

INTERNATIONAL ASSOCIATION FOR DENTAL RESEARCH

PROCEEDINGS OF THE NINETEENTH GENERAL MEETING¹

JEFFERSON HOTEL, ST. LOUIS, MO.

March 15 and 16, 1940

COMPILED BY HAMILTON B. G. ROBINSON, *Editor*

Washington University, St. Louis, Mo.

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I. ADDRESS OF RETIRING PRESIDENT

LOYALTY TO OUR ASSOCIATION AND TO OUR PROTECTING NATION

Wilmer Souder, Ph.D., National Bureau of Standards, Washington, D. C.

The International Association for Dental Research is now in its twenty-first year and has already taken its place in the field of Creative Science. We are well organized. The spirit of cooperation is excellent.

¹ The sessions of the International Association for Dental Research preceded, by agreement, those of the American Association of Dental Schools and Omicron Kappa Upsilon, in the same hotel, March 17-19. The members of each body were welcome at, and participated in, the sessions of the others. The annual informal dinner was served to 128 members and guests, preceding the concluding session.

² The Secretary-Treasurer, Edward H. Hatton, has given invaluable aid in compiling these proceedings.

The achievements of the Sections in the United States have been quite satisfactory during the last year if we may judge them by the reports presented during the six sessions of this meeting. All of us have, during the year, endeavored to maintain the ideals of the master International Association, though our thoughts have, at times, been much disturbed and our hearts have been heavy for the welfare of our fellow workers whose lands have been torn by the wars.

Although we in America are extremely proud of our heritage, let us not close our eyes or stop our ears to facts. Reports of well arranged plans to prey upon our Nation and its peoples are becoming too numerous. Reported bold affronts such as the wilful omission of necessary ingredients in published formulas of therapeutic agents developed abroad thus rendering them, when produced here, poisonous to our citizens, or the sabotage of our metal, lens and drug industries by agents living under our protection, should arouse us to a full realization of the fact that these traitors prosper only through our stupidity and credulity.

We of the science and research groups must cooperate with our Government and place at its disposal, as needed, the specialized information and service of our Association. Otherwise how shall our Nation combat the sophistry of enemies operating in our field under the cloak of our professional freedom?

Undoubtedly there are in our Association numbers of individuals who have been fortunate in escaping the iron hand of an autocratic ruler. We are happy to have them with us. They realize the significance of this message and will be found at our shoulder supporting us should our emergency arise. The uncertainties of our Nation's position during the next year compel me to bring this unusual message.

I shall not presume to set up or to suggest next year's program for our incoming president. But let us not be so dignified that we cannot see, hear, discover, interpret or report irregularities in our profession, if such should arise; and more particularly so when millions are now preparing to protect us with their lives if asked to do so. Dignity is not lost or discredited by open eyes, keen ears and alert minds. I cannot retire from this high office without emphasizing these obligations of citizenship and professional liberty.

I have already reported to the Council on the discharge of my official duties as your President. May I repeat some of the more important items to which you have given your approval.

1. The proposition of a friend, who offered to assume responsibility for the publication of our Journal, was investigated. He could offer us little if anything more than we were getting under our own management by our Drs. Robinson, Hall and McCrea. These three loyal workers give their services for the Association freely and are worthy of our continued confidence and support

2. We are now operating under the new Constitution which has been found more satisfactory for the enlarged Association. This new Constitution combines the offices of the Secretary and Treasurer. The Council has secured the consent of Dr. Hatton, one of our most respected members, to assume this double duty for the next year. I have enjoyed my past year's association with Dr. Hatton.

3. The special committee appointed to arrange the details for the Arts and Science Award has completed a nice piece of work. We are indebted to Dr. Robinson, President-elect Schour and Dr. Myers.

4. Then a word of appreciation must be spoken for our sincere friend, Dr. Merrit, and the American College of Dentists. Under the direction of Drs. Gurley and Waugh the College has responded most generously to the Journal Endowment Fund. Without this volunteered support and personal response by the members of the College, we should scarcely have been started on the \$50,000.00 endowment fund.

Before relinquishing this position which is supposed to be almost 100 per cent honorary, I want to express my appreciation for the work of other loyal committees. The Local Arrangements Committee, under the guidance of Dr. Robinson, has made our visit most pleasant. Dr. Baker of the Journal Committee and Vice-president Bodecker of the Necrology Committee have each given us dignified reports.

Then I must thank the individual members of the Association for their support during the year. Active members mean vitality for the organization. You have indeed been active.

