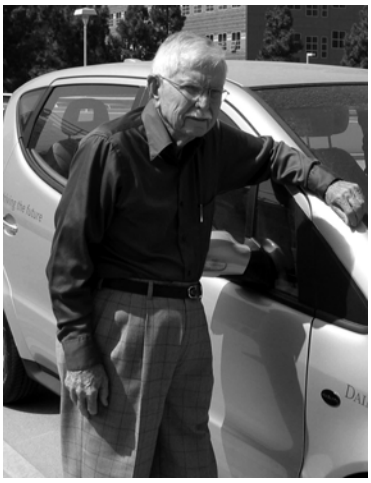

Interview with William Van Vorst, Ph.D.
Professor Emeritus
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Interview conducted by Professor Russell O'Neill

O'Neill: Bill, you're one of the early members of the faculty here. What brought you to the College of Engineering and when did you come?

Van Vorst: Well, I came in 1946. I remember that, and I'll go into just a little detail of my path here. I graduated from Rice in the early '40s and then went to MIT and then came west to work at Northrop on jet propulsion projects and then went over to North American to broaden my work a little and got into more general missiles and engine development. While I was there, especially as the War was drawing to a close—World War II—I noticed people were getting hired and being put in a superior positions relative to mine, though I was spending all my time telling them what we should be doing and I got to wondering about this a little bit. Turned out that the reason they were put over me was because they had something called a Ph.D. So, of course, the solution became pretty obvious—to get a Ph.D.

Coincidentally, with that, Myron Tribus and, I think, Heinz Poppendiek, maybe Bob Bromberg, were doing some consulting for North American and I learned they were from UCLA and that engineering was getting started here and that Boelter had come down to get things going at the graduate level. So talking to Myron, he suggested I come over and talk to [L.M.K.] Boelter. I did that and Boelter invited me to join the group, which I did. Although I started out just for the Ph.D., somehow I never left after I got it.

O'Neill: Before you met Boelter did you know about him? Had you read any of his papers?

Van Vorst: Well, I knew about the Dittus-Boelter equation and heat transfer, which I had learned under [William H.] McAdams, interestingly enough at MIT. Although,

I've heard some implications of rivalry between McAdams and Boelter, I know for a fact that McAdams was a great admirer of Boelter. I'd heard of him then and then once again while at North American. He had been prominent in the AIChE [the American Institute of Chemical Engineers] meeting, San Francisco, I think, in the heat transfer session. So, I knew about him and when I heard he had come here it made that much more attractive for me to try to get my degree here.

O'Neill: What was your impression of him when you first met?

Van Vorst: Well, I am trying to search my memory. I remember the eyebrows as most people do; I remember his covering matters that were obviously of interest to me. He told me his ideas on engineering education, early on, said he would welcome my contribution to that. He arranged for me to have a faculty appointment that would permit me to also be a candidate for a degree. I believe at that time we still had the instructor appointment and that gave you two years to study toward a degree. It took me a little more than that. He arranged a lecturer title so that I could continue. So, my overall impression, I know, was one of complete integrity and interest in the development of the people he had around him—just 600 percent favorable impression.

O'Neill: As an instructor, were your duties solely teaching?

Van Vorst: No, not solely, really. Although, that was certainly the main commitment. I was primarily in the thermodynamics area, but then I got to developing courses along the lines of chemical engineering, unit operations, mass transfer, and the laboratories. Boelter wanted chemical engineering representation in the laboratory program and I worked on that and also participated a little bit in the design of Unit A [west wing of Engineering 1]. I imagine many people on our faculty today don't know that that building was designed with chemical engineering very much in mind. There used to be a bay area so that we could put high column type chemical engineering equipment and span two floors there. We even designed wells, rectangular wells, in the floors in most of the rooms, one over the other, covered them with steel plate so that if we wanted to put in the super high column, we could go the whole four stories going up through those steel plates. So, I had a nice broad responsibility. I think I learned a lot beside the course content that I was teaching.

O'Neill: What was your impression of the post-World War II student body?

