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William J. Gies

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INTERNATIONAL ASSOCIATION FOR DENTAL RESEARCH

PROCEEDINGS OF THE FOURTEENTH GENERAL MEETING¹ BROWN HOTEL, LOUISVILLE, KENTUCKY

March 14 and 15, 1936

COMPILED BY WILLIAM J. GIES, F.A.C.D, *Secretary*^a

Columbia University, New York City

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¹The sessions of the Research Association preceded, by agreement, those of the Thirteenth General Meeting of the American Association of Dental Schools, in the same hotel, March 16-18. The members of each body were welcome at, and participated in, the sessions of both associations. The chairmen were the President, Dr. Theodore B. Beust, University of Louisville; the Vice-president, Dr. Paul C. Kitchin, Ohio State University; and the President-elect, Dr. William G. Skillen, Northwestern University. The annual informal dinner, served to members and guests on the evening of March 15 preceding the concluding session, was attended by 124 persons. [The President's address, abstracts of papers, and data of executive proceedings, etc., at the general meeting in 1935, were published in the *J. Den. Res.*, 1935-36, 15, 139-232; June-Aug.]

² Most of the abstracts have been prepared by those who presented the corresponding papers. All editorial revisions have been verified by the authors.

I. ADDRESS OF RETIRING PRESIDENT³

*Theodore B. Beust, D.D.S., M.D., F.A.C.D., School of Dentistry,
University of Louisville, Louisville, Ky.*

Life is a stern master. Probably one-third of civilized man's existence is devoted to the task of providing sustenance. "Enviably is he whose pursuit is fairly endurable. Lucky is he whose work is fairly congenial. Blessed is he who anticipates his daily duties with a pleasurable thrill." To the last category belong the few who are privileged to devote the major part of their time to research.

The investigator's immutable devotion to the solution of apparently insignificant problems presents an interesting study in human behavior. The urge to delve into the unknown implies the existence of a heritage extending back to the roots of the human race. Primitive man—even the human precursor—looked askance at the pranks of nature. Rain, lightning, thunder, and fire, according to the oldest records, were attributed to the benevolence or wrath of the supernatural. This signified the presence of a spirit of inquiry concerned with the relation between phenomenon and cause. This faculty of correlation must have been the factor that made the human race the intellectual superior of all creatures. The evolution of this spirit increased the mastery of man over the animate and inanimate. The passing of countless centuries saw the gradual creation of a soil embellished with mysterious alchemic laboratories and with centers of learning. Hippocrates, Euclid, Plato, appeared. The research man passed from the subconscious observer to the student of modern times. Empiricism, long a valuable adjunct of science, yielded to the methodical use of known laws or theories based on logic. *Accidental* discovery of truth, however valuable, no longer constitutes research. The concept now includes directed and sustained efforts for the solution of problems. No longer is it satisfying to know that a crowbar will help to move a weight. It is now asked that the principles be explained, and the result of forces applied to its handle be computed. Individuals following this line of work are dominated by mysterious inner forces. They find themselves in a state of submission bordering on slavery. Their workshop, whether a Rockefeller

³ This, and the two addresses on pages 299–301, were delivered after the annual dinner at the sixth session (March 15), before the concluding executive proceedings (page 377).

creation or a corner in an attic, is a sanctuary pervaded with the great spirit of research. They know but one desire: the solution of their problem. Regardless of hurdles, unaffected by back-sets, unconscious of discomforts, and oblivious to the passage of time, the devotee, with unflagging interest, toils toward his goal. Archimedes, during the siege of Syracuse, was killed by a soldier while he himself was so absorbed in mathematical calculations that his only remark was: "Do not disturb my diagrams."

