

# OORSPRONKELIJKE BIJDAGEN

## THE ACTUAL STATE OF DENTAL EDUCATION IN THE UNITED STATES AND CANADA <sup>1)</sup>

BY

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Op de in Augustus j. 1. gehouden vergadering van de Fédération Dentaire Internationale, is onder meer het onderwijs aan ernstige besprekingen onderworpen, en hebben verschillende onderwijs-autoriteiten uit alle deelen van de wereld rapporten ingediend en van meening gewisseld.

Prof. Dr. Ch. Turner, „dean” van het beroemde „Evans Institute” in Philadelphia was zoo welwillend ons toe te staan de door hem ingediende rapporten in dit Tijdschrift te publiceeren en waar het onderwijs ook ten onzent nog steeds een punt van discussie uitmaakt, meenen wij belangstellenden een diepst te bewijzen door de uitnemende beschouwingen van Prof. Turner ter kennis van onze lezers te brengen.

In aansluiting hiermede zullen wij in het volgend nummer van denzelfden auteur publiceeren: „The ideal dental curriculum for dental education up to the standard required for the efficient practice of dentistry,” dat wegens gebrek aan plaatsruimte moest blijven liggen.

R e d.

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During the past collegiate year there were in actual operation in the United States and Canada forty-eight dental schools having a four year course, and one, a department of the University of Alberta, at Edmonton, Alberta, Canada,

<sup>1)</sup> Rapport uitgebracht in de vergadering der F. D. I. te Parijs, Aug. 1923.

which offered only the first two years. Of the former, forty-four are situated in the United States and the remaining four in Canada. Thirty-five schools are integral parts of Universities, two are affiliated, four operate under the charter of a corporation organized not for profit, four are privately owned, two have a prospective University affiliation pending, one is now undergoing reorganization, and one, The Baltimore College of Dental Surgery, the oldest dental school in the world, goes out of existence as a separate institution with the close of the past session, having been merged into the Dental Department of the University of Maryland. The movement of the dental schools to the Universities has been very marked in the last few years as may be indicated by the statement that of the forty-six schools in operation in 1900, forty-one were private or affiliated, and only fifteen were University departments. In 1910, twenty-four schools were in Universities, with thirty-two private or affiliated, and in 1920, the number of University-Schools had increased to thirty-two, private or affiliated schools were reduced in number to sixteen, while eight schools had either gone out of existence or had combined with others.

This movement toward the Universities has been occasioned in part by the rising cost of instruction as the standards of professional education have advanced, and schools owned by individuals or corporations and operated for profit find it increasingly difficult to provide the facilities which are now demanded without showing a deficit in their accounts. Income from students' fees cannot be increased in ratio to the mounting cost of operation, and it is becoming more and more necessary for the school to avail itself of the funds accruing from endowment or furnished by the State in support of professional education. The maximum tuition fee of any American school is \$ 300 per session, and in some schools it is as low as \$ 125, while the actual cost in two University schools whose figures are available is shown to be \$ 410 and \$ 460, respectively, per student per session.

The strict enforcement of the increasing requirements in preliminary education and the limitation of the size of classes to accord with the physical facilities of the school, are also factors which materially affect the operation of the private school, and influence the current movement into the Universities.

With the beginning of the session of 1917-'18, a four year course leading to the degree was instituted in all the American and Canadian schools. The effect of this upon the curricula of the various institutions was naturally at first to cause marked variations in the contents and arrangement of the courses offered. Most schools added courses in biology, physics, and more extended courses in chemistry, to meet the obvious deficiencies in the preliminary training of the students admitted. English and technical drawing were added by some; and in all there was an extension in the teaching of anatomy, physiology, and other medical sciences. The additional year also afforded an opportunity for an improvement in the strictly dental teaching, especially in the clinical subjects. During the last few years much greater uniformity in the curricula has been established, but there is still considerable difference between courses as arranged in the schools now requiring one year of collegiate preparation for admission and those in schools which do not yet demand it. However, an analysis of the dental curriculum of American and Canadian dental colleges taken as a whole shows that it may be easily divided into two portions corresponding to the first and last two years of the course.

In the first period are naturally given the basic sciences, chemistry, biology or physics (if not required for entrance), the basic medical sciences, anatomy, physiology, biochemistry, bacteriology, materia medica, etc., the special courses in dental anatomy, dental materia medica, etc., together with all or at least the major part of the technical laboratory instruction, while the second period contains the special pathology and therapeutics of dentistry, and all the clinical

teaching, and subjects allied thereto. General pathology is usually included in the second two-year period, because of the difficulty of placing it in proper sequential relation with anatomy and physiology if introduced earlier.

