1994 RAY K. LINSLEY AWARD

Citation

Donald Dean Adrian

It is my most distinct honor to be asked to present the Ray K. Linsley Award of the American Institute of Hydrology to a most worthy recipient, Dr. Joseph B. Franzini.

My viewpoint of Dr. Franzini reflects the 1950s and 1960s most closely, although years of experience and reflection since then certainly modify those views. Why start with the 1950s when we never even met until 1960?

We studied from the 1955 first edition of Elements of Hydraulic Engineering by Ray K. Linsley and Joseph B. Franzini. And, recall, this was in that era when we believed everything was right in America, and if we identified the problem, science and technology would develop a solution so that we and the world would be better off. And all college graduates of my era received several job offers. Most years the United States ran a trade and budget surplus. In other words, harbingers of a new era embodied in the now decaying slogans remembered from "The Free Speech Movement" and "Don't trust anyone over thirty," had yet to be invented.

So, as undergraduate engineering students we studied in the 1950s and we kept coming across books authored by Stanford University faculty members. Perhaps we studied statics, mechanics of materials, dynamics, and structures from books authored by Stephen Timoshenko and Donovan H. Young. We studied transportation engineering from Clark Oglesby's book, and engineering economics from Eugene Grant's book. Then came the water series: Fluid Mechanics by John Vennard, Engineering Hydrology by Ray K. Linsley, Max A. Kohler, and Joseph L. H. Paulhus. Elements of Hydraulic Engineering completed our water series of electives. Clearly, the student of my generation was influenced by the Civil Engineering Department at Stanford University, and felt they knew many of the faculty members, including Professors Linsley and Franzini.

Why had few civil engineering educators pursued the Ph.D. degree in previous years? What set the stage for Professor Franzini to serve as a mentor for a number of students, many of whom became future faculty members? My simplistic answer is that the training engineering students had been receiving for decades, education which had served them and the nation well, was called into question one day in 1957 with the successful launching by the Soviet Union of Sputnik. Sputnik, as I now must explain when talking to my students, was of course the first satellite to circle the earth. It shook the nation's complacency. It destroyed our sense of security. In engineering, it called for a reexamination of engineering education, bringing about a return to fundamentals. And it publicized the need for a more highly educated engineering workforce. Soon, sponsored research at universities grew. And many of us who were graduating in that era were encouraged to attend graduate school, a thought we had not entertained earlier. We were encouraged and frightened by the thought that in some way we might work with "electronic brains", a name that was in the process of evolving into "digital computers". And when we enrolled at Stanford we met many of the authors of our books.

Joseph Franzini enrolled in The California Institute of Technology where he earned the B.S. and the M.S. degrees in Civil Engineering. Graduating in the midst of World War II, he immediately followed college with Navy service. After the war, he enrolled at Stanford to pursue the Ph.D. degree. His dissertation was on flow in granular media. He continued on the Stanford faculty for 36 years, rising to Professor, and, for many years, Associate Head of Civil Engineering.

His teaching focused on hydraulic and water resources engineering, where he successfully integrated theory into practice. His courses were popular among both undergraduate and graduate students. I recall with special fondness a two quarter-hour course he originated and taught on sedimentation. The course drew from research literature and current practice. His lecturing ability was regarded highly. He synthesized complex material for us, and presented clear examples which applied theory and practice. We were left with the clear understanding that we had learned a lot about the subject, but not the last word. There was still a lot we could expect to pick up on our own in specialized areas, but we had the basis for doing so in an efficient manner. One of his teaching techniques was to use mid-term exams as an additional learning experience, not worrying if we students faced new material on the exam. We would be able to develop a fuller appreciation of the new material later in the course. But the final examination was focused on what we knew and what we learned. The term "grade inflation" had not yet been invented. We knew we were being judged fairly by Professor Franzini, so there was little complaint about the final grade.

Both Stanford and the California Board of Professional Engineering Registration encouraged faculty members to engage in engineering activities with consulting firms. Dr. Franzini's consulting was anchored in a 30-yr relationship with Nolte and Associates and he has been a consultant for numerous private and public organizations both in the U.S. and abroad.

Dr. Franzini's research work involved a broad spectrum of hydrology and surface-water problems. The work with which I am most familiar dealt with ground water flow and numerical modeling. He early recognized the importance of unsaturated flow in porous media in civil engineering. Previously, most descriptions of ground water flow looked upon it only from the viewpoint of saturated flow. People in agronomy and in petroleum engineering had looked at multiphase flow of liquid and gas in porous media, but this was barely mentioned in civil engineering outside of hydrology where there was some mention of flow in the vadose zone. And, of course, numerical modeling was in its infancy in all areas. The problems of unsaturated flow yielded slowly to development of experimental techniques which helped describe flow relationships. Numerical methods brought the nonlinear equations describing unsaturated flow to a useable conclusion. But there were numerous pitfalls along the way for the pioneer.

My special memories and appreciation of Joe Franzini is as a graduate student advisor and research director. The perspective of 30 years makes his qualities in these areas even more memorable. His typical graduate student advisees arrived with little post-baccalaureate engineering experience, which I now take for granted with my current older and more experienced graduate student advisees. So part of his task tried his patience as he had to "house break" us to such fundamentals as writing down our appointments with him so that we didn't forget them (here I confess with embarrassment that I was a slow learner). We also had growing pains, which he guided us through, of dividing our time between duties as a research assistant, teaching assistant, and a student. Also, in those days, we graduate students had little understanding of the life cycle of a research project from its genesis as a research proposal, through its conduct in the laboratories, its completion as a final report, and its afterlife in the scientific literature. Too many of us were, I fear, self centered, interested in our courses, dissertation research, and the job after graduation to give much thought to the project final report or the scientific literature. And many of us were single, in an era when one courted for a time, then married. So he had his travails on the waxing and waning of our academic interests as they responded to our social state.

In conclusion, we gather for this happy occasion when we reflect on the accomplishments of a giant in the field of hydrology. A giant most known as a teacher and a writer, who made landmark contributions in hydrologic research, and who translated results into engineering practice. His legacy lives on after his retirement through his books, some of which I haven't mentioned, and his influence on countless students.

Acceptance Speech **Joseph B. Franzini**

The computer has provided us with computational procedures that permit us to handle many problems that are impractical to solve by hand calculations. This has been a boon to our ability to, among other things, model the hydrologic cycle, perform intricate statistical analyses, and develop streamflow using stochastic processes. Though software has been developed to solve a multitude of hydrologic problems, the importance of judgement and experience has not diminished. Looking ahead, we must not lose sight of the importance of the fundamental relationships of hydrologic processes, nor permit them to suffer at the expense of "software that solves all problems."

[Ed. note: The Ray K. Linsley award was established by the American Institute of Hydrology in 1986. It is named in honor of Ray K. Linsley, a great leader in the hydrological sciences. The award is presented for a major contribution in the field of surface-water or engineering hydrology.]