The history of research exhibits a significant periodicity in the production of world-approved investigators. In looking backward we find, for example, civilization set in wonderment by the researches of Harvey, Pasteur, Lister, Virchow, and others. These men deserved the popular acclaim that was theirs. But let us not forget the unsung legion of research men whose life work contributed to the principles which brought forth the illustrious few. Great men are rarely, if ever, spontaneous creations. They are expressions of the cumulative research of a host of scholars, assembled, correlated and enlarged upon at propitious moments. The rate and manner of growth of biologic science in its earliest days is reflected in its recent development. For example, Aristoteles, in the 4th century before Christ, built on the Hippocratic literature, in itself a product of over a hundred years of research. Aristoteles created an independent biologic science by releasing biology from the surfdom of medicine. His teachings persisted through the dark ages, dominated the work of Albertus Magnus in the 13th century, enriched the writings of Wotton in the 16th century, and guided the tendencies of Cuvier in the 19th century. Thus Aristoteles' direct influence extended through a period of over twenty centuries. The mathematician and architect Robert Hooke, in 1667, sectioned bits of cork and wood and found cells. During the next one hundred and seventy years nearly a score of botanists and histologists perpetuated their names on the roll of science through contributions to our knowledge of cells. But it was not until 1839 that cell-science had progressed sufficiently to beget the conceptions of cell reproduction published by the botanist, Matthias Schleiden. Subsequent studies undertaken with his friend, the physiologist, Theodor Schwann, revealed the astonishing fact of the cellular origin of all plant and animal tissues.

Such experiences are common in the annals of science. They illus-

trate that an evaluation of any piece of original research is impossible. Yet such attempts are sometimes made. An editorial on caries research, in the last volume of a prominent dental journal, although agreeing "that here and there a little seed has been sown," expresses the view that "never has such a vast amount of literature been written with so little concrete achievement." It adds that, unless the problem is solved soon, "we as a profession will stand convicted of a dereliction of duty." The rate of progress in biologic science, and the volumes written on unsolved or controversial problems in allied fields, indicate that this editorial was written in a moment of thoughtlessness, without regard to the fact that modern caries research made its advent with Leber and Rottenstein's work in 1867. Between that time and the early part of the present century the question of caries etiology, owing to almost universal acceptance of Miller's enlargement of Leber and Rottenstein's work, was given little attention. Recent voluminous caries-literature attests the realization that none of the theories thus far propounded has satisfactorily explained all phases of the complex problem. The numerous current publications constitute a favorable sign, denoting activity in many schools of reasoning. Theories are propounded, modified, and overthrown. These are steps in the evolution of science. The world, ignorant of the sacrifices involved, profits from beliefs that lived but could not endure.

Confirmed research men often lack in sophistry. This is especially true of men intensively engaged in biologic research. The biologist deals with phenomena of organized life, but his concentration on special problems, often involving all of his waking hours and frequently his hours of rest, precludes close familiarity with the capriciousness of the human race. Subtle machinations of mind based on worldly desires are foreign to his nature. He is satisfied if left undisturbed. That is why he so often is found in positions at insignificant salaries, with industrial corporations and other institutions where he manipulates the push buttons that stimulate progress. Research men are rarely politicians. Their work depends on punctiliousness, which is incompatible with political accommodations. This "shortcoming" can conceivably prove detrimental to an organization. Deep concentration on problems stands in an inverse ratio to practicality. Outward manifestations of a group of men are apt to be swayed by

the psychic state of its components. Fortunately most of our members exercise caution in routine transactions. Our rapidly growing society has thus far had the coöperation of officers who took an active part in its scientific proceedings. Unfortunately, however, a few members attend meetings for devious purposes. They rarely, if ever, are seen in the open sessions. Individuals, alien to the aims of the society, unacquainted with, or even unknown to the majority of its workers, might, under these conditions, be seated in administrative offices. An opportunity for sounding a note of warning is given a retiring president but once. Observance of our motto, "research and nothing but research," will tend to keep our organization clean. Precise specification of our interpretation of research, coupled with a more rigid application of our rules governing admission, would also help.

The letters "I. A. D. R." have been welded for all time by the immortal spirit of research. The most sanguine dreams of the founder and advisor of this Association, William J. Gies, must long have been surpassed. The potentialities of the members, when properly led, will forever prove a substantial bulwark to the waves of adversity. I relinquish my gavel with confidence in the future and bid my successor God speed.

II. INTRODUCTION OF PRESIDENT-ELECT

Isaac Schour, B.S., D.D.S., M.S., Ph.D., Secretary of Chicago Section; College of Dentistry, University of Illinois, Chicago, Ill.

