



**Interview with The Honorable W. Kenneth Davis
Former Professor
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Interview conducted by Professor William Van Vorst

Van Vorst: Ken, let's start with some information about you—birthplace, education, present or last position.

Davis: Well, I was born in Seattle, Washington some 77 years ago, and I went to UC Berkeley for two and half years as a chemistry major and transferred to MIT where I spent two years as an undergraduate and another three years as a graduate student and got my master's degree. At that particular time, we just had gotten into World War II.

Van Vorst: I am wondering how you chose UC Berkeley.

Davis: Because I lived about a mile from it. I was born in Seattle, but I lived nearly all my life in Berkeley, California. So, I knew the area and it was a nice walk to the campus.

Van Vorst: I guess there wasn't much chemical engineering at Berkeley in those days.

Davis: This is part of a story. I took chemistry, which is very good, but my advisor at Berkeley told me that I should try to get a job at Standard Oil in a laboratory, but I didn't want that. So, I decided to transfer to MIT and take chemical engineering. There is a connection though, and that is my father went to the University of California and one of his very good friends was Llewellyn Boelter. So, when I started talking about chemical engineering, Boelter was teaching a mechanical engineering course in the mechanical engineering department, which had a lot of chemical engineering in it. In fact, Boelter was very much interested in chemical engineering and I think if there had been a

chemical engineering department in those days he would have been the chief supporter. The problem was that G.N. Louis in the College of Chemistry believed that a good chemist could do anything that a chemical engineer could do. So, that was the end of that story. Anyway, I had known Boelter through my father and I had talked to him at some length before I decided to go to MIT. Boelter would have been happy to have me come and be a chemical or mechanical engineer. But, that wasn't what I was looking for.

Van Vorst: Well, after you graduated from MIT, you went to work with Standard [Oil] of Cal or Cal Research?

Davis: Yes, I went to work for Standard [Oil] of California, what's now called Chevron Research Corporation. The work was mainly on process design and engineering for oil refineries. Also, I got involved in quite a bit of development work on the synthetic rubber. So, we finished up the development and designed a plant in El Segundo, which I was partly responsible for, and then we built a 100-octane aviation gasoline plant on it.

Van Vorst: Then you were with Ford, Bacon & Davis?

Davis: I worked for Standard from about 1942 to 1947. A friend of mine who used to work with me in the process design department had gotten a job with Ford, Bacon & Davis and they were starting a big project in Chicago building a new laboratory for the brand new Atomic Energy Commission. Ford, Bacon & Davis had the contract to build that laboratory. So, Charlie persuaded me to leave Standard and go to work for Ford, Bacon & Davis. So, I spent a couple years in Chicago working on the design of what's now Argonne National Laboratory in Chicago.

Van Vorst: You came to UCLA after that?

Davis: Yes. Ford, Bacon & Davis got into a big row with the University of Chicago and the scope of their work got reduced very sharply. So, I decided to leave Ford, Bacon & Davis. Also, I wanted to take my daughter to a better climate. Anyway, Boelter got a hold of me and offered me a job as associate professor to install some chemical engineering and nuclear engineering into the curriculum, and I decided to come here.

Before we get back to UCLA I would like to mention something. My former associates at Standard Oil Company in the research department had taken a contract with the Atomic Energy Commission to carry out a very large project. So, I was talked into taking a leave of absence from UCLA for about a year and went to help set up a new research and development department for a subsidiary of what then was California Research Corporation—this is now California Research Development Corporation. Their project dealt with radiation and the work had originally been started in Berkeley and my department needed to develop some laboratories to do what we were trying to do. So, we finally took

over some old airport in Livermore and I moved my team there and built some laboratories and buildings that are still in use. So, that was the birth of Livermore Laboratory. But, the consequence was that I stayed there for three years rather than one, and Boelter called me and said “You’d better come back or leave.” And he promoted me to full professorship. [laughs]

Van Vorst: Yes, I remember. You were the youngest full professor at the University of California.

Davis: At that time, that’s what they told me and I think Boelter did it to prove he could do it because I hadn’t published any papers and I didn’t have a doctor’s degree. [laughs]

Van Vorst: All of those add a lot of distinction to the position. Maybe we could follow-up a little and I’ll let you tell me more about your impression of Dean Boelter and your feelings about him.