In the teaching of the fundamental medical sciences, considerable variation may be noted as to the method employed. In some University schools, the medical and dental students take identical courses in anatomy, physiology, biochemistry, etc.; in others, dental students take courses in these subjects equivalent to those in medicine and given by the same teachers, but arranged to meet the special needs of the dentist; in other schools a separate staff provides the instruction for dental students; and in independent schools, the basic general courses are frequently of an abridged character for lack of adequate apparatus and facilities. In the University schools, there has been a very great increase in the amount of the elaboratory instruction in these sciences, the lecture system has been largely superseded, corresponding to the tendency in medical education whereby the student acquires his knowledge by the practical method instead of depending solely upon the precepts of the lecturer for his information. This may be noted as one of the greatest advances in dental education in recent years, and its adoption is one of the compelling factors in bringing about the University affiliation of dental schools for it renders available the expensive equipment and trained teaching staff of their science laboratories.

Specialized courses in these medical sciences applicable to needs of the dentist are provided in the first two year period. Regional anatomy, human and comparative odontology, dental histology and embryology, dental materia medica, and metallurgy in its dental applications are included.

Instruction in the technical procedures of dental operations begins in the first year and is usually completed, or nearly completed before the advent of the second period in which the clinical instruction begins. Prosthetic technics is given in

all schools the first year, and operative technics usually begins in this year, but in some schools it is not given until the second year. These courses are designed to qualify the student to begin his clinical operative and prosthetic work with the start of the third year.

The second two-year period or the clinical years of the course have not undergone marked changes in their contents since the curriculum was lengthened. The teaching of the general principles of surgery and of medical practice has been introduced into many institutions, and the special surgery within the domain of the average dentist has been elaborated. Prosthetic and operative dentistry remain the major courses; general and dental pathology and therapeutics, orthodontia, general and oral hygiene, radiography, anesthesia are of course included, and certain ancillary subjects such as dental history and literature, economics, ethics and dental jurisprudence have been added.

The student enters the infirmary at the beginning of his third year, and devotes about one third of his time, or four hundred hours, to his work. The senior student has about three-fourths of his time available for clinical practice, which gives him nine hundred hours for the various divisions of this work. Such generous provision of time would seem to give him sufficient opportunity to acquire adequate experience. There has been a marked increase in the number of instructors concerned with clinical teaching, one instructor to ten or fifteen students not being uncommon. This enables the teacher to give a great deal of attention to each individual student, especially desirable at the beginning of his work upon patients. Another notable tendency among American schools is that of utilizing an increasing number of teachers who devote their full time to instruction and are not engaged in practice. In order to make the teaching attractive as a profession, it is necessary to compensate adequately those who enter it, and this is another factor which is increasing the cost of education. All schools now have a number of

teachers who are on the full-time basis, many of them are younger men who expect to make it their profession, while others are those who have already achieved distinction as teachers. The University of Iowa has more than three-fourths of its dental teachers on a full-time basis; the University of Southern California has twenty-four. The large number of professional teachers enables the institution to do a good deal of teaching by the clinical demonstration method, by means of which the various clinical operations are performed upon patients by experts before a small group of students. This method is being extended and is proving very useful in all its applications, but especially in orthodontia where the plan of teaching by having the students perform all the work is being gradually superseded.

The colleges are no longer content to be less exacting as to the manner of the conduct of the student clinic than is consistent with the best known methods of private practice. Sterilization of instruments is assured by a system of checking, in practically all schools. In many, a routine of two radiographs, one before and one after filling, is employed in all root canal cases. In one or more schools, a negative report from the bacteriological laboratory must be received before a filling may be inserted into the root canals of a tooth which has been infected.

The educative worth of a well stocked and well selected library, and a museum of specimens having teaching value is receiving increasing recognition, and a half dozen or more schools have both these agencies well developed. They are not only available for the research worker but are systematically utilized by teachers in their courses to the senior class.

