Porcelain Dental Art; and E. C. Kirk: Principles and Practice of Operative Dentistry.

The definition of dentistry given in this eleventh edition is far better than the definitions in the previous editions:

"Dentistry—a special department of medical science, embracing the structure, function and therapeutics of the mouth and its contained organs, specifically the teeth, together with their surgical and prothetic treatment".

Kirk’s understanding of the historical progress of dentistry was very sound. He ascribed to Pierre Fauchard his rightful place as one of the founders of scientific practice of dentistry, quoting widely from Fauchard’s book "Le Chirurgien Dentiste." The transplanting of teeth he credited to John Hunter and to van Leeuwenhoek went the credit for a better understanding of the nature of tooth morphology.

—18—
Kirk ended his article with an excellent summary of the status of dental education in the United States in 1910, pointing out that the number of accredited schools had increased from 12 in 1878 to 57 in 1910, with an enrollment of 6,919. Of these 57, 37 were departments of medical institutions. In fact, he felt that by 1910 "...the curriculum preparatory to dental practice has been increased as to content and length so that it is practically equal to the requirements for the training of medical specialists."

Kirk also authored the article in the thirteenth edition; its significant addition was a section dealing with the advances made in the field of dentistry in the years subsequent to 1910. Among other things, he discussed Sir William Hunter’s condemnation of American restorations as "mausoleums of gold over tombs of sepsis," recognizing that what Hunter was really condemning were "...badly conceived and unskillfully executed dental restorations." He also dealt with the increased use of X-rays in dentistry as well as the advances made in the field of public health dentistry.

The entry in the fourteenth edition was also the work of Kirk, and the significant addition was his description of the oral hygiene program employed in the public schools. Experiments done in connection with this program indicated that children relieved of the disabilities arising from infected mouths and diseased teeth showed improved physical and mental efficiency.

This was Kirk’s last article. He died shortly after, but he left a lasting memorial in his articles on dentistry in the Encyclopaedia Britannica.

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The Influence of Religion Upon the
Development of Dentistry Through the Ages

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From the very beginning of the history of mankind, religion has played a dominant role in determining man’s course. Early man believed that misfortune, disease and death were caused by displeased demons; therefore, it was the duty of the witch doctors and the medicine men of these early societies to minister to both spiritual and physical needs. As man evolved from his savage state, the tribal organizations grew into the ancient civilizations. But magic and medicine became religion, magic and medicine, and from the savage medicine man evolved the pagan priest.

As time went on, a special class of the priesthood assumed the role of the physician, and though their practice was dominated by magic and demonology, some advances were made. Information passed through succeeding generations of priests, and votive tablets, on which were described the symptoms of diseases, as well as known cures, were utilized by the priests in compiling the earliest medical writings. Hippocrates stored up all the medical records existing in the Temple of Cos, and it was he, who in the fifth century B.C., made the initial effort to emancipate the practice of medicine from religion.

Unfortunately, the Hippocratic virtues had only begun to exert their influence on medical growth when the world began sinking into that period called the Dark Ages, which was characterized by a process of decay and retrogression. Medicine reverted from its position as a budding science into the realm of magic, again dominated by the church. It was not until the late years of the Renaissance period that medicine became secular.

The art and science of dentistry was not established until the eighteenth century, so the early history of dentistry must be gleaned from the complex history of medicine. Interwoven into this maze is religion, which has exerted a prominent influence upon the over-all history of medicine and dentistry.

THE ASSYRIANS AND BABYLONIANS

In the Babylonian civilization, the practice of medicine was divided between the priest physician and the lay physician and surgeon. The priest physician employed religious and magical means for treating internal disease supposedly caused by demonic possession; the latter applied natural methods for treating external pathological conditions caused by injury and obvious acts of violence. The Code of Hammurabi (c. 1959 B.C.) reveals that the surgeons
held high positions in the state, did not belong to the priestly caste, and were in danger of losing their hands if they were found guilty of malpractice. It is significant that the priestly doctors and the magicians, on the other hand, were not subject to punishment under the code since they executed the will of the gods.

The Assyro-Babylonians attributed toothache to the activity of a demon identified as a worm. Their treatment of toothache consisted of a mixture of medicine and magic, which is illustrated as follows: "Mix beer, saki plant and oil together"; then repeat the incantation "three times three", put the remedy on the tooth, "and the worm will drop out of the mouth." This remedy was used by the priest physician who, failing to trust or understand the medicine, found it necessary to invoke the aid of the god "Ea" in order to produce a cure. The Assyrian incantation—The Legend of the Worm—probably is the earliest recorded method for treating toothache:

After Anu made the heavens, the heavens made the earth, the earth made the canals, the canals made the marsh, the marsh made the worm. The worm came weeping to Samas, came unto Ea, her tears flowing: 'What wilt thou give me for my food, what wilt thou give me to destroy?' 'I will give thee dried figs and apricots.' 'Forsoth, what are these dried figs to me, or apricots? Set me amid the teeth and let me dwell in the gums, that I may destroy the blood of the teeth and of the gums chew their marrow. So shall I hold the latch of the door.' 'Since thou hast said this, O Worm, may Ea smite thee with his mighty fist.'

THE EGYPTIANS

Medicine in ancient Egypt parallels the situation that existed in Assyria and in Babylonia: namely, medicine was practiced for some time by only the sacerdotal caste. The priest physicians of early Egypt derived their erudition from forty-two sacred textbooks. These texts contained all the wisdom of the ancient Egyptians and were attributed to the god Hermes (Thoth), who, like Apollo among the Greeks, was the special deity of medicine. The last six books were called "The Pastophor," and were entirely devoted to the healing art. Those members of the sacerdotal caste who treated disease were called the "pastophori."

The founders of Egyptian medicine were Apis and Serapis, both of whom were deified after death. Serapis was honored as a celestial healer, and many temples were erected to his memory. The most celebrated of the early Egyptian physicians was Imhotep (c. 2980 B.C.), who was deified about 525 B.C. and became the patron god of Egyptian medicine.

The learned priests were acknowledged as the leaders in Egypt, and to them was entrusted the dispensation of all forms of learning. Medicine was a branch of the general culture in Egypt; therefore, medicine, including dentistry and all other knowledge, was taught by the priest in schools connected with the temples.

Our knowledge of the medical and dental art in ancient Egypt is derived principally from the medical papyri. The two most important ones are the Edwin Smith and the Ebers Papyri, the latter being compiled about 1550 B.C., with some parts of it having their
origin as early as the thirty-seventh century B.C. The prologue of the Ebers Papyrus is of particular interest since it illustrates how firmly Egyptian medicine was bound with religion and magic; it is now regarded as a simple compilation, as if prepared for some great temple. The Edwin Smith Payrus was written about 1700 B.C., but the original texts were possibly a thousand years older.

