

**Interview with Tom Connolly, Ph.D.**  
**Former Professor**  
**October 5, 1996**

**Interview conducted by Professor William Van Vorst**

**Van Vorst:** Tom let's start with some information about yourself—birthplace, education, whatever.

**Connolly:** Okay, birthplace was Syracuse, New York; I was born in 1923 to Irish immigrant parents, which certainly had some influence on my life. Also the Great Depression in 1929 came along when I was young and that had a great influence on my life. My education was all engineering. As I said, I was born in Syracuse, New York and I went to Syracuse University. It was the only place my parents could afford. I took chemical engineering and graduated in 1943.

But, as history will probably show, there was a World War going on about that time and so, although I started out as a good chemical engineer working in an oil refinery for Standard of Indiana. I was rather quickly drafted and after 17 weeks of vacation as an infantry trainee down in Alabama, I found myself sent to Ohio State University to what was then called an ASTP [Army Specialized Training Program] and from there I was transferred to the Special Engineer Detachment at Los Alamos, New Mexico where I spent sometime purifying uranium and I was part of the atomic bomb project, which came to a culmination in 1945 when our bomb worked, which was rather something of a surprise. Then I was rather quickly and happily discharged from the Army and resumed my chemical engineering training; I went to Carnegie Tech.

Primarily, as I remember it, there was an ex Standard Oil of Indiana engineer who was in charge of the department, a guy by the name of Carl Monrad and also [Warren] McCabe of the textbook—[Walter] Badger and McCabe, which was a popular chemical engineering text at that time. So, I got my master's degree, went back to Standard of Indiana in Whiting, Indiana but then having spent a couple of years in New Mexico, I decided that I vastly preferred the Western United States to the Eastern United States or particularly to the middle of the United States. So, I applied to California Institute of Technology and went there in Pasadena and got my Ph.D. and then felt with all that education I should get a job. Somebody told me they were hiring at UCLA.

One of my favorite stories is that I made an appointment to talk with Dean L.M.K. Boelter, but I didn't have a good picture as far as where UCLA was

and I ended up going to USC. [laughs] I wonder after being an hour late that Boelter ever hired me, but we had a very good interview and he did hire me. So, in 1950, effectively the first of July or the first of September, I don't know, I came to work here at UCLA under Boelter. Incidentally, when I use the word Boelter I am reminded of the biography of somebody who worked for Henry Ford and the title of the book is *We Never Called Him Henry* and I never called L.M.K. Boelter anything but Dean Boelter. Although, I think I heard a few people call him Lou, I never called him Lou.

Having been trained in what is still the traditional engineering type training with the breakdown into civil engineering, mechanical engineering, chemical engineering, electrical engineering, here I come over and find that Boelter had a rather different idea. Although I had never taught a course in what was called fluid mechanics—although there was some fluid mechanics in heat transfer and that sort of stuff in chemical engineering—I actually taught a course fortunately in fluid mechanics. I was thanking God that at least he didn't ask me to teach a course in electric circuitry. The thing that saved me there was the book was written by Jack Vennard—who later became a colleague at Stanford, in civil engineering at Stanford—and that was a very good textbook and I found it very easy to stay ahead one page ahead of the class. And so, I think I got away with fluid mechanics, but the students may not have had that same idea. Anyway, that is how I became connected with L.M.K. Boelter.

**Van Vorst:** Could you tell us a little more about your impressions of L.M.K. Boelter? How would you describe him, that sort of thing?

**Connolly:** Certainly he is one of the people in my life that I think of most frequently, that I had the greatest respect for. It was more a matter of respect. It wasn't buddy-buddy. When I went to the dean of engineering at Stanford—it was Joe Pettit—and I called him Joe from the first day. Even after he was president of Georgia Tech it was still Joe, and I think I have been on first name basis with everyone. So, Boelter was definitely one grade up on the influence. I totally bought his approach to engineering that there is no point in teaching circuitry just to electrical engineers or no point in fluid mechanics being taught in the different departments. When I went to Stanford, the fluid mechanics—chemical, civil, mechanical—they had a Friday meeting at the faculty club and they were there every Friday and their group sort of reinforced what Boelter was preaching. I am still a great believer in it, but I understand the problems of organization and, of course, the professional groups the AIChE [the American Institute of Chemical Engineers], ASME [the American Society of Mechanical Engineers], and so on, which add some turf to...

