DISCOVERY!
Irwin D. Mandel, Editor

Ernest Hausmann

Computer Analysis Plus, Amherst, NY, and Department of Oral Biology, SUNY at Buffalo, School of Dentistry, 365 Squire Hall, 3435 Main Street, Buffalo, NY 14214; hausmann@sdm.buffalo.edu

J Dent Res 79(8):1546-1547, 2000

Forty-four Years of Dental Research: Role of Education, Teachers, Research, and Teaching

CHOOSING A CAREER

How does one choose a career in dental scholarship and research? Neither of my parents was a high school graduate. I surely had no role model for a career in scholarship. One member of the family, Josef Hausmann, my uncle, went to a teachers' college, becoming a high school French teacher. I was told that my personality was similar to his. Unfortunately, he did not live long enough to serve as a vital role model for me, for he was killed at Auschwitz. I was expected to get an education. After all, education, a priori, was considered a very desirable goal. One chose something practical, a field in which one could make a good living, and one which would gain for you the respect of your family and community. God forbid if I sought, for example, to study philosophy! My choosing such a path might have contributed to my father having a second heart attack. Dentistry seemed a realistic goal for me which would satisfy my family's concerns. It seemed like an interesting lark to apply to Harvard-something like buying a lottery ticket. One of my interviewers at the Harvard School of Dental Medicine asked me why I chose to apply there. My reply was, "I have to get out of New York, away from my parents."

MY DENTAL SCHOOL EXPERIENCE

The first two years of basic science were identical to those at the medical school. In fact, the students from the two schools went to classes together and were not even identified to the teaching faculty as "medical" or "dental". Most of the instructors presented their subjects with precision, with logic, and with enthusiasm. They surely inspired me to a career in human biological science. It is interesting to note how the Harvard School of Dental Medicine came to have the strong basic science curriculum to which I was exposed. A person who can take considerable credit for this was a dentist, Dr. Percy Howe. At a time when dental research was in its infancy, he did classic caries- and periodontal-disease-related research in the pathology department of Harvard Medical School. He also had a private practice in which Dr. James Conant, president of Harvard University, was a patient. Dr. Howe got President Conant's ear on what changes the dental school needed in its curriculum. Dr. Conant responded. He said that the then-Harvard Dental School did not merit being part of the Harvard family, or something close to this. Either it would get its curriculum onto a more biological footing or he would close the school. Some university presidents might heed this example and take a careful look at their dental schools. Reform comes much easier from outside of our profession than from within.

The basic science education which I had was traditional, discipline-based, gross anatomy, histology, etc. Soon after I graduated from Harvard, system-based basic science teaching came into vogue, led by Western Reserve University Medical School. An advocate of their faculty claimed that it was so good because their students scored third highest in the nation in part 1 of the national medical board examination. It is interesting to note that Western Reserve students also scored third highest in the nation in the medical aptitude examination. More recently, McMaster University (Hamilton, Ontario, Canada) introduced problem-based learning, which has found many advocates among dental educators. Some years ago, when Lisa Tedesco--now a Michigan Vice-President--was an Associate Dean at our dental school in Buffalo, she championed problem-based learning. She invited Dr. Anderson, one of the founding members of the original McMaster program. He was awe-inspiring. It became clear to me, however, that Dr. Anderson was a person who could sell anything. I came to the conclusion that the system used for teaching--the traditional, discipline-based, system approach or problem-based learning--was of much less importance than the quality of the teacher. My approach is to get a good teacher and than let him/her decide what approach to use.

The Harvard School of Dental Medicine clinical faculty struggled to fit the clinical program into the new curriculum. They no longer had time during the first two years for the traditional pre-clinical technical courses. They effectively used their ingenuity to streamline that portion of the curriculum. Now there was the appropriate continuity between pre-clinical technique and clinical practice. For example, after we made satisfactory class 1 amalgam preparations on a typodont tooth, we could proceed to place a similar restoration in a patient at a time when we had not yet mastered a class 2 preparation. Where most of the clinical faculty fell short was in relating this excellent basic science information and the scientific method to clinical practice. It really was not their fault, because they had not received the appropriate education to do this. Maybe before the new currriculum was introduced for students, in-service training should have been provided for the faculty! Anyway, this seeming lack of continuity between the basic science and clinical curriculum was very frustrating to me. I

KEY WORDS: education, quality, curriculum, research career.