A comparison of these two papyri reveals that the Ebers Papyrus deals with internal pathologies, attributes disease to supernatural causes, and resorts to religion and magic for treatment. The Edwin Smith Papyrus, on the other hand, deals with ailments of which the cause is obvious and natural, and applies rational methods of treatment in the hands of skillful operators. The Ebers Papyrus is silent in regard to mechanical dentistry, but it does contain forty-eight remedies intended for the alleviation of gingivitis, erosion, pulpitis and toothache. The remedies are theurgo-empiric in nature, which would indicate that diseases of the mouth were considered as having a supernatural origin and amenable to religious and magical methods of treatment.

Undoubtedly, dentistry had its origin in Egypt as an independent branch of medicine. We are certain that religion and the sacerdotal caste exerted a strong influence upon medicine and dentistry in this country. The ivy, sacred to the god Osiris, was used by the Egyptians for the treatment of the toothache. They believed also that the mouse was under the direct protection of the sun, which was worshipped; so a second method of treating toothache consisted of applying the warm body of a split mouse to the cheek over the offending tooth. Religion was the force that impelled the Egyptians to mummify their dead and to provide them with the materials necessary in the life hereafter; yet, the early Egyptians did not practice anatomic dissection. Their ostentatiousness should have fostered a desire for dental appliances that could have been fashioned by their master craftsmen whose talents have never been questioned. But such was not the case with the Egyptians. Perhaps we shall never know why this people failed to contribute more to the development of dentistry, but if we are permitted to speculate, we might consider that their neglect of the living was caused by an extreme devotion to their dead.

THE HEBREWS

The civilization of the Egyptians, the Assyrians and the Babylonians had long been established when the ancient Hebrews were emerging into history as a nation. It was not until the eighth century B.C. that the practice of medicine began to be established among the Israelites. The Hebrews held a supernatural concept regarding medical phenomena which differed from their neighbors in the fact that they, being monothelistic, attributed health and disease as emanating from one divine source. The people commonly turned to the “man of God” (II Kings V: 8-14) for medical miracles. It is recorded that the patriarch Rabbi Jehudah was tormented with a
toothache and the prophet Elijah cured him by laying his finger on the painful tooth.

Sacerdotal medicine among the Hebrews embraced all diseases of the body, including dental, and was bound with hygiene as a part of their religion. However, the Hebrew priests, unlike the priest-physicians of Egypt, had no medical authority; nor did they in any way follow the practice of medicine: instead, they acted as hygienic police. Nevertheless, one needs only to read of the diagnostic ability which the law (Leviticus XIII, XIV) required of the priest in his examination of persons suspected of leprosy to appreciate the medical knowledge required of them. In addition to the priests and the physicians were the practitioners of folk medicine; the latter were craftsmen who dealt in amulets and formulae.

The Bible and the Talmud are our principal examples of Hebrew literature, these being primarily religious anthological documents which refer to medicine or dentistry only when it pertains to religious or civil laws.

The first evidence of dentistry among the Hebrews is found in the Talmud, a voluminous work which contains the whole body of Jewish civil and canonical laws and traditions with rabbinic commentaries. The Talmud deals with many subjects, one being medicine, with no specific section devoted to it. Medicine and dentistry are alluded to when they pertain to a point of law, or when an important person is affected.

We have been unable to find a specimen of dental prosthesis that can be attributed to either the ancient Hebrews or the Egyptians; yet we know that the Hebrews practiced prosthetic dentistry, and further, that it was confined to Jewish women. They did not wear veils; so we must assume that it was cosmetic reasons that impelled them to wear dental appliances. The appliances (inserted teeth of metal or wood and crowns of gold or silver) were fashioned by craftsmen known as "Naggar" who were workers in wood or metal and were distinguished from the physician who prescribed for dental ills.

Rabbi Zera speaks of the removable gold tooth and the problem as to whether a woman should be permitted in public with such an appliance (Shabbat 65, a. Nedarim 66, b.). The same Talmudic reference reveals that the rabbis permitted a woman to go out with a metal or gold tooth, but the sages forbade it. The opinion of the sages is based on the assumption that a woman would remove the tooth to display it to her friends; in so doing she would be carrying it, and carrying is forbidden on the Sabbath. No difference of opinion existed in regard to the silver tooth because there was less reason for its being removed for the purpose of display.

Beautiful teeth were no less appreciated in Biblical times than they are today; but even more important than this valuation, a man's strength was measured by the condition of his teeth. The Hebrews fully realized that anodontia denoted weakness or poor health (B. Talmud, Niddah, 65, a.). The condition of the teeth as-
sumed particular importance in the physical examination required of rabbis before they were admitted to active service in the Temple. One or more missing teeth was sufficient reason to disqualify a candidate for attaining this office (B. Talmud, Berakot 44, a.).

The early Hebrews considered toothache to be caused by the worm, and the Talmud is not without comment on its treatment. Some of the remedies mentioned are vinegar and salt, clove of garlic, oil and fruit juices, and the eggs of grasshoppers. The use of snake skin and similar agents derived from animals was not countenanced because of the Hebrews’ strict dietary laws. All such nostrums were considered “unclean” and therefore unfit to be placed in the mouth.

THE GREEKS

The history of Grecian medicine begins with an ancient Greek physician Asklepios (later Aesculapius), who lived between the twelfth and the thirteenth centuries B.C. This early physician displayed great ability in the art of healing and in time was regarded as the god of medicine. In the centuries that followed, various traditions arose concerning his marvelous powers, so that instead of one, the popular voice spoke of several Aesculapii. Many temples were erected to Aesculapius; eventually the temples became schools of medical science. Lay medicine gradually supplanted sacerdotal medicine, but the latter was practiced in Greece until the pagan temples fell into ruin because of the advancement of Christianity.

The first mention of dentistry in Greece is found in the tradition of Aesculapius. Cicero relates that extraction was first advised by the third Aesculapius who also recommended cleansing the mouth and the teeth. According to this information, dental hygiene and dental surgery had a divine origin in this particular country.

The written history of dentistry begins with Hippocrates whose voluminous writings faithfully represent the state of medicine, including dentistry and surgery, during the latter part of the fifth and during the fourth century B.C.² Hippocrates belonged to the sacerdotal caste of the Asklepiadi and, according to some of his earliest biographers, was the nineteenth descendant of Aesculapius on his father’s side. It is interesting to note that Hippocrates “…treasured up all the records of medical practice that were preserved in the temple of Cos,” but later was accused of having set fire to this same temple. Perhaps it was Hippocrates who courageously destroyed the temple in an effort to free medicine from the paralyzing effects of superstition, imposture and the supernatural character attributed to it. It was the contention of Hippocrates that medicine should be emancipated from religious influences and instead, should become a liberal and human art based upon the observation of clinical facts and the study of natural laws.