Van Vorst: That was interesting because we were all of an age so to speak. It was a good group to start with because they were serious. They had come back because they wanted to and it was challenging to me, maybe more than it was to them. But, I enjoyed it, and in fact, I made many friendships that continue to this day.

O'Neill: Our first permanent building was not ready for occupancy until 1950. Where were your classes before that?

Van Vorst: Mostly in the old chemistry building [Haines Hall]. My office was in the basement of that building and there were a lot of steam pipes running around. Kept us warm and hissed at us a little bit, but we made do. Classes were indeed in the chemistry building and in the first physics building for the most part. And interestingly enough, now that you mentioned our first building, you know there was really quite a controversy about the appearance of that building. It did not follow the Byzantine-type architecture that Royce Hall, the library, and other buildings had and I've heard that the only reason it was approved was that it was going to be so far away from the center of the campus that people probably wouldn't notice it. But again, maybe we were a little ahead of the time; I notice other buildings closer to the center of the campus now do not continue the Byzantine thesis either.

O'Neill: In spite of the fact that your offices were in the chemistry building and other faculty may have been in other buildings, and all that, how would you describe the work environment and the spirit then?

Van Vorst: I think it was pretty collegial. The spirit was largely one of cooperation. You're right about being spread out from building to building. I remember when I first came, I was taken down to the mechanics art building to talk with Professor [Wendell] Mason and that seemed an awfully long way. In fact it was a little effort to go back and forth. But, in general, I remember the spirit very fondly. We were pretty much intrigued with the unified curriculum concept; Craig Taylor's research project was one of the early ones. It was a human heat tolerance project. At least, it covered human heat tolerance as much as other things—started engineering thinking about life systems other than non-life systems. It was a great time.

O'Neill: MIT was, and still is, one of the premier schools of engineering in the country. You made the move from MIT to UCLA. What did you think of the intellectual environment here?

Van Vorst: Well, it was quite stimulating. Of course, I was really closer to the intellectual environment here than I had been at MIT. In a sense, simply due to the difference in the faculty status here and the student status at MIT. But, when you were around Boelter there was no question about intellectual environment. That's another impression I retained. One of real intellectual, oh gosh, almost an intellectual giant in a sense. His holding his own in discussions varying across the board.

O'Neill: There was also a war in between, but what about the students at MIT and, I guess Rice as well, and UCLA?

Van Vorst: Well, the students at Rice, I guess it's harder for me to characterize because I was right in there. Right in the middle, we were a pretty intense group. And Rice was pretty well known for chemical engineering at the time. I guess we thought we were pretty good. Probably thought we were better than we were. But, chemical

engineering was a very demanding program at Rice and I tried to play in the band as well, so I had long days, nights. Probably the hardest work of any of my student days until I started teaching while I was still a student. MIT was definitely feeling the effects of the war. Almost all the research had been converted into wartime activity. Faculty members were members of the War Production Board and various scientific committees and groups that were formed. So, that, in a sense, there wasn't the spirit around MIT at that time. Students were pretty much on their own. It wasn't, I didn't anyway, have the feeling of belonging to a group the way I had at other places.

O'Neill: What did you think about the campus itself? The general campus other than engineering at UCLA?

Van Vorst: At UCLA? Oh, I was amazed. It was certainly the largest school I had ever come to, although at that time it was about 10,000 students. I thought the buildings were beautiful. I thought the mix was interesting, so I thought those graduate student days were great.

O'Neill: Going back to those years, what stands out in your memory?

Van Vorst: In the early days?

O'NEIL: Well, engineering and what caught your interest and what did you think of as being sort of extraordinary here?

Van Vorst: Well, I have to think a little about the university then and now and especially engineering then and now. The thought that comes to mind is kind of a precursor to my comments, to remind us that service played an important role in the university mores at that time. And Boelter's mind especially was one of outreach to the professional community. You'll remember we had off-campus programs. I happened to be associated with one at the Naval Ordnance Test Station at China Lake. Even spent an academic year there as a resident representative of UCLA and I found that very interesting.