In a few minutes I shall yield the office of President and ask a repre-

sentative of the Council to proceed with the installation of a worthy successor to whom shall go my best wishes and loyal support.

It shall then be my pleasure to return to the humble position of an active member of the International Association for Dental Research.

II. INTRODUCTION OF PRESIDENT ELECT

Frederick B. Noyes, A.B., D.D.S., Sc.D., School of Dentistry, University of Illinois, Chicago, Ill.

Mr. President, members of the International Association for Dental Research, and guests: It is indeed a pleasure for me to introduce your new President, for we have been very closely associated for more than twenty years; first as teacher and student; then as colleagues on the faculty; and as very close personal friends. Through all of these years our friendship has broadened and deepened and ripened into a very fine treasure. His energy, enthusiasm, clearness of vision, and unflinching loyalty have been a very great inspiration to me.

Certainly your new president most richly deserves the honor you have conferred upon him. I need not rehearse before any research body the contributions of your new president; I have before me a list of eighty odd; a very large number. It is interesting to note, however, that he worked for ten years with very little publication before his studies ripened to the point of presentation. His writing may be grouped under five headings: 1. Vitamins, 2. Endocrines, 3. Metabolism, 4. Growth, and 5. Teaching. During the last few years the study has been more and more concentrated on growth. He has had the wisdom and foresight to associate himself with outstanding investigators by following the dental application of their studies, and has always been able to add much to the work. In this way he has been associated with such investigators as M. C. Smith, H. B. Van Dyke, A. W. Ham, J. M. Rogoff, W. R. Tweedy, F. A. McJunken, S. R. Chandler, R. Kronfeld, E. Roberts, and others, as well as many of the staff of the Colleges of Dentistry and Medicine at the University of Illinois. It is especially important to note that his work has not only added new details to our knowledge of dental structures, but has made notable contribution to broad, fundamental biological concepts.

Beside his research articles, he and Dr. H. J. Noyes have edited, revised, and largely rewritten the *Textbook of Dental Histology and Embryology*, very greatly increasing its value. He has contributed two chapters to *Dental Science* and *Dental Art* and a chapter in E. V. Cowdry's *Special Cytology*, a very important addition to biological literature.

Great as his claim to your recognition is, because of his literary contributions, he is rendering a far greater service to research in developing research workers and stimulating students to study things for themselves. We have perhaps known teachers whose object seemed to be to impress students with the magnitude of their knowledge and the depth of their wisdom from which the students might gather some crumbs, if they could. This man has established a common ground for student and teacher in the examination of the facts. He has been able to awaken in students a desire to answer questions for themselves, which is the foundation of research. Most important of all he has been able to link such a subject as dental histology to the art of dentistry and make students understand that all scientific knowledge has its application if you have the wit to see it. It has been wonderful to see him bring Freshmen students back to the laboratory on Saturday afternoon to answer questions for themselves.

His work has already developed such men as M. M. Hoffman, M. Massler, J. M. Spence, J. W. Adams, R. G. Sarwat, F. Herzberg and more whose names do not come to my mind. It is a greater service to research to develop the powers and fire the enthusiasm of a student and investigator than to write many papers. And so I have the honor to present to you your new President, Dr. Isaac Schour.

III. INAUGURAL ADDRESS

THE PROBLEM OF INTEGRATION IN DENTAL RESEARCH, TEACHING AND CLINICAL PRACTICE

Isaac Schour, D.D.S., Ph.D., School of Dentistry, University of Illinois, Chicago, Ill.

Our secretary, Dr. Hatton, informs me that tradition calls for an inaugural address by the newly elected president on a subject related

to his own research work. Such tradition, then, in my case would call for a discussion of experimental studies in tooth development.

But I wish to assure you that you will not be subjected to the reading of a monograph on histology. There is a problem confronting us that is more important than histology—one of greater common interest to all of us. I should like to talk to you tonight as a teacher as well as a researcher on the problem of the integration of dental research, teaching and clinical practice.

We are gathered here tonight because we have a common bond and purpose—to promote dentistry as a health service. This singleness of interest is in sharp contrast to the multiplicity of methods we have chosen to attain our common goal.

The three foundations upon which the future of dentistry rests are Research, Teaching and Clinical Practice. The group gathered here tonight represents one of the bulwarks of the dental profession—Research. But I see among us also teachers, administrators and practitioners—in the persons of research workers.