There is not one particular chapter in the writings of Hippocrates devoted to the teeth; instead there are many passages concern-
ing dental problems scattered throughout his works, covering many aspects of dental treatment. Suffice it to say that "The Father of Medicine" was the first to strive for a separation of medicine from religion. That he apparently succeeded is evident in the fact that in time doctors' shops began to appear in the most important centers of population, and it was to these stations that the sick went for treatment. Dentistry was practiced in these shops by doctors who treated dental maladies along with other pathological conditions of the body.

THE ROMANS

The elder Pliny tells us that the Romans, before they invaded Greece, "... got on for 600 years without doctors," relying mainly on medical herbs, religious observances, superstitious rites and votive offerings set up in the temples. The first physician to practice in Rome was Archagathus, a Greek priest, who came there in 218 B.C. In time, however, the practice of dentistry was recognized to be in the province of secular physicians. The writings of Celus, Pliny, and Galen permit us to conclude that dental art, in ancient times, reached its highest degree of development at the time when the Roman civilization was in its greatest splendor, when, in the capital of the world, wealth, luxury, and the refinements of social living marvelously increased its needs.

THE RISE OF CHRISTIANITY

By 200 A.D., the Western Roman Empire had started to decline. Rome became corrupt; the wealthy class was becoming more wealthy, and the great masses of the people were little more than paupers and slaves; malaria was becoming prevalent in Italy, and the barbarians were pressing upon its northern border. Another force operative at that time in Rome was the rise of Christianity. The simple summons, "Come unto me all ye that labour and are heavy laden, and I will give you rest (Matt. 11:28)," was more appealing than any message of the cults that had become established in Rome. As the state organization began to break up and the life of the individual became more and more difficult, the promised peace in the life hereafter permitted the Europeans, like the Egyptians before them, to focus their attention on their life after death. The state, however, resisted the rise of Christianity by persecuting its converts.

Charms bearing the names of martyrs or individuals canonized by the church were used by persons suffering from toothache. Some nineteen saints have been venerated by those seeking relief from dental pains, but St. Anna, St. Susanna, St. Peter and St. Apollonia are foremost among the Christian saints as healers of dental maladies. Of these, St. Apollonia was destined to become the patron saint of dentistry, "the protector and intercessor of those afflicted with toothache."
SAINT APOLLONIA, PATRON SAINT OF DENTISTRY

The historical account of St. Apollonia's martyrdom is related in a letter written by Saint Dionysius, Bishop of Alexandria, to Fabius, then Bishop of Antioch. The event occurred during the Roman persecution of Christians under the Roman Emperor Decius (250 A.D.):

"...they seized then the marvelous aged virgin Apollonia, and broke out all her teeth with blows on her jaws, and piling up a pyre before the city threatened to burn her alive, if she refused to recite along with them their blasphemous sayings. But she asked for a brief respite, and, being released, without flinching, she leaped into the fire and was consumed."

Apollonia was canonized a saint about fifty years after her death. Eusebius, in the fourth century, is the first to mention St. Apollonia, but it was not until the end of the fourteenth century that she was assigned a place on the calendar of the Church. Her day, February 9, is just two days later than the birthday of Apollo (the Greek sun god, also god of healing) whose festival at that time was called "the Apollonia." It is worthy of note that the early church dignitaries wisely transformed into a Christian festival any day that had been recognized as a public holiday since ancient times.

At the turn of the fifteenth century, religious enthusiasm was at its height. The church, deprived of the lucrative practice of curing disease by actual administration, revived the mystery of the ancient gods and amassed great wealth by the erection of shrines to saints reputed to heal every disease of the body.

Churches and altars have been dedicated to St. Apollonia throughout the world. There are only two such shrines in this country. One is in the School of Dentistry, Loyola University in Chicago; the other is at St. Cecilia's Church, Boston, Massachusetts.

THE INDIANS

Much has been written about dentistry in the countries of the Near East and of Europe, but, comparatively speaking, very little has been written about dentistry in India, where dentistry formed part of the Ayurveda, or Indian medicine, and as a science flourished earlier in India than it did in Egypt.

Dentistry was of divine origin in India, as it was in Babylon and in Greece. Records dating from 5000 B.C. relate that the Ashwins, "twin sons of the sun," gave new teeth to Pushan. The Ashwins imparted their holy knowledge to Indra, and Indra handed down the science of life to Dhanvantari, who imparted the light of truth to Sushruta. Sushruta represented the surgical school, while Charaka belonged to the school of medicine.

It is difficult to trace the regular chronology of the history of Indian medicine and dentistry. The first, or Vedic, period (about 2,500 B.C.) of Indian medicine, was dominated by magic medicine and faith healing. The post-Vedic period was characterized by the employment of empiric and rational methods in medical treatment. Then came the "golden days" of Indian medicine which occurred...
at about the beginning of the present era. Indian dentistry reached its zenith at a time when in Egypt the dissected body of a mouse was used as a cure for toothache.

In the centuries that followed, Buddhism passed into modern Hinduism; and the teachings of Gautama Buddha, which forbade human dissection and the touching of dead flesh, put an end to the anatomic research begun by the Indian surgeon, Sushruta. The Brahmin research scholars withdrew from medicine and dentistry as the priests assumed the practice of medicine and attempted to cure with spells, charms and incantations. The temples were used as clinics in which body and soul were treated. The Mohammedan sovereignty lasted from 1001 to 1707 A.D. Then came the Peshwas and later the British. Dentistry during these ages fell into the hands of the unskilled and produced the barber surgeon before it sank into oblivion.

The Hindus have a strict code of hygiene which includes compulsory ablution. The mouth is the gateway of the human body and must be kept scrupulously clean; therefore they will not take anything by mouth in the morning without first cleaning the teeth, tongue and the mouth. The belief of the Hindus that most ailments are due to bad teeth, and the fact that their religion demands cleansing of the teeth and the oral cavity, have done much to focus the attention of the Indian upon his teeth.

The Indians brush their teeth with the twig of a tree, a practice that has been transmitted from father to son from time immemorial. The twig is popularly known as the dantana, or the "Indian tooth brush." The Indians had contempt for the European who used a toothbrush made with bristles from a dead animal (which was unclean), and also because the European used the same brush many times although after the first use it had been defiled with saliva. The late Mahatma Gandhi had three teeth and accessory dentures. The dentures were used only at mealtime and never for eating meat. Likewise, he cleaned his three teeth, his tongue and his gums with the dantana just as the Brahmins had done for centuries.

In the last century, Abbe Dubois lived as a Brahmin among the Hindus and compiled a vast number of notes on "Hindu Manners, Customs, and Ceremonies." Under the caption, "Rules to be observed when cleaning the teeth," a portion of the Brahmin ceremonial, Dubois recorded the following procedures, prayers, and avoidances:

I. To clean his teeth, a Hindu must use a small twig cut from either an UDUGA, a VENGU, or a NERADU tree, or from one of a dozen others.