O'NEIL: Would you expand on that a little bit on some details about that program?

Van Vorst: Well, that was a program that allowed people at the station, Naval Ordnance Test Station, civilians for the most part working for the Navy, to earn their degrees at UCLA. UCLA sent instructors to the station and also utilized personnel at the station. The station at that time was very, oh gosh, what shall I say, consisted of some outstanding people. Unfortunately, I can't think of names at this moment. But, I know one of the directors went on to become head of the National Bureau of Standards Research Labs in Colorado. Some of the students have gone on to do outstanding work. And there was a problem, I now realize, probably with the Western Association of Schools and Colleges accreditation procedures that were concerned about universities operating programs off campus more nominally than

actually. I know that is still a concern today and so, Boelter wanted to have faculty, regular faculty members, in residence at China Lake—advising the students, talking to them about their programs, planning the programs, deciding what courses should be given and making it really as campus like as possible. China Lake was a good place to do that because the Michaelson Laboratories was among the outstanding research facilities in the country at that time. So, it was really a good synergistic endeavor and worked very well until what I consider a trend against that sort of service developed, not just at UCLA, but nationwide in universities.

O'Neill: I remember that you also spent some time in Indonesia. Tell us about that project.

Van Vorst: That again, I think, is under the service banner. I should preface my thoughts on that, I think, by mentioning that after the China Lake duty, I took a sabbatical and went to the Philippines. There I became quite interested in, what should I say, international engineering education. I was at the University of the Philippines under the sponsorship of Stanford University and learned a lot about foreign policy and foreign activities. There was a point as to whether or not UCLA might be interested in a project in Indonesia. As it turned out it didn't.

O'Neill: Okay.

Van Vorst: But, there was no follow up on that. There was talk about my going to Indonesia and making a recommendation, but the idea itself didn't go away. In fact, there was kind of a grand design of having the Berkeley campus be of assistance in Bandung, Indonesia and UCLA sponsoring or helping the University of Gadjah Mada in Yogyakarta. Berkeley did not, was not interested in that project. It went to the University of Kentucky, but we did accept the University of Gadjah Mada affiliation and I was quite active in that—helping to draw up contracts. In fact, we gained some distinction as being rather independent and forcing some changes on the part of the United States Agency for International Development at that time.

O'Neill: This was the time when...?

Van Vorst: This was Sukarno's time. In fact, Sukarno visited UCLA's campus and was just a completely charming person. So much is said against him, it is hard to imagine that, but Sukarno was actually, I don't know if I can say fine person, but a very interesting person and a very dedicated person to Indonesia. We didn't have contacts with him directly, though we did have very good contacts with the Ministry of Education. We faced, again this business of do you operate a program nominally or actually. Many universities were criticized for hiring people not associated with the university. And we had to do some of that, but we made a very real effort to have our own faculty go and several people did go. We kept our project fairly small. I don't think we ever had more that twelve people there at one time.

O'Neill: What was the goal of the project?

Van Vorst: The goal of the project was to help the University of Gadjah Mada develop its Colleges of Science and Engineering—they were separate. Gadjah Mada was regarded as the Indonesian university. The others, the University of Indonesia was formed under the Dutch Administration, so was the Bandung Institute of Technology. But, Gadjah Mada was the Indonesian university and they wanted to develop an outstanding program in engineering and science. Their heritage, of course, was the Dutch system and human nature being as it is, there was quite a bit of resistance to changing to the American system. But, as an interesting side light, when I visited Holland on my home leave, I learned that they were adapting, adopting and adapting, the American system. So when I went back to Indonesia, I spread that information around and we had a lot more success. But, the goal was to develop outstanding laboratory facilities, modern curriculum in the several branches of engineering, and to get them started on research programs. I've gone back several times as a consultant to what they now call their second university development program. And I'm really very pleased; there is definite evidence that we did something good and I think it was really a good thing to do and we made a difference and a good contribution.