To introduce Dr. Skillen is a pleasant assignment. It gives me an opportunity to tell publicly what I have felt and known regarding a friend who has been generous with his help and constructive criticism. His personality is quiet, unassuming, modest. Very few, therefore, know that he is an excellent athlete and equestrian, and possesses artistic talents in painting. Born in Toronto, our President-elect came to Chicago at the age of thirteen, when his first research problem was to obtain employment. The successful solution of this problem was accomplished on his fourteenth birthday. He completed his high-school training at night, and obtained the dental degree in 1911

at Northwestern University. Upon graduation, Dr. Skillen was appointed a member of the faculty in the Department of Operative Dentistry. Apparently his interest in the fundamental sciences and research motivated him to leave the operative department, for in 1914, we find him in the Department of Histology of the same institution, working as a staff member without remuneration and developing a modification in staining technique.

It was fortunate intuition that led Dr. Skillen to make this change, for dental histology, as an organized branch of scientific dentistry, owes much to the impetus given to it by Northwestern University. The first lecture-and-laboratory course ever given in this subject was taught at this institution, in 1896, by Dr. Frederick B. Noyes. In 1914, Dr. Noyes became a teacher at the University of Illinois. Dr. Skillen was then appointed instructor under Dr. Newton G. Thomas, who succeeded Dr. Noyes as the head of the Department. Four years later, when Dr. Thomas followed Dr. Noyes, our President-elect was selected to head the Department. Dr. Skillen has continued and furthered the progressive tradition and standards of the Department of Dental Histology of Northwestern University for practically twenty years. It is, therefore, proper to pay tribute to him and his colleagues who have carried on research, not only in recent years but in the years preceding the organization of the International Association for Dental Research—when research was less fashionable, and called for a special fortitude of mind and courage of conviction to carry on in the face of indifference and apathy in a large proportion of the dental profession.

Dr. Skillen's investigations have reflected the research trends that have become increasingly manifest in recent years. Although he is primarily a histologist, his studies cover, in addition to purely descriptive microscopic analysis, physiologic, pathologic, clinical and experimental problems. He has often alternated periods of concentration on technique, be it staining or experimental, with periods devoted primarily to critical analysis and reflection. A fine balance between work and thought is an important factor in successful research. "Arm-chair science" alone is not research, nor is technique or mechanical skill. A happy combination of these, however, does constitute science. With each problem, regardless of what it may be, a cultural background is essential in the unfolding of new facts. Sometimes a

given historical background, a principle in another branch of science, or a happy idea, catalyzes one's work so that it progresses quickly and effectively where otherwise it would remain inert and static.

The somewhat younger men in the field of dental research are deeply indebted to Dr. Skillen and his co-workers, who have maintained high standards of research during the adolescent period of storm and stress in dental research, and have prepared the way for Gies' monumental contribution in placing dental research on an organized and permanent basis of usefulness and expansion. There are many members in the dental profession who ten or twenty years ago regarded research as the concern of some queer and impractical individuals, but who today have a genuine respect for it. I am informed on good authority that, at a national dental meeting in 1905, an audience of several hundred dentists had dwindled down to thirty members when the program was turned over to a leading authority who was to speak on "the relation of the structure of enamel to the preparation of cavity walls and margins." In spite of the fact that the subject was concerned with important clinical applications, the reference to fundamentals in dental histology was sufficient to cause a mass exodus. Today, as a result of the persistent work of the relatively small group of dental investigators, in which our President-elect has played an important rôle, we can appear before the dental profession with a subject title that holds no promise of immediate clinical application, and still command an interested and attentive audience. Today it is possible to give a report on even an experimental study dealing with the incisor of the rat, and still have an audience after the lantern slides have been shown in the dark. This remarkable transformation within a period of less than thirty years has been made possible by the thorough and persistent work of educators and investigators like our former presidents and Dr. William G. Skillen, whom I now have the honor to introduce as the next President of this Association.

III. INAUGURAL ADDRESS

*William G. Skillen, D.D.S., Dental School, Northwestern
University, Chicago, Ill.*

Presumably, in making an address such as this, one is expected to take some stand on current problems; to erect a platform. However,

I have no real desire to do this, at least at this time, or even give you as much as a single plank. One hears rather too much of platforms these days—structures which to me seem to be on a par with new-year resolutions, and which do not even make good firewood. I, myself, am not particularly fond of after-dinner speeches and, to be consistent, should spare you. Someone, in outlining the proper length for a speech, has very aptly said that it ought to be like a debutante's dress—long enough to cover all essentials and short enough to sustain interest. I am very sure that I am not a good enough designer to meet all of your varied tastes in this respect. Furthermore, Elbert Hubbard has stated that "oratory is a matter of tooth-someness." He related the story of one of the greatest orators, who was thrown from his artistic hobbyhorse when his "store teeth," in an impassioned moment, shot over the footlights and fell with a sickening clatter into the orchestra. Wanting to retain what little prestige I may have as a speaker, I certainly do not wish to invite such a contretemps this evening. Therefore, on all counts, it would be well to terminate here and now.