II. If such a thing is unobtainable, he may use a bit of wood cut from a thorny or milky shrub.

III. Before cutting the twig he must repeat the following prayer to the god of the woods: 'O gods of the woods! I cut one of your small twigs to cleanse my teeth. Grant me, for this action, long life, strength, honor, wit, many cattle, and much wealth, prudence, judgment, memory and power.'

IV. This prayer ended, he cuts a twig a few inches in length, and
softens one end into the form of a painter's brush.

V. Squatting on his heels and facing either east or north, he scrubs his teeth well with this brush, after which he rinses his mouth with fresh water.

VI. He must not indulge in this cleanly habit every day. He must abstain on the sixth, the eighth, the ninth, the eleventh, the fourteenth, and the last day of the moon, on the days of new and full moon, on the Tuesday of every week, on the day of the month which correspond with those of his birth; at an eclipse, at the conjunction of the planets, at the equinoxes, the solstices, and other unlucky epochs; and also on the anniversary of the death of his father or mother.

VII. Anyone who cleans his teeth with his bit of stick on any of the above mentioned days will have hell as his portion!

VIII. He may, however, except on the day of the new moon and on the EKADASI (eleventh day of the moon) substitute grass or leaves of a tree for this piece of wood.

IX. On the day of the new moon and on the EKADASI he may only clean his teeth with the leaves of the mango, the JUVI, or the NEVE. 17

A traveler writing in the early days of the last century described the Brahmins of Hindustan as addressing their morning prayers to the sun while rubbing and cleansing their teeth for upwards of an hour.

**BUDDHA'S TOOTH**

The greater and lesser saints have left many relics through the ages, but each in its time lost in popularity and appeal, as have the cults of the saints themselves. The most remarkable exception to this general tenet is the relic of Buddha, a tooth, which has endured in undiminished esteem for over twenty-four hundred years. 16 There were four of Buddha's teeth saved after his death in 530 B.C., but the one to which we refer is sacred to the Buddhist world and is enshrined in the Temple of the Tooth at Kandy, Ceylon.

This indestructible relic was extracted from Buddha at his death by a farsighted disciple, Kemo Thoro, who took it to the town of Kalinga, which became known as Dantapura, "the Town of the Tooth." Buddha's original tooth was brought to Ceylon in 411 A.D. It was taken by the Malabarsin in 1315 and again carried to India, but years later it was restored to Kandy.

It was captured by the Portuguese in 1560, who took it to Goa where it was destroyed by burning in the presence of the Viceroy and Court. The most remarkable part of the legend begins, rather than ends, at this point. A resourceful Buddhist, Vikrama Bahu, manufactured a new tooth out of a piece of ivory which the Buddhists readily accept as a worthy successor to the original one.

The Temple of the Tooth—The Dalada Maligawa—is a small picturesque, granite building surrounded by a moat. Two high priests of Malwattee and Asgiriya are the custodians of the tooth. It is the duty of these dignitaries to appoint a Lay Custodian for the Sacred Tooth Relic from one of two families in which the honor has hereditarily descended.
Lord Frederic Hamilton was given an opportunity to view the tooth by Sir Hugh Clifford, who, as Colonial Secretary, was the official protector of the tooth. The priests were given two days’ notice which allowed time for the news to be telegraphed all over the island and permitted thousands of pilgrims to journey into Kandy for the unscheduled ceremony. The uncovering took place at seven in the morning in order to afford a sufficiently long day for the exposition. Christians were not generally admitted to the actual sanctuary of the tooth; therefore, Lord Hamilton was instructed to keep perfectly serious and adopt a becoming attitude in view of the immense veneration with which the Buddhist regarded the uncovering ceremony. Here is Lord Hamilton’s account of the ceremony:

The room was entirely lined with copper, walls and roof alike, and the closed shutters were also copper-sheathed. Every scrap of light and air was excluded; there must have been at least two hundred candles alight, the place was thick with incense and heavy with the overpowering scent of the grangipani, or "temple-flower" as it is called in Ceylon, which lay in piled white heaps on silver dishes all round the room. The place was crowded with priest and leading Buddhists, and we Europeans panted and gasped for air in that stifling over-scented atmosphere. Presently the Hereditary Keeper of the Tooth, who was not a priest but the lineal descendant of the old Kings of Kandy, knelt down and recited a long prayer. At its conclusion eight men staggered across the room, bearing a vast bell-shaped shrine of copper about seven feet high. This was the outer case of the tooth. The Hereditary Keeper produced an archaic key, and the outer case was unlocked. The eight men shuffled off with their heavy burden, and the next covering, a much smaller, bell-shaped case of gold, stood revealed. All the natives present prostrated themselves, and we, in accordance with our orders, bowed our heads. This was repeated six times, the cases growing richer and more heavily jewelled as we approached the final one. The seventh case was composed entirely of cut rubies and diamonds, a shimmering and beautiful piece of work, presented by the Buddhists of Burma, but made, oddly enough, in Bond Street, W.I.

When opened, this disclosed the largest emerald known, carved into the shape of a Buddha, and this emerald Buddha held the tooth in his hand. After prolonged prostration, the Hereditary Keeper took a lotus-flower, beautifully fashioned out of pure gold without alloy, and placed the tooth in it, on a little altar heaped with frangipani flowers. The uncovering was over."

Only the most privileged may look upon the tooth as it lies in the “holy of holies,” but the temple is opened twice daily and on special occasions to receive worshippers. The tooth is displayed annually at the impressive Esala Perahera—the Festival of the Sacred Tooth. On this occasion thousands of loyal Buddhists converge upon Kandy to openly worship the tooth. During this ceremony, the tooth, in its golden casket is carried upon the back of a consecrated elephant, the Maligawa Tusker. This animal is richly decorated and walks upon a white cloth that is spread before it.

THE ARABIANS

The Arabians achieved their greatest success in astronomy and in medicine, although in the latter their success was limited by restrictions imposed by the Koran. The Oriental idea that it was
sinful to touch dead bodies and the fact that the Koran prohibited the dissection of human bodies made all anatomic research impossible.

One of the characteristics of Arabian medical and dental practice was an aversion to bloody operations. The Arabians, even more than the Greeks and the Romans, were reluctant to extract teeth and employed all possible means to obviate this operation. Therefore, it was convenient for the Arabian physician to avoid dissection out of religious convictions, and to relegate operative surgery (including the extraction of teeth) to wandering specialists. Dentistry was not considered a branch of medicine and surgery and was practiced by both qualified men and unqualified barbers, cuppers and others.

The Arabs were generally proud of the "pillars of the mouth," as they called their teeth, and fully accepted their ancient adage: "He who does not masticate well is an enemy to his own life." The toothpick, likewise, was in common usage among the Arabians. The great prophet, Mohammed, told the faithful that a prayer preceded by the use of the toothpick was worth seventy-five ordinary prayers. "Nature's toothbrush," the siwak, was also used by the Arabs.