**Van Vorst:** And the industry, I guess, in many ways.

**Connolly:** I hadn't thought of that, maybe I don't have that much contact with industry. It could well be.

**Van Vorst:** I think that they were so used to hiring...

**Connolly:** Oh, yes, but whether they showed resistance to the organization that Boelter had instituted here I don't know. Clearly, when they came to interview why did they think in terms of the traditional names?

**Van Vorst:** Just going back to the early days again, you have alluded to this, but maybe you'd like to tell us a little more about your duties and responsibilities and contributions. In fact, maybe think a little about the campus in those days. What was the campus like then? Where was your office? What was the classroom situation? I think you came when it was still expanding.

**Connolly:** Well, when I came what is now called the Boelter building, although it was not called that at that time—this is 1950. My memory is that Boelter building was here, I could be wrong on that.

**Van Vorst:** I think it was what we now call Unit A or perhaps Unit One and it was built right on Westwood Boulevard.

**Connolly:** Right on Westwood Boulevard. There were some temporary buildings adjoining where some of the research people worked and so on, but I think the building number one, or whatever, had been completed. I believe my first office was in that building and it was very close to Boelter's office, the Dean's office, and one of the interesting things was that Ken Davis was here and he had started a course called "The Engineering Aspects of Nuclear Processes," which you'll notice did not say nuclear engineering, but studiously avoided that. I think it was course 155. So, Ken Davis left to go north to what became Livermore and it fell to me because I had been at Los Alamos and had some background to continue with this course, 155, "The Engineering Aspects of Nuclear Processes." So, that was one of the early things. I remember working with Chauncey Starr. In fact, Chauncey, I think may have given the course once or twice with my listening very carefully. See, I called Chauncey, Chauncey. [laughs] So, that was an interesting thing. There wasn't anything like a good textbook, and so putting together notes was an important part of that course and as I said it was one of my first experiences.

I remember—well, clearly I left in '59 so this must have been the mid-'50s—some people wanted to start a new society, which they were going to call the American Nuclear Society and I remember having some meetings here and Boelter resisted that with all of his political strength that he could bring to it. He wanted to make it a section of the chemical engineers, but the political or whatever you want to call it, or the philosophical drive to define

a new area of engineering called nuclear engineering. I am a professional engineer in nuclear engineering and the term persists. But, I do remember Boelter's efforts to resist that and to resist the proliferation of engineering branches, which developed their own approach to life and everything else. So, ask me a few more questions.

**Van Vorst:** How would you describe the work environment in those days?

**Connolly:** Okay, all I can say is that I enjoyed it very much. There's somebody at Stanford, Milt Van Dyke, whose father had been on the faculty, I think at the University of Illinois and when I was at Stanford I remember him saying, "I do not understand why there is such congeniality among the faculty here. When my father was teaching there were always arguments on the faculty." I have to say the Stanford engineering faculty gets along very well and I feel the same about UCLA. I enjoyed my colleagues, working with people like Wesley Orr and Martin Duke—they're both from a civil engineering background. I found the work environment—maybe I wasn't smart enough to be sensitive to conflicts and so on—but I found the work environment very good. My memory of it was that most faculty—I can remember somebody, [W. Delmar] Hershberger, is that right? who really wanted the classic...I think he was an electrical engineer. But, most of the people, most of the faculty at that time understood Boelter's concept and agreed with him in principle if they did not always feel it was always working out from an administrative point of view.

So, to answer your question I was enjoying the work environment here very, very well. Two things I do want to mention about Boelter was his feeling, a strong sense of feeling to the University of California from the whole institution and that was something that I just didn't have because I just walked in sort of cold, but I was always impressed by that. I remember how often he would communicate with Mike [Morrough] O'Brien who was the dean of engineering at Berkeley. How when, I believe it was at UC San Diego when another engineering department—I'm not sure they do have engineering—that he really wanted the whole University to teach engineering in some kind of a unified way. Exactly what he had on his mind I'm not quite sure, but I do remember some unhappiness on his part with the development at some of the other campuses in the way of engineering—engineering departments, administrations. So, he had both a unified engineering and a sort of unified university concept and I think he felt very strongly about that. He certainly sold me on it as far as engineering goes. I never had that feel for the University that he had.