Davis: Well, Boelter had an idea that didn’t work out for reasons, which became apparent when things got to a larger scale. But, Boelter wanted to have degrees in engineering and I was a professor of engineering and there was no mechanical and so on. So, we tried to divide things up so they would make some sense. But, that was a mess. Boelter insisted that engineering was engineering and he was happy to offer engineering courses in chemical and mechanical engineering, which Bill and I were involved in. It was a lot of fun. One of the characteristics of Boelter was that he would write a memo in which he would say, “I think it would be a good idea if you taught a graduate seminar in thermodynamics this fall. No reply is necessary unless you are unable to do so.” [laughs]

Van Vorst: Yes, I remember that.

Davis: I only turned him down once. He wanted me to teach an upper division course in electrical engineering and I said, “No, way.” So, we taught new courses in chemical engineering and we taught some courses in nuclear design work because I had gotten interested in that through the time I had spent in Chicago. But, we had a small staff and I was involved in recruiting and setting up extension courses in places like Bakersfield. I think [Professor] Sam Yuster and I were involved in this together, but he was ambitious. I would say that he made excellent progress, but the problem was that there was a lack of organization. Boelter was in charge and nobody else was in charge of anything. But, I remember I was on the executive committee and that was the closest thing that we had to an organization. We told Boelter that we needed to have a committee on organizing the department of engineering. Boelter said, “I will appoint a committee to consider organizing the department of engineering.” And, two years later, he still hadn’t appointed a committee. [laughs]

Van Vorst: I once heard Boelter referred to by Bill Young in chemistry as master at opportune foot dragging.

Davis: Boelter was a smart guy and we had a lot of good courses and we had a lot of students. Despite the lack of structure, which was mainly because of Boelter's personality, we eventually did have people who were in charge of laboratory courses and operations and kept struggling with some other way of dividing up the responsibilities. But the basic problem was that nobody came up with a bright idea which would allow you to do that and would be consistent, which was a unified engineering. So, we were growing rapidly and we were getting a lot of new people that were teaching courses that were never taught before and inventing them as we went along and I think a lot of good things were done, which I think were very useful to the department, but it was a real struggle trying to see how one could organize a department of engineering without damaging the existing establishment. The problem is that we have all the professional societies organized by chemical, mechanical, and other departments. Everybody was on this side of the track and Boelter was trying to be on a different one.

Van Vorst: I think the industry had trouble accepting the lack of classical branches.

Davis: Yeah, that was another problem, too. The industry didn't know if we were electrical, mechanical, or other.

Van Vorst: True, the interesting thing is that the records of those graduates were pretty outstanding, but of course you could always raise the question that they were more mature because of their war background. We had an outstanding contribution from that group. It always worried Boelter that they might go into management. But they all started running companies and other things.

Davis: Well, I think there is some relationship with what Boelter was trying to do and what happens to a lot of engineers—particularly chemical engineers. One of the great virtues of chemical engineers was the considerable variety of courses that they took. I remember taking surveying at MIT, several courses in civil, electrical and mathematics. The curriculum that most schools were using for chemical engineering, in addition to having a lot of chemistry and physics, had a lot of different kinds of engineering. So, the chemical engineers almost uniquely were able to do a lot of things that more or less specialized engineering students were not able to do. A lot of chemical engineers gravitated toward nuclear fields. Many people in the nuclear business in the early days were chemical engineers.

Van Vorst: Didn't you start the nuclear engineering courses here?

Davis: Yes, I started one and developed some more before I took a leave of absence to go to Chicago. I would say that by and large the students—both in graduate and undergraduate—did extremely well and a lot of the former members of the faculty did very well in industry and in the academic world.

Van Vorst: Do you remember where your office was?

Davis: Well, kind of, I think it was in the Mechanics Building.

Van Vorst: I think we were having trouble getting labs really going.

Davis: Yes, we really didn't have adequate laboratories and it was a long time before we built some here. But, overall, I think it was a very good start and it was a real experience here. I mentioned that Boelter invited me to give a graduate seminar in thermodynamics and I ended up taking some courses in that field, but I still didn't think that I understood thermodynamics. So, I was very nervous about teaching this graduate seminar and I think that it went very well and I got a feeling, after taking all those thermodynamics classes, that I finally understood thermodynamics. It was an interesting experience and Boelter pushed me into it.