Numerous forms of hygiene assume religious significance among the Moslems, who, in obedience to religious rites and the Canon Law of Mohammed, were compelled to wash their hands, face, nose, ears, neck and feet three times before each of the five daily prayers. The custom of washing the mouth every morning is a religious precept among the Arabians: "With the face turned toward Mecca, they rinse their mouth thrice and clean their teeth with a brush." Mohammed said: "You shall clean your teeth for this is a means of pleasing God."

The Moslem practice of rubbing a baby's gums with chewed dates is an example of a prophylactic measure practiced before the eruption of the teeth. This was considered a religious rite which they began on the first morning after the child was born. The rite was so solemn that in Medina the Prophet himself was invited to perform the ceremony.

The Mohammedans consider hogs as unclean animals and are not permitted to eat pork. Likewise, they have a great horror of toothbrushes with hog bristles. Kanner relates the story of an explorer in Arabia who considered it necessary to state that the hair of his toothbrush was from the wild horses of his home country because the Arabians who were with him refused to talk with him when they thought his toothbrush contained hog bristles.

**DENTISTRY DURING THE DARK AGES**

That period of history initiated by the fall of the Western Roman Empire in 476 A.D. is generally known as the Dark Ages. This period was characterized by blind submission to authority. The church became all powerful and exerted much influence on the prac-
tice of medicine. Whatever had remained of ancient knowledge gravitated into the monasteries, and the monks, since they were among the few who could read the writings of Hippocrates, Celsus and others, became the medical practitioners. The rational practice of medicine was gradually replaced by faith healing and a belief in the miraculous healing power of the saints and of holy relics. Supernatural aid became highly esteemed, particularly when the medical art proved itself powerless during the great epidemics. Western medicine became as rudimentary as that of primitive man.

Under these circumstances, very little progress was made in dentistry for many centuries. Mechanical dentistry was all but forgotten because health, cleanliness, and the adornment of the body were considered sins of the flesh which might jeopardize man's place in heaven. Sack cloth and horse hair became a desirable garb, and the hermit who never took a bath, the most respected citizen.

Anatomic research throughout the medieval period was almost non-existent because the Arabian culture had become securely grafted upon European medicine in the thirteenth century, and the Arabians forbade the dissection of human bodies for religious reasons.

After the beginning of the eleventh century the church took all healing into its hands, and surgical operations were performed by the clergy, who were assisted by the barbers. The barbers became more closely associated with the clergy after the year 1092 when the monks were forbidden to wear beards. The famous edict of the Council of Tours, which was promulgated in 1163, forbade the monks from dealing in any matter which involved the shedding of blood. The barbers and lay operators were benefited by this order which permitted them to assume the practice of general surgery.

In the Middle Ages the extraction of one or more teeth was sometimes inflicted as punishment for crimes, such as eating meat during Lent. The extraction of teeth in such cases was performed by the executor of public justice; so it was natural for the physicians to be reluctant to practice an operation which was often executed by the hangman.

With the coming of the Renaissance began a period of development of dental science accompanied by a consolidation of the unrelated parts of dental practice. Dental ills began to be treated by physicians; the surgical part of dentistry was practiced by surgeons and barber surgeons, who were a step below the surgeons in the social scale. Another class was the "tooth drawer," which was below that of the barber, who also practiced surgery, and whose practices were frequently intermingled with mysticism and sorcery.

Most important, however, is the fact that the Renaissance ushered in an era of scientific inquiry which allowed medicine and dentistry to develop unfettered. From this point forth the influence of religion upon dental practice lessened as rationalism took over.
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Some Problems in the Writing of History

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One consistent source of weakness (in articles submitted for publication) stems from certain false assumptions about what constitutes good history. Such ideas have a common origin, and they are shared by a lot of historians who should know better. These concepts, or impressions, take root with the instructions for the writing of the first research theme in high school English, and they are bolstered at the higher education level in college English courses. They become the basic rules of all research papers done by the student in his undergraduate career. Such is the training that underlies most of the scholarly papers we receive.

For the professional historian, however, these narrow concepts continue into history courses, where proper documentation, the organization of a bibliography, and such questions as the nature of internal and external evidence, comprise the better part of the required course in "Historical Methods." On the basis of this training, plus extensive reading of history and attendance in many lecture courses, the so-called professional historian goes out into the world to make his mark. If—as is usually the case—he has also attained an M.A. or even a Ph.D., the probability remains that his treatise was written according to the rules he mastered in high school, in Freshman English in college, and in the "Methods" course given by the history department. Our fledgling historian is still very likely to retain a most narrow view of what constitutes good history writing.

And so it is that many historians write miserable history. What are some of their shortcomings? There are many, but in this short discussion let me mention just two of them: the weaknesses of overdocumentation and overquotation. Both of them stem from the training given at the high school and the college level.

Somewhere along the way the idea seems to have taken root that everything in a research paper must be documented. If this is so, then what is the end product of the so-called history paper, but a mere chronicling of events? And what is such a chronicle but a dull treatise—a mere transferring of dry bones from one grave to another. Where, asks the bored but perceptive reader, is the synthesis and the interpretation? Where is the evaluation of evidence, where the weighing of various elements as to their importance in the progression of events? True, factual matter that is not common knowledge needs citation, and plagiarism must be avoided at all cost. But the master historian progresses from his facts. He never considers the assemblage of facts as an end in itself.

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A second weakness is the excessive use of quotations. This is the trade mark of the term paper, even of many Master's theses or doctoral dissertations. Sad to say, this habit continues right on into the profession, and long quotations, indented and usually in small print, are the very hallmark of Dr. Dryasdust. Occasionally someone comes along who has mastered the grammatical ability of incorporating quotations into the running content of a narrative. This is an improvement, but it is still overdone. It is most annoying to the reader. Those funny little dual marks mess up the page and slow his reading. He tires of seeing them.

I have just completed reviewing a work of history written by a "historian's historian," a man who commands great respect in the profession. His book, which is of modest length, is so crammed with quotations, ranging from one word to indented items a half page long or more, that I suffered "quotes before the eyes" before I was through the first chapter. Every quotation demanded a citation, of course. My colleague had over 1,500 footnotes in a book less than 375 pages long, and some of the notes contained five or more references. There is hardly a paragraph in the entire book without a citation.

All of the techniques of historical methodology that are so emphasized in high school and college were strictly adhered to. And yet, in my opinion, the book is a failure. It is a prime example of "brilliant pedestrianism," to use a play on words. The man apparently lacked the ability, the courage, or the ambition to do his own writing, to go out on his own, to paraphrase rather than quote, to make judgments and spice up his narration with his own points, arguments, asides, and suggestions. His book is factual, correct, and hopelessly dull.