However, it would seem that it has become the rule at a time like this that something must be said. In searching for a subject, I necessarily first reflected upon this organization, its purpose, its character, and its possible outcome; and, in so doing, came to realize perhaps more definitely than ever before just what factors have contributed most generously toward its success. Looking in retrospect over the years that have elapsed since the beginning of this group, it would appear, perhaps, that at least two more or less inter-related principles have been consistently maintained. Indeed, it would seem, that in the minds of many, these principles have assumed the proportions of ideals. *First of these is unity of purpose.* Each and everyone is, and has been, working toward a common goal; motivated by the same incentive; eager at all times to catch new thoughts—as it were, to "put salt on the tail" of a new idea, for the purpose of adding to our fund of knowledge of the working of the human mechanism, with the hope or expectation that ultimately some benefit may accrue. And in this working toward a common end, there seem to have been perfect satisfaction and happiness in doing what one could without particular consideration of cost or expectation of reward.

But unity of purpose, although a valuable asset in any group, probably would not in itself have been sufficient. *There must also be coöperation.* To be of genuine advantage, all work must be reciprocal. We help ourselves by helping others, and man alone will accomplish little or nothing. All of his thoughts and actions have a direct relationship with others and men succeed only as they work together. This too seems to have been a prevailing idea among this group. It had never appeared that anyone has been particularly desirous of personal emolument but, as some one has put it, has rather shied from all the "foolish claptrap of place and power." Personal gain has been incidental. Mutual gain has been paramount. This complete mutuality is exemplified, I think, by the fact that our discussions, although at times dangerously charged, have terminated in complete understanding with appreciation rather than in animosity. New opinions always have been welcomed; constructive criticism, invited. And I believe the past has clearly indicated that everyone is big enough to bear no grudges, harbor no jealousies, and accept no insults. Rather, as Emerson so nicely puts it: we have found in getting together that "we talk better, we have the nimblest fancy, a richer memory and our dumb devil has taken leave for a time." What is more, it would seem that out of even some of the most heated disagreements have developed real friendships. For instance, just as an example: when one receives, from an individual with whom one has disagreed more or less strongly at times, a letter addressed, "Dear Brother Bill," it would seem to mean something—to me it appears to be about as friendly a gesture as one could wish. No doubt, most of you are able to recall such experiences for yourselves. Surely these are attributes of which any organization may be proud, and would seem fully to express Emerson's definition of friendship: that its "essence is one of entireness, total magnanimity and trust."

No one can deny that dental research has finally come to occupy a not-too-small place in the world of science. It is my feeling that this has been made possible and hastened by the complete unanimity of purpose, thought, and activity which has guided the members of this organization, together with their tolerant and friendly reciprocity toward each other. And I sincerely wish to see this attitude maintained. Therefore, it is my hope, even my firm belief, that this little

plank—which, in spite of myself, perhaps I have given you—will prove to be not a springboard, but a sufficiently strong foundation to assure even greater success than you have heretofore realized. I believe that this success will be furthered if our means of publication is preserved to us [*Journal of Dental Research*]. In conclusion, I believe we all owe a great deal to our much respected and far-sighted pilot, Doctor Gies, under whose guidance these things have been made possible.

IV. INDEX OF NAMES OF PARTICIPANTS, AND SEQUENCE NUMERALS OF CORRESPONDING ABSTRACTS

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V. FIRST SESSION: MORNING, MARCH 14; ABSTRACTS 1-12

1. BIMONTHLY OBSERVATIONS OF ORAL FLORA. *Maynard K. Hine, D.D.S., M.S., Rockefeller Fellow in Dentistry, School of Medicine and Dentistry, University of Rochester, Rochester, N. Y.* Method to determine variations in mixed flora, which reveals all morphological groups of bacteria present and their numerical relationships (Bibby: *J. Den. Res.*, 1935-36, 15, 170), was adapted to show variations in bacterial

* No manuscript received for publication; read by title.