Van Vorst: Yes, he was good in doing that. Do you have any feelings for the campus?

Davis: I thought it was a very nice campus. I think it was very pleasant. It wasn't in downtown Los Angeles. It was in a remote part of the city and I liked living and working there. If I hadn't been pressured to take the job with California Research and Development Corporation, I would have stayed here longer. Of course, the upshot of that was that I didn't go back when my appointment basically had expired after my leave of absence. I did go to work for a subsidiary of Standard Oil Company and after three years there I tried to persuade my boss to let me go back and work for the Atomic Energy Commission in the division of reactor development and he suggested that I should do it. So, I was on a leave of absence from Standard. [laughs] I went back there for one year, which ended up being five years.

Van Vorst: I am wondering if you could describe the campus environment and the support we had here.

Davis: My feeling was that we had a lot of support and my guess is that Boelter picked people who shared his ideologies and knew him and I can't recall any major dissatisfaction among the faculty. I think there were times when they were frustrated, but they were enthusiastic about what they were doing and they recognized that they had an opportunity to establish one of the major engineering schools in the country, which it indeed has become. So, I would say that there was a spirit of enthusiasm and cooperation and we also got along very well with Boelter, but he would push us to our brinks. [laughs]

Van Vorst: I remember there wasn't any lack of responsibility, but never very much authority; we all had to decentralize.

Davis: Boelter had an idea about what a school of engineering ought to be like and he was enthused about it. I think a lot of people back then were enthused about it. As time went on, it became obvious that there were some problems that needed immediate attention—unless you could find something to organize that met the requirements of operating an organization.

Van Vorst: I find it hard to articulate, but I have memories of an intellectual climate and I was wondering if you could comment on that?

Davis: Oh yeah, there were a lot of bright guys here and I spent a lot of time talking to great variety of people and I would say it was challenging time, at least for me. I have to say I never have been so busy in terms of hours per week before or since. [laughs]

Van Vorst: I think I am in that club too. [laughs]

Davis: But, the atmosphere was pretty free and open. You could find yourself talking with somebody who was involved in civil engineering about something that you were mutually interested in and so on. I remember Louis Pipes, who was one of the people who we had working in the office. He was a mathematician and I always enjoyed talking to him. He was a very bright guy. I remember he embarked on a project figuring out how the telephone company's signaling worked. He figured out some of the mathematics of the dialing system and he was one of the first people I know of who had figured the system. He could call anywhere in the world for free. [laughs] He didn't do it frequently, but he would do it to demonstrate that it could be done. It was a mathematical exercise to him, but he scrambled what was a closely held secret by the telephone company. We tended to interact with people in other fields of activity just out of mutual interest and friendship and it made for a much broader thing for the faculty because we would find ourselves mixed with a faculty, which was relatively small. We were very well acquainted and never felt any restraints about talking to other people about various things. So, I look back on that as a very positive thing.

Van Vorst: We talked a little about the students, but I am wondering if you could compare the maturity of the students—those then to those now?

Davis: Well, because of the war we received an older and consequently a more mature student body. I think the average age was a couple of years higher than what it is now today and there were a lot of bright ones too.

Van Vorst: Who were some of the unforgettable people of those days?

Davis: I remember Jack Frankel. He was a civil engineer by background, but you could hardly tell it by what he was interested in. He was interested in anything that came along. Bob Bromberg is another one and I have seen him on few occasions. For a while, I came on campus and gave lectures.

Van Vorst: Heinz Poppendiek was another memorable individual. Do you remember?

Davis: Yes, he was another bright guy. I haven't heard from him in a very long time.

Van Vorst: Boelter brought him down along with Bromberg and Tribus from Berkeley. Moving on, do you have any fond memories that we haven't mentioned that stand out in your memory?