**Van Vorst:** Interesting you mentioned that because I suddenly remember our discussing this a hundred years ago perhaps at a time when probably I was discouraged about promotion and I think Boelter's love was not only for the University, but for the Berkeley campus and we sort of agreed that we were wondering

about chances for advancement if you hadn't been with Boelter at Berkeley. [laughs] There was that bias.

**Connolly:** Definitely, I remember people like Myron Tribus and [Heinz] Poppendiek that he brought from there and again the people that I had the highest regard for, but I guess I didn't stay here long enough to get worried about whether I was promoted.

**Van Vorst:** I know you had a good opportunity at Stanford.

**Connolly:** Which does remind me of something also in Boelter's approach to things, and that was his concept of the university and particularly the university in engineering education and sort of a total commitment to the community. And one of the aspects of having this total commitment to the university meant that working engineers at McDonnell Douglas, I think it was just Douglas at that time in North America—meant that courses would be taught at night and this was 7:00 until 9:30. And I have to tell you, when I got through teaching a course, trying to get a week's lecture into a 7:00 to 9:30, I was really dog tired and I still had to drive over to the San Fernando Valley to get home. Fortunately, I never fell asleep on the way, but that was one of the more difficult things for me—it was one of the things that made Stanford very, very attractive. Stanford is a resident school for resident students and their commitment to the community of professional and practicing engineers is truly limited, Joe Pettit did install a television program by which we reached the working engineer, which was very well received, although I couldn't tell you what the status of it is today.

**Van Vorst:** Is this like receivers at Hewlett Packard or something like that?

**Connolly:** Yes, and with the two-way communication, the students can ask questions and it's been a long time since I taught in that format, but I did teach it. My impression is that Joe Pettit, when he was dean was much stronger on it than his successor. So, I'm not even sure what the status is on it today.

**Van Vorst:** That comes up and is talked about in glowing terms from time-to-time here, but somehow it never gets off the ground.

**Connolly:** Well, it would certainly be worthwhile, if anybody was interested in working on, it would be interesting, I think worthwhile to interview the people at Stanford who were most responsible for it because at its peak it was a major operation.

Another thing on the professionalism and Boelter's concern with it was that Boelter was in charge of making out the professional exam for chemical engineers and this can be checked, but subject to the record, I believe he held the first exam for professional chemical engineers...

**Van Vorst:** Yes, he had number one.

**Connolly:** He had number one. [laughs] Anyway, one of my chores, not extra curricular, but extra something, for a couple of years, maybe three years, I essentially made out the exam. I was always interested in talking with Boelter about the questions I had chosen and why, and so one and so forth. And, my big concern is, for the engineers in industry—the practicing engineers—that I was emphasizing something that only an academic would be concerned about, but we never did seem to get any big complaints

**Van Vorst:** No, I did a lot of that, too and I remember talking to Ken Davis one time with his experience with what's now Chevron and asking if we could get some practical questions because professional engineers did complain about the questions but they never made a big issue. They said the exam ought to reflect actual practice and of course that was ideal. But, Ken and I were working on this and one day he said, "You know, this isn't going to work because if I ask a practical question somebody at Chevron will have one answer and somebody at Shell is gonna have another and they both be right within their company policy." So, we never got very far with that and we went back to more academic type questions.

**Connolly:** But, I think the fact that Boelter assumed that role, I'm not aware, I haven't run into that at Stanford at all, the concern of the academics with the professional exams. There may be some, but I wouldn't know about it.

**Van Vorst:** Actually, I have the feeling that there's some professional organization now that writes exams for all of the states.

**Connolly:** My guess is that L.M.K. Boelter would not like that. [laughs]

**Van Vorst:** Well, think back again and tell more about your impression of the students in those early days.

**Connolly:** My impression first of the undergraduates was that they were very good and very well prepared. They were not difficult to teach. If I wanted to teach thermodynamics, fluid mechanics, or heat transfer—the group that I was dealing with was a very intelligent group and teaching them was not a chore, it was a pleasure. At Stanford my concern was—the admission of undergraduates is almost entirely a centralized operation, but the admission at the graduate level is very decentralized at the departmental level—for mechanical engineering, I had the responsibility of taking care of that for at least a decade or so. My impression is that Stanford simply gets a much higher cut than I recall us getting here in engineering at UCLA of the nation's student population that, judged by the school, the university, the grade point average, and their performance in the graduate record exam, had

a more qualified applicant pool than UCLA. My impression is it was generally simply higher, and that Stanford did better on NSF fellows, and, while they existed, the AEC fellowships in nuclear engineering, which were in existence through the '60s. Do you want to ask me some other slant on that same thing? Since I was not comparing equal things, I really cannot say how the graduate application population compares.