O'Neill: Your mention of curricula brings up this next question. You came from schools that had strong chemical engineering programs that were based on departments. When you came to UCLA there was a unified curriculum. How did you put together the chemical engineering and the unified curriculum?

Van Vorst: Well, first I welcomed the unified curriculum because although I'd only had three or four years industrial experience, I had learned that there was nothing that said a chemical engineer couldn't do what most of the people might think of a mechanical engineer doing and vice versa. So, with that I thought that it made sense to have a unified curriculum at the undergraduate level and then have the graduate years for specialization. But, as for the direct relation of chemical engineering to the unified curriculum, actually I used to kid Boelter a little bit and I said, "Why don't you just make everybody take chemical engineering, that will be your unified curriculum?" On good days he would laugh at that and I really just found no problem. The one question, of course, is the amount of chemistry required and that was the hardest of the branches to fit in to the unified curriculum. By fit in I mean to cover the fundamentals and I talked to Boelter about this because I, despite what other people thought, I knew he respected chemistry as an important discipline. His answer, unfortunately, not terribly realistic, but basically very sound was that we didn't need courses in chemistry so much as the discipline of chemistry in all the other courses, which we were never able to accomplish—although I think some of the material science people are coming close. But, back to your question, I had no problem being a chemical engineer and fitting in with the unified curriculum.

O'Neill: You also became involved with some projects, like the hydrogen car and all that. Did that grow out of the chemical engineering or out of mechanical engineering or out of unified engineering?

Van Vorst: Maybe out of desperation! I had been on an extended leave to Robert College of Istanbul and came back looking for something to do and our late colleague, Al Bush, had sponsored the hydrogen car project. That had come out of the growing concern about the contribution of auto emissions to pollution of the atmosphere. And, as Al told it, some of the students were interested in entering what was called an Urban Vehicle Design Contest—a nationwide contest. They wanted to emphasize the possibility of minimizing noxious emissions. And one of them, I suspect Frank Lynch, had the bright idea of saying, "Why don't we use a fuel that's not going to generate any noxious emissions?"—which means hydrogen. And they apparently had trouble finding a sponsor, but as we remember Al Bush we know he was game to take on just about anything. He took on this project and the students developed the hydrogen car, entered it in the contest, won first prize. This was all pretty much a university project, university funded, plus donations that the students were able to get from various companies. When I came back the project was growing and Al asked if I would get into it. And I told him I didn't know a lot about engines, but I guess, given my chemical engineering background, I knew a pretty good bit about hydrogen, so we made a pretty good team and were able to get some support from Department of Transportation and the United States Postal Service from their research funds and continued the project.

O'Neill: What was Al Bush's background?

Van Vorst: Al had been a civil engineer; but he then had gotten into public health and had a master's in public health from Harvard. His really major interest would now be wonderfully appropriate. He kind of fought a losing battle while he was here, but he was a high, high level of what was then called sanitary or sanitation engineering. This would now be called environmental. He would have a field day—many of the things he talked about are in use today.

O'Neill: Did any of the students in that hydrogen project go on to work in industry?

Van Vorst: Yes, Yes! I've kept contact as best I can. Frank Lynch is probably the most outstanding person in the country for adapting vehicles to hydrogen. Joe Feingold was a leader on the project, but he's forsaken engineering for business now and is with Hewlett Packard in their marketing department. Ned Baker was one of the early group and also worked more directly with me on the Postal Service contract and he's with NASA at Langley Field now and rumor has it that he's still working on hydrogen for the space plane, but it is classified information.

O'Neill: You say rumor. Are you in contact with him?

Van Vorst: Not directly. I'm in contact with Frank Lynch who is in contact with him. In fact, Frank and Ned formed a small company for a while called Hydrogen Consultants and Frank still operates that. Ned, as I say, has left. Carl McCarley was another student that worked on the hydrogen car, started out from the chemical engineering standpoint on the combustion, but then he just discovered his real knack was for electronics and got into controls, went on to get his Ph.D. and now is on the faculty at [California State Polytechnic University] San Luis Obispo.