Prior to 1921, the uniform requirement for admission to all the schools in the United States and Canada, was the completion of a standard American four-year high school course or its equivalent, but in the year mentioned, the schools holding membership in the Dental Faculties Associa-

tion of American Universities, with one exception, and the schools located in New York state, required applicants to have completed a year's work on a college of liberal arts and science, including English, biology, inorganic chemistry, and sufficient electives to total fifteen units, before they were accepted. This requirement is now in force in eighteen schools, several having begun it in 1922. The School of Dentistry of Columbia University has required two years of pre-dental college work since its inception about eight years ago, while Montreal University will require a full baccalaureate course for admission in 1927, the newly projected University of Rochester will require three years of liberal arts for dentistry when it begins operations. New York State will demand two years of Arts and Science as a preliminary to dentistry for students entering in 1926. North Carolina announces the same qualification, and the State of Pennsylvania one year in 1925. With the exception of the Canadian schools, where the pre-dental course is given in the dental school, this course is taken in Colleges of Arts and Science, and would count toward the baccalaureate degree if the candidate should desire to continue.

During the ten-year period 1910 to 1920 there was an average of about 2,500 graduates annually from the dental schools of the United States and Canada. Because of the war the actual number in 1920 from those in the United States was less than 1000 with about 1500 each in 1921, and 1922, with figures for 1923 not available. In 1921, 3,292 students began the study of dentistry with the total for all classes of 13,868. For 1922, 3,448 new students entered, with a total enrollment of 14,687. These figures relate to the United States alone.

In the United States, the Dental Educational Council of America has become in the last few years an important force in the general upbuilding of dental education. It was organized more than ten years ago by five representatives each appointed from the National Dental Association, the National

Association of Dental Examiners, and the National Association of Dental Faculties, but was not very active until in 1918 it was designated by the Surgeon General of the United States Army to classify the dental schools in connection with the commissioning of officers for the Dental Corps. In 1921 it was enlarged to include representatives of the Dental Faculties Association of American Universities, and now consists of twenty-four members, four each from the two faculties groups, and eight each from the other two patent bodies. Its chief function at present is to classify the schools and to suggest in a constructive manner to all schools, means by which they may be improved. It has no legal jurisdiction over the schools, its authority being derived from the moral force of its published standards. It does not attempt to set those standards at a level too high or too impractical for the time, and it recognizes that there are schools which are already above its published minimum requirements. It has been of great service to the weak schools, especially those of a private character, which have been forced to come up to an acceptable standard or to accept a classification which would seriously injure them in the public eye.

Its published „Minimum Requirements for Class A Dental Schools” is attached to this report, and gives an excellent idea of the carefulness with which every detail relating to the conduct of a school is considered. The curriculum outlined in Article Six is a minimum one for a Class A school, but of course it encourages any school to set higher standards if it desires. The classifications are made only after the most exhaustive inspections, and before they are published each school is notified as to details in which, in the opinion of the Council, it may be improved.

The last classification which was published on July 1st, 1923, is as follows:

#### **Class A.**

University of Southern California, College of Dentistry,  
Los Angeles, Calif.



Chicago College of Dental Surgery, Chicago, Ill.  
 Northwestern University Dental School, Chicago, Ill.  
 University of Illinois, College of Dentistry, Chicago, Ill.  
 State University of Iowa, College of Dentistry, Iowa City,  
 Iowa.

University of Louisville, College of Dentistry, Louisville,  
 Kentucky.

Harvard University Dental School, Boston, Mass.

Tufts University, Dental School, Boston, Mass.

University of Michigan, College of Dental Surgery, Ann  
 Arbor, Mich.

University of Minnesota, College of Dentistry, Minneaoplis,  
 Minnesota.

St. Louis University School of Dentistry, St. Louis, Mo.

Washington University School of Dentistry, St. Louis, Mo.

Creighton University, College of Dentistry, Omaha,  
 Nebraska.

University of Buffalo, College of Dentistry, Buffalo, N. Y.

Western Reserve University Dental School, Cleveland,  
 Ohio.

Thomas W. Evans Museum and Dental Institute, School of  
 Dentistry, University of Pennsylvania, Philadelphia, Pa.

University of Pittsburgh, School of Dentistry, Pittsburgh,  
 Pa.

Vanderbilt University, School of Dentistry, Nashville, Tenn.

Baylor University, College of Dentistry, Dallas, Texas.

Marquette University, College of Dentistry, Milwaukee,  
 Wis.

### **Class B.**

University of Denver, School of Dentistry, Denver, Colo.  
 (Formerly Colorado College of Dental Surgery).

Georgetown University, Dental Department, Washington,  
 D. C.

Howard University Dental College, Washington D. C.