Research has made rapid strides, but unfortunately most of its effort has been directed to *analysis within highly specialized fields*, rather than to *synthesis of all* toward the promotion of dentistry. We have cut up our special fields of interest into smaller and finer components and pieces, and narrowed our vision, forgetting at times that these pieces have to be put together again in the teaching and practice of dentistry. As individuals we have come to “know more and more about less and less.” We have attained such a highly specialized division of labor that our scientific language is becoming more and more technical. Soon we shall need expert translators and interpreters at our research meetings.

The rapid progress in research confronts us with a problem and a challenge—to integrate the various special fields of dental research, to consolidate our outposts and to bring together into a more cohesive whole our increasingly diverging fields of endeavor.

The problem of integration in research is closely related to the problem of integration in dental education. The research worker is also a teacher—whether he teaches formally at a dental school or informally through his writings, presentations or clinics. An examination of the traditional teaching that is usually followed shows that the teacher of

the preclinical subject too often confines his interest to pure research whereas the clinician restricts his interests only to applied researches. Therefore, in dental education (as well as in medical education) there has been created an entirely artificial separation (sometimes even a barrier) between preclinical and clinical instruction. Because of this lack of integration, dental training has become incomplete and inconsistent. The head and the hands too often have not been trained or encouraged to work together. There has developed the false conception that thinking and doing are entirely separate processes. Mental superiority or curiosity has been suspiciously regarded as conducive to dental or technical inferiority and dullness. Too many times have clinical instructors looked with unmistakable disfavor upon the student who still showed active interest in his nonclinical subjects.

The student often passes through four years of training with only one or two rare instructors who will attempt to integrate and help him to coordinate his brain and his hands. Too often his instruction consists of isolated, uncorrelated facts or procedures which the student pigeon-holes mentally or manually for examinations rather than for use.

In 1929 I tried to point out that "one of the common problems in teaching preclinical subjects is that of correlation. The responsibility for correlating the subjects of a given curriculum must be shared equally by all departments. Preclinical teaching should anticipate clinical instruction. Clinical teaching, in turn, should be based on facts observed and studied in the preclinical courses. Intelligent association of two subjects affords reciprocal value to both. The efficacy of correlation is definitely limited by the time allotted to the course, by the scope of the student's knowledge, by the amount of cooperation among the departments concerned, and by the extent to which the instructor has mastered not only his own subject, but also the subjects with which his course is associated. For the sake of simplicity, correlation may be classified into three types: (a) correlation among preclinical subjects; (b) correlation among clinical subjects; and (c) correlation between the preclinical subjects on the one hand and clinical subjects on the other."

How shall we meet this challenge for greater integration? (Of course we could appoint a committee! That is an easy and popular way of disposing of a question.)

While there is no one way of solving this problem, there are a number of approaches that will start us in the right direction. Since the success of integration depends upon the proper coöperation of the researcher, the educator and the administrator, it becomes the serious responsibility of each to be imbued with the spirit of integration and to promote its development. The responsibility for this much-needed integration rests chiefly upon the teaching faculties in our dental schools, where the researcher and the clinician meet on the same platform as teachers.

The crucial test for the success of integration lies, therefore, with the teacher. A great teacher will teach and inspire, regardless of the disorganization of the curriculum or the inadequacy of the physical equipment. On the other hand, all the rules and regulations, memoranda and instructions, faculty meetings and conferences, will accomplish very little if the teacher lacks the qualifications in personality, intelligence, background and enthusiasm necessary to execute sound principles in education. I have been told of a Curriculum Committee which had been meeting for long hours trying to allocate properly the time available to each subject. Suddenly a member who had been silent throughout the discussion proposed a simple solution—take the hours from the poor teachers and give them to the good teachers!

What, therefore, are some of the specific qualifications that we as teachers should develop?

One essential requisite in teaching is a broad viewpoint, a broad cultural and intellectual background and a continuous devotion to study and learning. This devotion should be a daily discipline. Our love of knowledge should extend beyond our limited field of responsibility. In our role as investigators, too, we should not lose ourselves in our narrow niche but learn to correlate our efforts with those of others. The purist in his subject or science is in danger of becoming static rather than dynamic. Alexander has aptly emphasized the need for a broad perspective in the following statement: "The true specialist should also be a generalist, and should couple a hawklike perception of essential detail with the breadth of vision of the old-school 'natural philosopher'."

Those of you who have had the patience to read my reports visualize the rat incisor when reference is made to my name. However, I have regarded the rat incisor as only one of the many small images of the human incisor, of the human teeth and jaws and the human organism.