Davis: Well, I was getting ready to attain my Ph.D. at MIT, but World War II started and I took a master's degree and left, but Boelter later offered to let me to go back to MIT and get my doctorate and compose a thesis. So, I wrote a letter to the chemical engineering department and the head of the department, I forgot his name, wrote a letter saying "What for?" [laughs] He said, "You're an associate professor at the University of California and you have other accomplishments. Unless you want to be called 'doctor' you shouldn't pursue it." So, I showed the letter to Boelter and he laughed at it and said, "That's the end of that subject." [laughs] I think Boelter had an idea that was the answer I was going to get.

Van Vorst: Let's go back to your career after you left UCLA.

Davis: I went to the Atomic Energy Commission, which was fairly new at that time. As you know, the agency was founded in 1946 and I went there in 1954. So, it was still in its early years. Anyway, they wanted me to be the assistant director of the Reactor Development Division, which had been primarily formed to find a home for Captain [Hyman G.] Rickover. [laughs] So, the Reactor Development Division consisted primarily of the Naval Reactor Branch and they merged the Division of Engineering and the Reactor Development Division.

As we go back to some of the work that Rickover had sponsored at UCLA, we know that he was a pain in the neck. Later, I became the director for four years during which time we had our fun with Rickover and, in theory, Rickover worked for me. [laughs] Then we formed the Air Craft Nuclear Propulsion Group and we formed the Armory Reactor Branch and we formed the Civil Reactor Branch. In about five years, we had a very large operation. Much of the technologies that are successful around the world today were in fact developed by Rickover and his staff, but we had a big shake up in 1958 and I left. Then I went to work for Bechtel and officially retired in 1981 when I found myself an employee of the government again.

Again, I found myself Rickover's boss. [laughs] Interesting to note, I was one of the people involved in his elimination from the Atomic Energy Commission. People there agreed that he getting was too old. There were also other problems as well. One of the problems was that he had developed such a good thing that he was afraid to change it. So, he didn't want to try new ideas to the extent that he probably should have. We had a briefing from our friends in the intelligence agency about the performance of the Russian submarines and Rickover said, "That's impossible." [Laughs.] So, it was that kind of thing.

But, he did not retire too gracefully it turned out. They had negotiated with Rickover for him to retire and keep an office in the Pentagon and be on staff. [John] Lehman took Rickover to see the president, as a gesture. Anyway, they

go to see Reagan, and Rickover proceeds to tell the president exactly what is wrong with the Department of Energy and the Navy. I got a call the next morning from Lehman, the Secretary of the Navy, saying that his plans had changed regarding the retirement of Rickover. I said, "What happened?" And he told me what had happened. He said that Reagan said, "Get rid of that son of a..." [laughs] So, he ended up without his office and all of the things that they were going to give him.

Van Vorst: I hadn't heard that story. I don't think many people have.

Davis: The other part is that I got a call from Jim McClure and Senator Jackson [from Washington], and they wanted to talk to me about Rickover's retirement. He was a strong supporter of Rickover. So, I went to Washington D.C. and had a meeting with Senator Warner, McClure, and "Scoop" Jackson and they said, "We believe it is time for him to retire, but we don't think it was done very nicely." [laughs] They gave me a little lecture, and I told them that this was part of the feedback from his visit to President Reagan. They were going to do a lot of things for him, but they had changed their mind after his visit to the White House. Anyway, that turned out to be nothing. He was one of the real characters. He was trying to design submarines and he wanted data, but the problem was that he wanted to get it yesterday. He didn't appreciate that the university people perceived the project mainly as research rather than data collection. He went with the numbers.

Van Vorst: I was wondering if you could recall any milestones.

Davis: Well, I wasn't here long enough to reach any milestones.

Van Vorst: That's true, although you have kept up an interest in the department. We always appreciated that. I remember you had an important role in getting the nuclear reactor.

Davis: Yes, I have always been interested in that and I knew Chauncey Starr pretty well when he was the dean, but I think these were the people who were quite sympathetic to many of Boelter's ideas and that was helpful. They didn't try to undo what he had done. I think the department was fortunate to get somebody like Chauncey. I think one of the big milestones was the building of Boelter Hall, which was the nicest building on campus, at least during the time I was there. [laughs] When I was there, we were in the development phase and getting people. I think Boelter was very good at pushing people to work hard. He also pushed us to find good people and he felt that he had a group who had good judgment. We had remarkably little trouble getting people hired.