- Atlanta-Southern Dental College, Atlanta, Ga.  
 Loyola University, School of Dentistry, New Orleans, La.  
 Tulane University of Louisiana, School of Dentistry, New Orleans, La.  
 University of Maryland, School of Dentistry, Baltimore Md. (Baltimore College of Dental Surgery was merged with it on June 15, 1923).  
 Kansas City-Western Dental College, Kansas City, Mo.  
 University of Nebraska, College of Dentistry, Lincoln, Neb.  
 Ohio State University, College of Dentistry, Columbus, Ohio.  
 North Pacific College of Dentistry, Portland, Oregon.  
 Temple University Dental School, Philadelphia, Pa. (Formerly Philadelphia Dental College).  
 Meharry Dental College, Nashville, Tenn.  
 University of Tennessee, College of Dentistry, Memphis, Tenn.  
 Medical College of Virginia, School of Dentistry, Richmond, Va.

### Class C.

- Cincinnati College of Dental Surgery, Cincinnati, Ohio.  
 Texas Dental College, Houston, Texas.

### Classification Postponed.

- University of California, Dental Department, San Francisco, Calif. (Classification postponed until September 15, 1923).  
 College of Physicians and Surgeons of San Francisco, San Francisco, Calif. (Classification postponed until September 15, 1923).  
 Indiana Dental College, Indianapolis, Ind. (Classification postponed until September 15, 1923).  
 Columbia University School of Dentistry, New York, N. Y. (Incorporation of the College of Dental and Oral Surgery of

New York, and reorganisation of the united schools, in progress).

New York College of Dentistry, New York, N. Y. (Merger with New York University in process of negotiation).

Ohio College of Dental Surgery, Cincinnati, Ohio. (Affiliated with the University of Cincinnati on July 1, 1923; early complete merger in prospect).

**Merged recently with universities.**

Colorado College of Dental Surgery. (Merged with Denver University, June 15, 1922).

Baltimore College of Dental Surgery, Baltimore, Md. (Merged with the Dental Department of the University of Maryland, June 15, 1923).

College of Dental and Oral Surgery of New York, New York, N. Y. (United with the School of Dentistry of Columbia University on July 1, 1923).

**Discontinued since the publication of the last previous classification in 1920.**

(1921) George Washington University, Dental School, Washington, D. C.

(1923) University of West Tennessee, Dental Department, Memphis, Tenn.

Since the year 1921, the Carnegie Foundation for the Advancement of Teaching, has been conducting a survey of dentistry and dental education in the United States and Canada, similar to those previously completed in regard to medical and engineering education. The purpose of this survey is to arrive at a comprehensive understanding of the present status of dentistry as an important agency in the conservation of public health, with the avowed purpose of promoting

dentistry in this relation by constructive suggestions and by substantial assistance from the funds of the Foundation. Prof. William J. Gies, of Columbia University, has been in charge of this important work, and during the session of 1921—'22, with the assistance of members of the Dental Educational Council of America, he completed the field work of examining and inspecting all the dental colleges of the two countries. His report has not yet been published, but it is probable that it will appear before the end of the current year, and it is believed that it will contain much that will be extremely useful to the dental schools.

This report would be incomplete without reference to the development of the dental hygienist, who has come into existence within the last eight years as an important adjunct to the dentist, and seems destined to become an extremely useful agency in the prevention of dental disorders. The function of the hygienist is to serve under the direction of the dentist in the prophylactic cleansing of the mouth and teeth, and as a teacher in public schools, hospitals, private dental offices, etc., of the means for the home care of the teeth and the prevention of their diseases. There are now ten institutions engaged in the training of dental hygienists, the majority of them being departments of existing dental colleges. In all save the College of Dentistry of the University of Minnesota, the course is completed in one session or one year, but the institution named requires two sessions. The majority of the schools require high school graduation for admission, but in New York State only one year of high school work is demanded. Twenty-one of the States have enacted statutes legalizing the work of the hygienist, and bills are pending in three others. In all these States the hygienist is required by law to work under the supervision of a licensed dentist, and cannot practise independently, and the operative work is restricted to the removal of stains and accretions from the exposed surfaces of the teeth or those directly below the free margin of the gum.

The dental schools have thus far engaged in the training of dental laboratory mechanics only to a limited degree. Three or four dental schools offer courses, but the majority of the mechanics obtain their training by an apprentice system in a commercial laboratory, or in one of the private schools conducted for this purpose, in which the standards are low and the results mediocre.

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