For, over and above all the methods that are taught for the writing of the research paper, or the history essay, the good writer takes a flyer. He is himself. He lets his readers know that he is the one doing the writing and the thinking. He says what he thinks. And then what happens? Magically, the writing takes on flesh and blood. . . And then it ceases to be a bore. People will read it, and they will like it.

Try this the next time you write a history article. Write your essay without documentation. Do not use a single quotation. Then go through your work, citing the necessary factual matter and inserting a few well chosen quotations, but do not allow yourself the luxury of a single long one. And then read over what you have written. Does it not come out a lot more readable, a lot more interesting, and a lot more satisfying to you, the author?

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Let us look at history in response to two one-word questions: "History-how?" or "History-why?" "History-how?" places its emphasis on the narrative. How did the events take place which make up the stuff of history? Properly developed, properly written, properly taught, "history-how" has a valuable place especially if worked out with care, depth and understanding. If it incorporates readability and interest because it is inspired, creative, colorful, even romantic, it attracts a wide audience. "History-how" can become a literary landmark and a contribution to belle lettres. It is not neglected; it is assuredly easier to write or teach than "history-why."!

I must confess that I lean more to the "history-why" school. I admire the writer and the teacher who analyze their subject, who pose a thesis, tease it, develop it, sometimes to prove their point triumphantly, at other times to erect an entire structure of imposing proportions. Of course, another may then take the same subject, place it in fresh perspective, add new facts, and come up with a different conclusion or a different edifice. A noted scoffer — Bernard Berenson — goes so far as to write:

And all interpretations or conclusions, based as they are in the realms of history on data so inadequate, so questionable, can only be in the nature of what we happen to feel and think about them — of gossip, in short.

Despite Berenson's derision, possibly a product of disillusion and old age, "History-why" is based on more than gossip. Otherwise we wind up in the same position as the rabbi in this story.

It seems that this rabbi, as was the custom in pre-war eastern Europe, often performed the task of impartial judge in civil complaints. Presiding at one such hearing and having heard the complainant present his case, the rabbi, moved by the force of the presentation, ruled in his favor. The defendant immediately demurred, pointing out that he had not even had the chance to rebut the arguments. Being allowed to proceed, the defendant continued with such skill and vigor, that he was able to convince the rabbi that his position was also correct. The rabbi's wife, observing the proceedings, then drew him aside and asked him gently how it was possible to rule in favor of both sides. Stroking his long beard, the rabbi replied, "And you, my dear, are also right."

Obviously, the rabbi would never be included in the "history-why" school. The facts are presented with eloquence, yet he never reaches a real decision. To my mind, I would rather run the risk of failure to draw the proper conclusion than to draw no conclusion at all. And this would hold true for the teacher as well as
the writer. History has a purpose, history serves a function, whether we focus on a general course on western civilization or a specific course entitled the history of medicine or of dentistry. Allow me to develop this thought in another manner, this time connected primarily with the teaching of history rather than with the writing of history.

Teachers naturally tend to differ in their classroom approach. If they were to compare notes, a sizeable number of patterns and procedures would emerge. As for myself, no matter what methods I use from year to year, I find time in the first meeting of a class in history to discuss a few select fundamentals. No matter how often these same essentials are reviewed, they always have remained fresh to me. For example, we discuss what history is, and why it has value. Why should six semester hours be devoted to the History of Western Civilization? Curriculum makers might do well to sit in on such a discussion by students in their own institutions, and perhaps the same process should be extended to all required subjects. In any case, I usually feel satisfied after a number of telling blows have been struck on behalf of Clio, and I experience an inner glow at the innate wisdom which college students possess in recognizing the value of my subject.

Among other objectives, students like to emphasize the relationship of history to informed citizenship, and more especially to the ability to converse literately and to read and comprehend daily events as reported in the newspapers. I do not know exactly when I began to experience doubts as to whether these values claimed as an outgrowth of study of history are actually being achieved. It is my recollection that on one occasion Adam Smith’s Wealth of Nations was the topic for the day, and I sought, in offhand fashion, to link it with the news of Congressional debates centering on the extension of the Presidential tariff powers. But I drew no response which indicated any degree of familiarity with the current developments. Somewhat piqued, I proceeded to question my students individually on what newspaper they read, or how else they learned of the events of the day. Although they invariably claimed to read at least one newspaper and to listen to news broadcasts as well, further probing revealed what seemed to be abysmal ignorance of the history being made right around them! Familiarity with the sports page, the gossip column, and the details of a sensational murder trial was displayed to a greater extent than knowledge of the issues facing the country or dividing the world community.

Dismayed at what I felt was a shocking shortcoming in my own institution, I searched for clues in others. In Philip E. Jacob’s Changing Values in College, I came across this comment:

The casualness of most students about politics is reflected in the poverty of their information about important political events, procedures and personalities. They rarely understand how political parties function, the significance of primary elections, the duties of major agencies of American government, or the critical issues of domestic or foreign policy. It is the exception when a student can identify the Premier of Russia, the Secretary of State or any other Cabinet officer in the United States government, or the governor of his own state. 2
I cannot say that I felt better upon finding out that the disease was epidemic. Time passed while the "historical perspective" of daily life set in, and while I sought to find what I as an individual could do to soothe my own sense of guilt.

It is not my intention to find fault with the shortcomings of students, or the inanities of curricula. After all, each may have his own pet theories for up-ending these perennial targets. But there should be room for an idea which can be incorporated in the classroom with surprising ease.

My proposal is addressed primarily to the teacher of the introductory history course, but it can be extended to the elective course in history, the dental history course, and, when appropriate, to other subjects as well, unrelated to history. In its essence, the instructor would be especially mindful within the classroom of the relationship of his subject to the world today. When a parallel can be drawn, when a link can be demonstrated—without undue strain—the discussion would move into this eddy temporarily, and then return to the main current. Similarly, a striking contrast can become an opportunity for analysis or interpretation. This pattern of procedure would be made clear to the student at the very beginning of the course. Alongside the prosaic tools of texts and other sources, room would be made for the newspaper, and every day's assignment would automatically require a thorough perusal of it. Knowledge of what goes on in the world around him thus would become another measure of the student's mastery of subject matter.

For example, a study of nineteenth century imperialism could be linked to the rebirth of nationalism in the Mid-East and elsewhere, the Northwest Ordinance to the efforts of Puerto Rico to achieve statehood, and the sixteenth century voyages of discovery to the voyage of the "Manhattan" in traversing the Northwest Passage. These relationships seem obvious to me. Another instructor might see different ones. Students will come up with still others. All to the good.

It may be maintained that compelling the student to read a newspaper carefully and critically will not guarantee his knowledge and understanding of history as it is made. Nor, it may be added, will it insure that he will continue to read the newspaper after he has completed the course. I am willing to chance these "risks." Both arguments can be raised about the method and value of any course in the curriculum. I have known people who have experienced a "liberal" education and have the sheepskin to prove it, who never have read a book after graduation.