Received March 7, 2000; Accepted July 10, 2000

must mention that one clinical faculty member stood out way beyond the rest in making "basic science-clinical" connections. This was Dr. Paul Keyes. It should be noted that a few years after my student experience, Dr. Keyes left the Harvard School of Dental Medicine because he had not been productive enough in research. At NIH, his studies, together with those of Fitzgerald, stand out as 20th Century landmarks in caries research. One Harvard teacher, Dr. Reidar Sognnaes (although unfortunately he did not participate in clinical teaching), stood out for me. I thought that if such a fascinating person could find satisfaction in dental scholarship, there surely should be some place for me as well in that field. What stood out about Reidar Sognnaes for me was not only that he was doing high-quality research, but also that he was doing exciting research. On graduating from dental school in Norway, he served as a research dentist on a medical team doing epidemiologic studies on Tristan Da Cunha, an island located between the tips of South Africa and South America. He observed a high incidence of dental fluorosis among the inhabitants, even though the fluoride concentration in the water supply was low. It turned out that the high intake of fluoride was from the eating of fish bones. This was the first description of fluorosis due to a high intake in food rather than in water. During the Second World War, Dr. Sognnaes served as a dentist in the Norwegian Air Force. During this experience, he was the first person to identify pain of dental origin in bomber pilots. During my senior year at the Harvard School of Dental Medicine, I made up my mind that a career in dental research was the thing for me. Every dental student had been required to do a research project. I did mine with Reidar Sognnaes on the mechanism of deciduous tooth root resorption. This led to my interest in becoming a bone biochemist.

RESEARCH: TRAINING FOR IT AND DOING IT

With a significant degree of chutzpah, I decided that if I were to continue my education beyond dental school, I would want to be trained in bone biochemistry by the very best person in the field. Therefore, I applied for PhD programs with Dr. William Neuman in Rochester and Dr. Wallace Armstrong in Minneapolis. I was lucky to be accepted by both of them. I chose Dr. Neuman. My graduate program was one strictly in basic science, biochemistry. Combined PhD-clinical specialty programs were not yet in existence. However, 12 years after completing a PhD program, when I already was an Associate Professor of Oral Biology at SUNY/Buffalo, I felt that I was missing something in my background. I looked at Paul Goldhaber, who, like me, was doing basic bone research. He had something extra that I did not have: clinical specialty expertise. To the consternation of my department chairman at that time, Art Ellison, I started in the periodontology certificate program at Buffalo. Completing that specialty program, I believe, had a profound effect on my subsequent research. I decided that I was going to utilize all my past training–dental school, periodontics, and biochemistry–in my future research. From that time on, I concentrated primarily in experimental radiology, developing methodologies for quantitative measures of alveolar bone in man.

Besides being stimulated by what turned out to be very productive research, I discovered that there were some side-benefits. I was invited to participate in meetings and to give talks all over the world. One such trip stands out in my mind: an invitation to the University of North Carolina Dental School in Chapel Hill to talk about my research. There is something about Southern graciousness, for the day I was to come, I received a call from Chapel Hill. Since I would arrive the evening before my talk, would I be interested in having dinner with someone in particular? I asked if I could have dinner with Dr. Paul Munson, the co-discoverer of the hormone, thyrocalcitonin. I had gotten to know him when I was a student at Harvard and he was a young Assistant Professor of Pharmacology. In the meantime, he became Professor and Chairman of Pharmacology at North Carolina. He did come to meet me. He was then 78 years old, enjoying life with a new 39-year-old wife and writing a textbook. We had some delightful reminiscences, one of which I would like to share with you. We discussed quality of teaching. I mentioned that, in general, the quality of teaching in the basic sciences at Harvard was high. He said, "I can tell you why it was so high in pharmacology" (his former department). He asked, "Do you remember that, in your lectures, the entire department faculty were sitting in the back row? After the lecture, we gathered together for ten minutes and had a critique of the preceding lecture. Therefore, no one would dare come ill-prepared for a lecture." I believe that this is an excellent example of the valuable effect of peer review on the quality of teaching. We have much too little peer review today in dental education.

LOOKING BACKWARD AND FORWARD

What are the pro's and con's of doing research or teaching? I chose a mix of 80% research, 20% teaching. Research allows for the greatest amount of independence. Once you obtain funding, essentially, you run your own program. Your granting agency will be satisfied when you are productive. The results you obtain will get into the dental research literature, and you may get the satisfaction that others will build on the information you obtained. Besides making a contribution to dental research, your results may have broader significance in biological research. For example, my co-workers and I, 30 years ago, demonstrated that purified lipopolysaccharides obtained from periodontopathic bacteria stimulate osteoclastic bone resorption in bone organ culture. A spin-off from these results has been the now-common use of lipopolysaccharide as a positive control in bone organ culture experiments. Lipopolysaccharides have assumed this role because of their great stability. A significant down-side to research is that funding is not easy to obtain. One may suffer the pain of a highly negative "pink sheet" from an NIH Study Section.

Teaching can offer great satisfaction in providing an opportunity to help mold young minds. Making significant curricular change often becomes very difficult. In all likelihood, it will require curriculum committee approval and the significant cooperation of other faculty members.

In conclusion, I would like to admonish young people starting a career in dental scholarship and research that there may be many discouraging hurdles along the way. I suggest that when you get to one of those hurdles, don't give up right away: Cool it and jog. I retired from running marathons at age 63, but I continue to run half-marathons, 13 miles, at age 71.