It is also essential that we have a proper perspective of our function. We are training students for the practice of dentistry. My own specific assignment is to teach them histology. But my function is not alone to teach histology but also to teach dentistry through the medium of histology. This point of view does not compromise in the least the subject of histology, but, rather, enhances its scientific discipline because it subjects the findings and interpretations in histology to the test of clinical applications. It is scientifically sound to remove the pulp from the incisor of the rat in order to establish the role of the pulp in eruption. Is it not equally scientific to study the eruption of the human incisor from which the pulp was removed for clinical reasons?

The problem of making our professional teaching more utilitarian is not confined to dentistry alone. This challenge has been thrown to medicine as well. August Krogh, one of the greatest physiologists of our time, in an address before the American Academy of Arts and Sciences said: "I am happy to state that the conception is gaining ground in this country that the teaching of physiology in medical schools has for its object to educate students to become doctors and not to become dabblers in the experimental and theoretical science of physiology, but tradition is strong, and, as I see it, there is still a great deal that will have to be weeded out from physiological curricula in medical schools and a great deal that will have to be put in."

In the dental curriculum, too many courses are being taught without any regard to future dental application. General bacteriology is frequently taught without any attention to dental bacteriology. In many schools physiology is taught for over 200 hours and not a single hour is given to dental physiology (or physiology of the dental apparatus). No wonder that in some fields retention of such knowledge by our students is so low. If we had no occasion to walk for a period of years, we would soon forget how to walk.

There should be no conflict between theoretical and practical studies. They are equally important and it is only their synergetic effect that will make for the best and highest advance of our profession.

John Dewey has pointed out that: "The more theoretical studies do not attain their highest development until they find some application in human life, contributing indirectly at least to human freedom and well-being, while the more practical studies can not reach their highest

practicality save as they are animated by a disinterested spirit of inquiry.”

It is obvious that in order to integrate our teachings we must integrate our own background and keep continually abreast with current development. The recognition of the value of integrated knowledge is reflected in the increasing interest in comprehensive examinations for our students. What is beneficial to the student is also good for the teacher and in all seriousness I suggest that before subjecting our students to comprehensive examinations we should in our effort to integrate teaching and research first pass these examinations ourselves.

Fortunately most of our dental teachers have dental degrees, and therefore have personal acquaintance with clinical dentistry. In medicine, unfortunately, preclinical subjects are often taught by Doctors of Philosophy who have no medical training.

The preclinical teacher should fortify his subject with clinical correlations. But it is equally important that the clinical teacher justify his position as teacher and base his technical procedures upon biologic principles analyzed and taught in preclinical courses.

It appears that the clinical teacher has been more neglectful in his responsibility in correlation than has the preclinical teacher. It is therefore gratifying to note the presence in this audience of a number of leading clinicians who are active in research and who carry over their research experience and the scientific method into their everyday teaching and practice.

The question might be raised: “Why should these problems of teaching and clinical correlation be discussed at a research gathering?” The justification for this discussion lies in the fact that the researcher is the father of the teacher and the teacher is the father of the dental profession.

It is therefore essential that the researcher in his role as teacher be conscious of the importance of correlation and integration. The investigator should also be an integrator. Without research, teaching would become sterile. Old knowledge can live only when it can feed on new knowledge. Without research, the profession would stagnate.

The ideal solution of the problem of integration is to have the same teacher teach both preclinical and clinical aspects of the same subject

and to have the researcher work upon both the biologic and clinical aspects of the same problem. When this is not possible, a given department should have on its staff both classes of instructors and researchers in close proximity. Collaborative interdepartmental research is often more feasible than intradepartmental research.

Next in importance to the teacher is the curriculum. The function of the curriculum is to promote the full expression of the growth potential and capacities of the student. Now our problem becomes closely interrelated with that of the administrator.

For the function of the dean is to plan and coördinate the entire educational program. He is in the strategic position of seeing not only the individual trees but the entire forest; and the curriculum is one of his special responsibilities. The curriculum should provide a diet that is balanced and palatable, and one that can be assimilated. It should permit both variety and freedom of choice. There should be some time out between meals. A chemical analysis of the dental curriculum would indicate overfeeding of certain elements and deficiency of other nutriments, especially the minerals and vitamins. These accessory catalytic factors promote and integrate the utilization of the bulk of facts. It seems that a number of our courses give sufficient or even excessive factual material but suffer from avitaminosis, so that the facts do not become vitalized and incorporated in the student's mind.