The proposal may have salutary side effects as well. Even the most talented teacher experiences occasions when the period drags, or when he feels he is no longer commanding, with his usual aplomb, the attention of the group. Reference to the present can be an added weapon in his armory for combating the mood or enlivening the discussion. The course itself, no matter how often the instructor gives it, can include novel and stimulating touches making
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But I wonder how many of them understand the motivation behind
our sinking into the Southeast Asian quagmire with roots going back
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well-intentioned, complete the course syllabus? If it is not completed, are not the last assignments the ones which are usually slighted?

And if this is an accurate presentation, are we not then confronted with a glaring omission in the education of our youth? Can they reasonably be expected to recognize and fill this gap?

Today, students on campuses all across our nation are becoming increasingly involved in issues which they consider of vital importance. Not too long ago, our students were being accused of being apathetic, withdrawn, and unconcerned. I do not agree that this constitutes a revolutionary change despite the appearances. Generalizations like these often tend to emphasize the most obvious, the most vocal, or the most striking, while tending to ignore the submerged mass of the iceberg which constitutes its bulk. Nevertheless, the trend is apparent even though the question of how many students are affected remains unanswered.

To go back to the example I gave earlier, numbers of students are questioning the nature of their government's foreign policy, some voicing qualified support, others denouncing it in no uncertain terms, and a few even participating in scattered acts of open opposition. Students should become interested in their government and its actions. Everyone should. This is a healthy sign, the very essence of a democracy. But students should operate from the bases of critical discipline and knowledge. As far as foreign policy is concerned, there is no short cut which would eliminate the need to be familiar with its roots and the environment in which it has developed. It goes without saying that this takes in far more than an understanding of the American past alone.

Edward Hallett Carr says that history "is a continuous process of interaction between the historian and his facts, an unending dialogue between the present and the past." So the student must accept the challenge and carry on his share of the "dialogue between the present and the past." But he must be familiar with the present to understand the past, and vice versa.

Let me present a possibility to help meet the problem, which to me has the virtue of novelty if nothing else. Perhaps if one were to start with the present or the recent past, and then proceed backwards, one would be certain that its treatment is not neglected as a result of the pressures of the calendar.

When I first idly toyed with the idea, I rejected it out-of-hand. How is it possible to build a structure starting with the roof? History must be taught as a logical and orderly sequence of events and developments. What happens today depends on what happened yesterday, last year, in the last century, and continuing in this fashion in order of time. Yet I kept returning to the pragmatic consideration of the basic problem: how does one develop in the student an understanding of the lessons of the past, more specifically of the recent past, in order to understand the present, when he is not exposed to study of the recent past?
I am convinced, first, that the problem exists; second, that it must be faced and solved. And while there already exist solutions, they are not being utilized in large measure, nor can they be mandated. I do not imply that my proposal can or should be adopted universally, or that it can or should be mandated. I advance the idea of teaching history “backwards” by those of an adventurous spirit, at least on an experimental basis.

The idea is not as radical as it sounds. Most courses in history do not start at the beginning of history even as it now stands. The Brooklyn College basic course in history begins with the Middle Ages. Perhaps courses in ancient history open at the beginning of history, but these certainly represent a small minority of the offerings of history departments. We start in medias res now.

Nor is there a regular progression from this point. After taking the basic course, the student is usually free to choose from a variety of courses which may be taken in any sequence—twentieth century, seventeenth, nineteenth, medieval, or what have you; British history, American history, history of the Far East, economic history, political history, intellectual history—the list is as endless as the course offerings listed in the college bulletin. Is there an order based on a time sequence? Not ordinarily. What is so sacred then in revising the order in the basic course?

History is not unique in this respect if one examines college curricula and programs of study. The student who majors in literature is free to choose a course in modern drama before he takes a course in Shakespeare. A philosophy student may elect a course in contemporary thought before one in nineteenth-century philosophy. An economics major can study contemporary economic theory before he takes up the evolution of economic thought. Even if one were to examine a student’s program in any one semester, it might include a course in one department dealing with ancient times, a course in a second department dealing with the medieval period, and a course in a third which covers the modern scene. The student can choose to study simultaneously courses in any one or several departments covering different periods of time. The synthesis of learning must ultimately occur in the student’s mind regardless of the order of absorption.

Marc Bloch writes, “It would be a grievous error, indeed, to think that the order which historians adopt for their inquiries must necessarily correspond to the sequence of events.” I would extend this concept to the student of history as well.

But enough of the classroom for the moment; let’s go on to you people today.

The would-be dental practitioner, the teacher of dentistry and the practicing dentist are all part and parcel of society. It is not possible to stop-the-world because you want to get off. And I would say this is truer today than it ever was in our history. It seems to me that we have to assume (or reassume) our position of leadership. Otherwise, others—presumably less qualified—will take it from us. We should be asking the question “why”? more
frequently than we ask the question ‘how’?

And when you assume this position of leadership in so-called community affairs and are called upon to develop new legislation, meet public needs, shape public attitudes, is it sufficient to rely solely upon the fact that you are a fine dentist?

I hear the word ‘relevance’ used so often on my campus that I almost wince. If relevance signifies practicality and only practicality on a liberal arts campus like mine, I reject it, even though this is what is in the minds of those who have not thought this implication through. Many students tend to be most critical, for example, of the teacher preparation courses in education which have to do with philosophy, history and theory; the courses in practice teaching rate highest. I daresay the situation is the same in dental schools comparing student attitudes on dental history with work in the clinic. Practicality would eliminate many subjects — whole departments — on my campus for failure to meet this test. How practical is mathematics for all students, or the study of literature, of philosophy, of art, etc.? Could history pass such a test for all students? I doubt it. But if you think of relevance in our discipline of history in a broader sense, of relevance as the relation of the past to the present, of relevance as what we can learn from the past, of relevance as what we can learn from the present as well, from the ferment, from the malaise, from the weaknesses and strengths of our society, its disappointments and aspirations, then history can have relevance.

E. H. Carr writes that ‘...the work of the historian mirrors the society in which he works. It is not merely the events that are in flux. The historian himself is in flux.’ I would extend this to the history teacher and insist that he seriously reexamine and if necessary recast his thoughts, his approach to his subject, and his methods. Curricula today on campuses across the country are in a state of change, sometimes for the better, more often for the worse in my opinion. This is because the change is taking place figuratively at the point of a gun or in an attempt to keep up with the Joneses. I am an advocate of change, but only where justified, only where defensible, only where brought about with mature consideration and deliberate speed. But if we do not bring about change when we recognize the need for change, whether in curricula, subject matter, or teaching methods, change will be forced upon us willy-nilly. It may be slower to appear in the medical schools, but it will appear — it already has in some places.

Again on the liberal arts campus, I bring to your attention a growing number of developments (some of which incidentally I agree with) — for example, addition of courses on the so-called Black heritage - study of Swahili, black history, Afro-American music, etc.