Van Vorst: And, I think he supported his people very well. I have in mind some of the incidents with Louis Pipes in the early days, but Boelter was 100 percent supportive.

Davis: Yes, he was very supportive and if you had a question he would try to give the best answer in a very thorough and organized manner. He had things mapped out and planned and he knew the university system very well and knew how to use it effectively. He was also highly regarded in the university. Anyhow, going back to UCLA, when I went to work at Livermore I got some of the fellows there to come and work at the university.

Van Vorst: That was very good for us. You sent us Tom Hicks—that was certainly a plus.

Davis: That was an interesting project. It was born in the days when the theory was that the United States didn't have any significant amounts of natural uranium and so, therefore, the problem was to convert the uranium that the United States had into plutonium and the person in charge of this was Ernest Lawrence, who later won a Nobel Prize for the project. He proposed to do this using an accelerator, and bombard uranium, which produced a lot of neutrons, which you could then capture to make plutonium. My job was to develop and design and build targets. But, the project folded, and Berkeley took over the project later on.

Van Vorst: Can you comment on Boelter's relationship with the rest of the faculty?

Davis: I think of Boelter as being involved in lots of things and I know that he had some contacts with the School of Medicine. My impression from talking to some of the other deans was that they had high regard for him and were sympathetic with Boelter's cause, although I think they were unhappy that he was taking so much money.

Van Vorst: I think so too. Recently I was on a committee with [Stafford L.] Warren. When he heard I was from engineering his face kind of lit up. He said he was always so glad to have someone from engineering because engineering seemed to be the only school that appreciated the problems he had in building these buildings and the physical things. All the other people just expected things to happen overnight and have a full-blown medical school. He had to go through designing all the facilities and engineering seemed to be the only place where he got any appreciation.

I think Boelter and Warren had a mutual respect and had a good friendship. I have an interesting story about Boelter and Warren. They had been working on a nominee for some committee in the Academic Senate. Warren suggested somebody and Boelter suggested that engineering would support that. The only trouble was that he had neglected to pass the word around, so in the meeting where the recommendation was supposed to take place, William J. King got up and made a speech and nominated Craig Taylor. He was very popular and got elected and I think Boelter later explained that to Warren. Anyway, going back to our discussion, would you like me to maybe mention some names and have you say something about them?

Davis: Sure.

Van Vorst: Do you remember John Miles?

Davis: Yes, what happened to him?

Van Vorst: He went to the University of San Diego, primarily in oceanography at Scripps. He was actually Vice Chancellor at San Diego for a while. He was primarily a mathematician, and got interested in waves. The next thing I knew, there were papers coming out on waves and mathematical generations of waves and he had partnered with somebody in England and they wrote the papers together.

Davis: Of all the people in the department, he could take any topic and push it into five different papers.

Van Vorst: He caught on early to the game and he really played it well.

Davis: He was a real artist and he'd take something substantive and manufacture a series of papers whereas most people would only write one paper. [laughs] He would divide the topic into segments and would discuss each part in a separate paper. He also liked to go to the beach and that's probably how he got into studying waves. I remember one day there was somebody waiting to see him and John jumped out the window to avoid the person who was waiting for him. [laughs] We were on the first floor; I think it was our friend Libby [chemistry professor Willard F. Libby].

Van Vorst: Did you work with Libby?

Davis: I knew Libby pretty well. We used to go to the same church. He was an old friend. When he became a member of the Atomic Energy Commission he summoned me up to his office and he said, "Ken, I want one thing clearly understood." He said, "You are the Director of Reactor Development and I am a member of the Atomic Energy Commission. Thank you." [laughs]

Van Vorst: Wow!

Davis: He was strange. He was a great proponent of using nuclear weapons to make a harbor and he pushed this idea to have an experiment and I think he pushed very well and there was a place in Alaska where they were going to apply his theory and there was a commission meeting in which the consensus was that the idea was revolutionary and great, but why would one want to build a harbor? [laughs] That was about the last time we heard of that subject. Going back to UCLA, they have always preserved a somewhat unique organization, which I guess, is a by-product of Boelter's early days.

Van Vorst: Yes, that's true. Well, thank you Ken, for your time.

Davis: It was a pleasure.