O'Neill: We've jumped around in those early years, what jumps to your mind when you think of that? What have we not covered in those early years?

Van Vorst: Well, I think we've done pretty well, really. The one thing I might mention was the Engineering Executive Program. And I don't know whether to call that service or not, but that was a great example of Boelter seeing a need and moving to satisfy it. His thought was that engineers should be engineering management types or that engineering management should be engineers. He conceived of a program where practicing engineers would come back to the campus for, say one day a week in a concentrated period of six hours, and cover the essentials of management—the human relations aspect, the modern communications aspect, and keep up with the technology. There was quite a bit of opposition on campus, I know by reading some of the early committee reports, but he did see it through. I was in the group that put on the first program and again it was a remarkable group of students. When I saw that first group, I knew that Boelter was right because these guys were just as bright as they could be. They all had at least five years of experience and they were serious about their work and I thought they did an excellent job. Soon after that I had pretty much decided to go to Indonesia, so I didn't get to follow it up. But, the program was about twenty years ahead of its time, as I judge it now, and had all the difficulties of being ahead of its time. But again, I think its something UCLA did with some distinction and deserves a lot of credit for. Other than that, or along with that, not other than that, the Engineering Executive Program, the China Lake programs, our Indonesia project, and our hydrogen car project— I thought were all great things to do and be a part of.

O'Neill: As a chemical engineer, when you first came here did you try to start up a student chapter of the AIChE?

Van Vorst: We didn't get that far. What we did when we started the Engineering Society of UCLA, we had sub-groups and we had a chemical engineering group along with the mechanical, electrical, and civil. The problem was getting professional society, the American Institute of Chemical Engineers, in our case, to recognize the group. They had a very firm policy that they could recognize chapters, student chapters, only when the university had an accredited program in chemical engineering—accredited by what was then the ECPD [Engineering Council for Professional Development]. So, we couldn't have a real chapter going, but we did have a group going and we did some things. We visited, primarily visited, chemical operations and plants.

O'Neill: Do you remember the first ECPD accreditation?

Van Vorst: I do, I do. We, unfortunately, dealt with people who just couldn't understand what we were trying to do with the unified curriculum. It was a little disenchanting, though I thought we came back pretty strong when Boelter, apparently, made his case that we deserved people on the accreditation visit that could understand our ambition and…maybe you can help me with the name of the fellow from Purdue who was so influential in engineering education at that time?

O'Neill: George Hawkins.

Van Vorst: George Hawkins. He helped a lot, I think, in getting our next team together and we got accredited. Boelter got the greatest kick out of telling people that we were probably the only university in the country that had every program it had accredited—every one that wasn't so essential. Incidentally, I'll mention one other thing that just comes back to mind. My activity—more than UCLA's. As you remember, Boelter was very active in the registration of professional engineers and he lobbied a lot, testified a lot, got the [Professinal Engineers] Act amended to include mechanical, chemical, and electrical engineers.

O'Neill: Include these in addition to what?

Van Vorst: Civil. The original Act was civil—registration of civil engineers and land surveyors. That Act was then expanded to include registration of chemical engineers, mechanicals, and electrical. Boelter became the chemical engineer member of the board and had to rule on all the applications of chemical engineers who wanted registration. Of course, he couldn't do all that personally and called on me to do that.

O'Neill: Was this during the grandfathering phase?

Van Vorst: This was indeed the grandfathering phase, but then he continued on the board for quite a while. Before long, we were not only ruling on whether the applications were acceptable, but making up the examinations, grading them, doing an awful lot of work to further the professional recognition of chemical engineers.

O'Neill: We've covered a lot of ground. I just wonder if you have something else?

Van Vorst: It's hard to pick things. You're sort of inundated with memories of what, 40 years, I guess.

O'Neill: What sort of changes, perhaps, I mean over the 40 years?