**Van Vorst:** I was going to say, you might want to compare it with Cal Tech, although since you were a student there at the time you'd have a different perspective.

**Connolly:** I think one of things that we have at the graduate level in mechanical engineering, anyway, when we admit and we do not get an acceptance—particularly if we offer monetary...a fellowship, assistantship or whatever. We usually find out where the student did indeed go and I'd say we think we're just a wash with MIT, Princeton, and Cal Tech. That is about the competition and if we lose, we lose. Oh, and don't forget Berkeley—Berkeley's very strong competition. Which would lead me to ask, you don't have to answer this, but how do UCLA and Berkeley compare now in the quality of their graduate students?

**Van Vorst:** I really don't have a good feeling for that. I know we lose some students to Berkeley, I don't know if they lose any to us. Well, the early days are so much fun to dwell on. I wonder do you have any sort of unforgettable types you remember who were around in those days? You mentioned Myron Tribus, Wendell Mason was still very active...

**Connolly:** Wendell Mason, of course, he was one of the first people from Berkeley brought down here. Am I factually correct on that?

**Van Vorst:** Yes, Boelter didn't bring him down, but he came down and was a fixture in the pre-engineering program.

**Connolly:** If there is any one that stands out it was Boelter. [laughs]

**Van Vorst:** Was John Miles still here when you came here?

**Connolly:** John Miles was here, yes indeed.

**Van Vorst:** He had a great career in the university but at San Diego. And Tom Hicks?

**Connolly:** Yes, Tom Hicks was here. In fact Tom Hicks came here a year or two after I did. John Miles was certainly a force on the faculty, very strong and he was a great fluid mechanic as I recall. I hope I don't insult anybody, but I can remember a large number of them when you mention their names.

**Van Vorst:** Well, I suppose I could open it up and let you tell us some things that stand out in your memory—most extraordinary, most interesting.

**Connolly:** I think it's probably too bad that Boelter's concept of engineering and its unity as a profession does not seem to have taken hold, at least that's my impression. I think as professionals, engineers simply do not have the political power and are not able to make the influence on policy matters involving engineering that would perhaps come if engineers collectively were a more unified force. The professional engineers, who cut across the board, do seem to have quite an organization, but again I don't see that they have much influence on policy, and to have influence on policy one must have political power. I don't know that changing the organization of engineering education and indeed engineering practice would change that.

**Van Vorst:** Someone, I forget who—we used to argue about this and discuss this. We like to think of ourselves as a profession, but we'll just never have the professional relation with our clients that say the doctors and lawyers have when their clients are individuals. I can't help but think that that's a very basic difference. That's not to say we are not professionals, but it's a different ball game to say the least. You were here about nine to 10 years?

**Connolly:** From 1950 to 1959.

**Van Vorst:** Did we pass any milestones during those years?

**Connolly:** I hate to say no, but. [laughs]

**Van Vorst:** We didn't get the reactor during that time, or did we?

**Connolly:** No, although it was a very active thing. That's very interesting because Hicks worked on a great deal of the proposals for it and all of the discussions and so on. I think I do recall being in a meeting at the University's architect office in which the bids first came in. I think it led to AMF getting the bid and that must have been 1959. I would guess that the thing was built in the very early 1960s. But, Tom Hicks pretty much had the responsibility for that. Of course I went to Stanford and found one already built, but it is like the reactor here, it is now gone.

**Van Vorst:** Did you have campus political opposition there?

**Connolly:** Not inside the campus, other than financially. Teaching nuclear engineering was a financial loser and [Fred] Terman was very sensitive to the financial situation. So, there was no battle to save it.

**Van Vorst:** Well, Tom this has been very much fun for me and we really appreciate you coming down and talking to us.

**Connolly:** One thing that I would express very, very definitely and even if I am not able to articulate it very well, Boelter had a tremendous influence on my life. I don't think that a week goes by that I don't have some reason associate his thinking with something and I really can't say that about anybody else in my professional life.

**Van Vorst:** I think that's kind of a recurring theme that all of us share from those early days. I feel almost sorry for those who came later and didn't have that experience. [laughs] Thank you again.

**Connolly:** You're very welcome.