Another development would base admissions to the college and I daresay ultimately to the professional school on other considerations than ability and merit; on such new criteria as race, color, or the ethnic composition of the community. I refer you to an
article in the New York Times on the composition of recent entering classes in law school. 5

A third development is described in a recent New Yorker cartoon. It shows a middle-aged couple reading a letter which goes as follows:

Dear Mommy and Daddy: Today we marched around the Administration Building with bad words painted on our faces because they won't let us hire and fire the faculty. It was fun. Love, Sunny.

I go no further, except to emphasize that where the complaint is legitimate, but has been allowed to fester unnoticed, it may very well lead to an eruption with resultant irreparable damage. This is brought out by the October 1969 report of the U.S. Health, Education and Welfare study group called the Subcommittee on Easing Tension in Education:

"The group concluded that students were influenced by the immediate social issues such as the war in Vietnam and poverty. But it said that students were perhaps even more concerned about what seems to them to be badly taught, irrelevant subject matter, impersonal and undignified treatment, and insufficient voice in the affairs of the only institution in which they have really been involved."

I have confined myself today to a relatively peripheral concern - the study of history. I am not even sure whether you share my concern in this respect. And if you do, it certainly is not the most important subject for concern, even for me. But my interest is history and your interest is history. And interest can be as vital a force as concern.

I received my training under Allan Nevins at Columbia and I would like to close with two references to him. The first goes back to the time I studied in one of his seminars along with — and this may be difficult to believe — Abraham Flexner, the man who revolutionized the study of medicine in this country more than 50 years ago. It was a revolution, but a necessary one and a peaceful one, one which meets my criteria of how change can and should be brought about. Flexner, close to 90 at the time, was still interested in learning.

The second reference to Allan Nevins is a quotation from his work The Gateway to History, which I think encapsulates a good deal of my random thoughts as expressed in this article.

Although when we use the word history we instinctively think of the past, this is an error, for history is actually a bridge connecting the past with the present, and pointing the road to the future. 6


DR. HOROWITZ is Professor of History and Associate Dean, Brooklyn College of the City University of New York.

(Presented at the Eighteenth Annual Meeting of the American Academy of the History of Dentistry in New York, N.Y., October 10, 1969.)
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Letters to the Editor

To the Editor:

Heartiest congratulations for what is obviously a splendid issue of the Bulletin of the History of Dentistry (Volume 18, No. 1), describing the history of Tufts Dental School and allied institutions. It is illustrated most instructively and certainly makes a most valued contribution to our resources in history research and publication. My congratulations also to Drs. Deranian and Shklar.

Cordially,

George E. Batterson

(Professor Batterson, who is in the Department of Social Dentistry of the University of Oregon, is the immediate past president of the American Academy of the History of Dentistry.)

To the Editor:

The "Tufts Centennial Issue" of the Bulletin has arrived! It was well worth waiting for. It was my honor to present a copy of it to the Provost of Tufts University last Wednesday at a meeting of the Executive Faculty. It has been very well received. In fact, Dean Calisti now wants 4,000 extra copies to distribute to Alumni of the Dental School. Also Dr. William Feagans, the new dean at Buffalo told me that he had heard many favorable comments at Buffalo about the issue. We have discovered a few unavoidable errors and omissions, mostly in dates. We plan to correct these.

You should be very proud of your work as Editor of this issue. I hope that it will stimulate other dental schools to subsidize future issues of the Bulletin.

Best wishes! Sincerely,

H. Martin Deranian, D.D.S.

(Dr. Deranian, who is a past-president of our Academy, was the co-author of the Tufts Centennial Issue.)

To the Editor:

I can't tell you how delighted I am with the June issue of the Bulletin of the History of Dentistry. This was precedent shattering, and I want to thank you for all the work that you've done.

Sincerely yours,

Louis J.P. Calisti, D.D.S., M.P.H., Dean
School of Dental Medicine, Tufts University

—44—
Book Reviews

Cotton Mather: First Significant Figure in American Medicine.

The reissuance in 1968 of this excellent monograph on one of the more colorful figures in early American history will enable many newcomers to the field of dental history to enjoy this work if they had missed the original publication sixteen years ago.

The son of the pastor, Increase Mather, Cotton entered Harvard College at the age of 11 and was graduated at the age of 15 in 1678. He was early distinguished for his piety and when he was fourteen years old he began a series of rigid and regular fasting vigils which he continued throughout his life. However, it is as biased prosecutor at the Salem witchcraft trials that he is most generally known, having published in 1685 his Memorable Providences relating to Witchcraft and Possessions which included a narration of actual “cases” of witchcraft around the country; and during the notorious trials in 1692 he authored Wonders of the Invisible World which was calculated to strengthen belief in demoniac possession.

In 1713 he was elected to the Royal Society of London, being the first American to achieve that distinction. This honor was not ill-bestowed, for Mather was instrumental in securing the introduction into the colonies of the operation of inoculation against smallpox, in spite of the vigorous opposition of the medical profession.

Four years before his death in 1728, Mather issued a now famous tractate on medicine The Angel of Bethesda which was an admixture of superstition, folk-lore, homey remedies as well as religious utterances of the “hellfire and brimstone” variety. Needless to say, Mather saw the workings of God in the visitation of illness upon man, for was not man being punished for his sins? Consequently, it comes as no surprise to learn that Mather states: “The Teeth, wherein I suffer so much Torture, how much have I sinned with them! The sin of my first Parents was perpetrated by the Teeth. An horrid Sin; a Sin that is mine; and forever to be bewayled.”

In an article in the Journal of the New Jersey State Dental Society (Vol. 32, No. 8, Apr. 1961) Asbell discussed at great length the selections dealing with the teeth as they appeared in Mather’s writings, and placed Mather in his proper perspective relative to the other practitioners of medicine in the early days of this nation. This book, now, gives us a very good understanding of Mather’s thinking and of the development of his medical rationale which showed itself in his non-medical writings as well. The current work is well
and interestingly written, well documented and a substantial con-
tribution to the history of dentistry as well as medicine.

Orígenes de la Odontología. By Focion Febres-Cordero. 131 pages
The Author. 1966.

Although this review is somewhat belated, since the book
didn't get into the editor's hands until recently, it is necessary to
recognize its contribution to the field of dental history. While con-
taining nothing new, the work nevertheless synthesizes the contribu-
tions of the peoples of both ancient Egypt and Mesopotamia to the
development of dentistry.

Dr. Febres-Cordero, who is a noted historian of dentistry in Latin
America and a member of the American Academy of the History
of Dentistry, based the book on a series of lectures delivered to
the Venezuelan Society of the History of Medicine. Written in
Spanish, it has extensive synopses of each section in English and
the extensive bibliography draws upon works of international sig-
nificance. Although paper-bound, the work is nonetheless of fine
quality, well illustrated and a noteworthy addition to the literature.