The recognition of the need for the vitalizing influences that integration affords has led to the organization of integration courses given for the specific purpose of correlation between preclinical instruction and clinical practice. For example, at our dental institution, a course originally taught as pediatrics has been transformed into one in dental pediatrics. This course now embodies within it not only the growth and development of the child as a whole, but also the craniofacial development of the jaws and teeth and, what is most important, the relation of such knowledge to the practice of children's dentistry, particularly to the diagnosis and prevention of early malocclusions.

But, while the development of correlation is encouraging, the logical and ultimate solution of the problem lies not in single correlation courses but, rather, in correlation in every course. No doubt we would agree that an adequate vitamin supply should be available in

our daily food and not merely on Sundays or vacations. Similarly, correlation should not be a special dish at a rare and particular occasion. Still it is granted that vitamins on Sundays only are better than none at all.

I hope I shall be pardoned if I cite from personal experience and experimentation. In the teaching of dental histology to our freshmen, only half of the time is spent with the microscope. The other half is devoted to viewing gross specimens, radiographs and—believe it or not—the patient himself. In most instances the patient is the student. The students look not only into the microscope but into each others' mouths. Common developmental disturbances such as enamel hypoplasia, peg laterals, supernumerary teeth, mottled enamel or white spots are easily demonstrated in the mouth of the student. The student's improved power of observation, developed through microscopic examination, is immediately transferred to gross observation. The student is encouraged to work on special projects and is urged to reason, to think, to question and to associate. Full-mouth intraoral radiographs are available to each freshman. He is given the opportunity (which he gladly takes) to examine the radiographs of his own teeth and to search for some of the structures and relationships which he sees in the microscopic section. The blood supply of the gingivae and the lips is studied in microscopic sections; but in addition it is demonstrated in the student's own mouth by means of the capillary microscope which shows the circulation of the blood as well.

Clinical microscopy is taught as well as pure histology. The emphasis in teaching is not only on the scientific discipline of facts and the scientific method of analysis, but also upon clinical correlation and preparation for the practice of dentistry. We are proud of the opportunity to participate in the teaching of dentistry and to stimulate the students' special interest in the dental phases of the basic sciences.

With the introduction of clinical correlations into our course in histology, the content of the course has become much fuller and richer. Teaching has become more efficient and enjoyable. Retention of knowledge has increased, not by memorizing but by the principle of association. Through the method of correlation the students will develop the habit of reasoning and will continue to think throughout their clinical years in terms of the basic biologic sciences. Yet,

surprisingly enough, with the more efficient and intelligent utilization of the time allotted to the course, and with the increased emphasis not merely on facts but on understanding, it has been possible to teach our students more in less time.

I believe that this experience in dental histology throws a refreshing light on the problem of the curriculum. The problem is not the number of hours we have but how we utilize them. The inefficient use of teaching hours is not corrected by additional hours or additional courses. It is gratifying to note that in the recent standards set by The Council of Dental Education the maximum hours for the four-year dental course have been limited to 4400, although a number of schools have been teaching many more hours.

Our dental curriculum has become overspecialized. Isolated and unrelated courses have developed without being tooled to fit one another. The Tree of Dental Education needs scientific pruning. It may be against tradition to eliminate courses, but the authority of logic is stronger than that of tradition. It seems that with the tendency for overdepartmentalization there has been an unnecessary increase in various courses and that the organization of a basic course in the principles of technique should facilitate and expedite their application to particular clinical procedures.

Just as the tooth develops not by a mere piling up of its cusps but unfolds by the harmonious fusion and integration of its individual growth centers, so our multiple research efforts and our curricula should culminate into more than the mathematical addition of the separate parts—but into an integrated unit. Such unity would afford our researchers, our teachers, and our students a growth experience that would expand year by year like a progressive spiral.

As researchers, we should not forget that we are teachers; as clinicians, we should not forget that dentistry can be advanced only through constant and conscientious researches; and as teachers we should remember that the future of dentistry as a profession and a health service depends upon us—through the medium of our students. Therefore we must never forget that we should be researchers as well as clinicians.

Integration has been accomplished historically mainly by the efforts of single great individuals like Sir John Tomes or G. V. Black. Ac-

tually they represent and epitomize the efforts of their many contemporaries without whose achievements their contributions could not have been made.

But we cannot wait for and depend upon genius. We must depend upon concerted and continuous effort. By encouraging integration, by advancing our understanding through research, and by stimulating the imagination of our students and teachers, we furnish the favorable climate and soil for the seeds of progress to grow and blossom.

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