Van Vorst: Well, certainly growth with accompanying growing pains. And I think here the changes are not just at UCLA, but also in engineering education nationwide. We've seen the emphasis on research and on scientific component of engineering,

perhaps at the expense of design and operations. But, I think, in general, the experience at UCLA has been one of steady growth, steady expansion, development, and again I think we can say, those early days laid a good foundation for what's come. As for the disappearance of the unified curriculum, again I think probably it was 50 years ahead of its time. Industry probably just isn't ready for it and it just kind of outgrew itself or the engineering program outgrew the unified curriculum.

O'Neill: Of the faculty that were here in those early years, for say, 20 years, who are the ones that are still outstanding in your mind?

Van Vorst: Well, certainly Myron Tribus. I worked very closely with Myron. He was not only very bright, but a very hard worker. That combination is almost inspirational in some way and very discouraging in others. Myron is still going strong as we know. I still think of Heinz Poppendiek quite a bit, though he didn't stay with the university and went on to develop his own business in the San Diego area. Bob Bromberg, of course, went on to be a vice president for Research and Development at Ramo-Wooldridge. George Sines still is on the faculty.

O'Neill: What about Bill Seyer? He was one of our early chemical engineers.

Van Vorst: That's right. Well, there's an interesting story about Bill. He was at the University of British Columbia and I don't know the whole the story, I'm sure, but he came down for a visit and talked to Boelter and Boelter talked to him there. The word we had was that he would not be joining us—sort of a mutual agreement. He thought he'd just stay at British Columbia and suddenly one Monday morning he was in Boelter's office and said that he had decided he would come. So that sent us scurrying around, but luckily Boelter still had control of the appointment and was able to make it and Seyer was a very interesting person, an awfully nice person. He didn't have the, what should I say, the mathematical component of engineering that we were developing, but he sure had the chemistry component of chemical engineering. That helped him, I think, get his graduate program started very expeditiously. Ken Nobe, of course, [who] was one his students, has become an outstanding contributor to UCLA. Another person we might mention was Ken Davis who came in the early days. A chemical engineer and he, too, was quite favorable to the unified curriculum and worked very hard at it, including the chemical engineering disciplines. Of course, Ken has gone on to become, well, he was head of the Reactor Development Division in the Department of Energy, and vice president for Bechtel Power Corporation, then the deputy secretary for the Department of Energy in the early days of the Reagan Administration before he found out how difficult it was for a honest, conscientious engineer to survive in the political environment in Washington and left after a couple of years. We've seen some outstanding people on this faculty.

O'Neill: Would you consider Sam Yuster a chemical engineer?

Van Vorst: Sam was almost a chemical engineer, but he was in petroleum engineering and the way chemical engineers and petroleum engineers divide up the petroleum business, of course, is that the petroleum engineers are interested in getting oil out of the ground. Chemical engineers are interested in refining it for consumer use. But, that was great for me that Sam came because it turned out my thesis interest was in drying porous media and that fit right in with Sam's background in petroleum reservoir technology and he was my thesis sponsor and I'm still indebted to him, not only for the thesis, but for learning a lot about great human beings from Sam. He was just an outstanding person.

O'Neill: Was Joe McCutchan a chemical engineer?

Van Vorst: Joe McCutchan was a chemical engineer, from Arkansas, and again, he was heavier on the chemistry side, but he became heavy on the engineering side here working with Boelter.

O'Neill: Then there were other chemical engineers—Tom Hicks, Tom Connolly.

Van Vorst: Right, Tom Connolly has just retired from Stanford after heading up their nuclear program. Tom Hicks had an interesting story. He worked at Berkeley during the War with Glenn Seaborg. As you know, they have real powerhouses there. Tom decided he should get a degree and Glenn asked him what it should be in and he said chemical engineering. At that time, Berkeley didn't have a chemical engineering program, but Tom got his doctorate in chemical engineering.

O'Neill: Well, how about a final recollection?

Van Vorst: I hadn't really thought. I thought of some individual things to talk about, but I must say I don't have any grand and glorious conclusion—except that, I think for me, its been a outstanding experience and despite temptations from time to time, I'm pretty sure I've been right where I should be, with UCLA and with UCLA education in engineering.

O'Neill: Thanks very much, Bill.