

Donald J. Cram

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Don Cram was definitely old school. Eccentric. Hard driven. Strong-willed. Spirited. Fearless. I was asked to provide personal reflections of Don Cram. I am sure these remembrances will bring back related memories to all who knew Don. But first, a brief background on DJC.

Biography

Donald J. Cram did his undergraduate work at Rollins College, Florida, and obtained an MS at the University of Nebraska in 1942. He earned a PhD in 1947 from Harvard University over a period of 18 months. He joined the faculty of the University of California, Los Angeles in 1947.

From his Nobel Address (<http://nobelprize.org>):

“I have contributed directly to the teaching of organic chemistry—about 12 000 undergraduate students—and, indirectly, by writing three textbooks: *Organic Chemistry* (with G. S. Hammond; translated into twelve languages), *Elements of Organic Chemistry* (with D. H. Richards and G. S. Hammond; three translations), and *Essence of Organic Chemistry* (with J. M. Cram; one translation), plus the monograph, *Fundamentals of Carbanion Chemistry* (one translation). I enjoy skiing and surfboarding, playing tennis,

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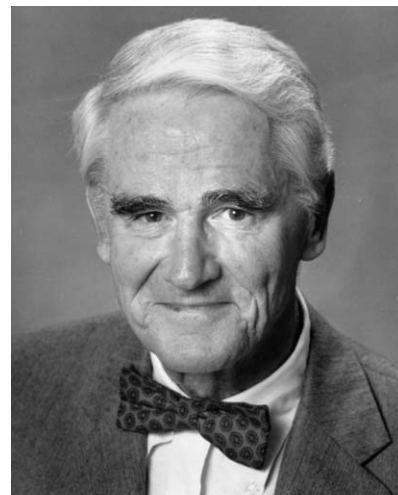
John C. Sherman was born in New York in 1961, obtained a BA from Haverford College, PA, in 1983, and a PhD from the University of California, Los Angeles (with DJC), in 1988. After postdoctoral studies in the labs of E. T. Kaiser (Rockefeller University) and N. R. Kallenbach (New York University), he began as an Assistant Professor at the University of British Columbia in 1991. He has been a Professor of Chemistry at UBC since 2001. He has been awarded the Merck Frosst Centre for Therapeutic Research Award by the Chemical Society of Canada, and was made a Fellow of the Canadian Institute for Chemistry in 2001. His research interests include study of encapsulation, de novo proteins, and most recently synthetic G-quartets.

and playing the guitar as an accompaniment to my singing folk songs.

“My fellow scientists have generously honored my research program with three American Chemical Society awards: for Creative Work in Synthetic Organic Chemistry; the Arthur C. Cope Award for Distinguished Achievement in Organic Chemistry; and the Roger Adams Award in Organic Chemistry. Local sections of the same society awarded me the Willard Gibbs and Tolman Medals. I was elected to membership in the National Academy of Science (1961), to become the 1974 California Scientist of the Year, and the 1976 Chemistry Lecturer and Medallist of the Royal Institute of Chemistry (UK). In 1977, I was given an Honorary Doctor's degree from Sweden's Uppsala University, and in 1983 a similar one from the University of Southern California.”

Cram worked on reactive intermediates including both carbocations and carbanions, stereochemistry including Cram's Rule, cyclophanes, and then host-guest chemistry. I was a graduate student in his labs in the 1980s in the midst of the host-guest period, at the

time when his interests were in transition from ionophores to carcerands.



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Don Cram's character and philosophies in his own words and by my recollections

“My mother, steeped in English literature, cultivated incentive by reading to me only the beginnings of tales that involved heroes, heroines, hypocrites, and villains. When we reached the exciting part, she left me with the story to finish by myself.” (<http://nobelprize.org>)

Don was nothing if not enthusiastic. His motivational skills were subtle and as natural and powerful as the breaking waves he surfed. No matter that you may have had some bad news, research or otherwise, no matter that he may have been suffering through the shingles, he'd find a positive spin. He was a master at turning things around. If you were down, he would not encourage you directly, but his undying optimism and his enjoyment of the process as much as the results would lift you. He'd tell a story about a

former co-worker, colleague, or friend, one who was beaten down by adversity. It'd be a long and colorful story. You'd be skeptical at first, but at last you'd be taken in. You'd wonder if the story was even true, but you'd realize that it didn't matter. You'd start feeling a strong sense of wanting to root for the underdog, urge the guy never to quit, to keep his chin up, if only you could have been there to help out. Then you'd realize that you were that guy, and you knew you had to find a way. He didn't push you or expect more from you, he'd get you to push yourself and expect more from yourself.

"According to my oldest sister, Elizabeth, I was as a child precocious, curious, and constantly in, or causing, trouble." (<http://nobelprize.org>)

"Elementary schooling for me was a series of multiclass single-room buildings, where the young and very young witnessed each other being taught. On report card days, I faced searching questions and criticism during which "character grades" were stressed over academic accomplishments. I usually was marked "A" in attitude and accomplishment, "B" in effort, and "C" in obedience." (<http://nobelprize.org>)

"When the word "research" entered my vocabulary, it had a magic ring, suggesting the search for new phenomena. Chemical research became my god, and the conducting of it, my act of prayer, from 1938 to the present. When told by my first college chemistry professor, Dr Guy Waddington, that he thought I would make a good industrial investigator—but probably not a good academic one—I determined upon an academic research career in chemistry." (<http://nobelprize.org>)

"This is largely the methodology I've used throughout my career—that is, starting with a question as to what might be the properties of a set of compounds that could be invented which were unusual and unpredictable. Many times I've felt a bit like Columbus setting sail." (www.brainyquote.com)

Don was a shameless master of clichés and sayings. He had a banner "engage in overkill" above his blackboard. He referred to himself as "legend in my own mind." He talked of "reasoning by analogy" with great profundity.

For Don, research was a quest, and the process was a journey through an

unknown land. He liked nothing more than talking about research. As he valued all resources, especially people, he enjoyed being stimulated and stimulating others. You never knew where ideas would come from. If you were presenting your research to him, and he got that glazed look on his face, that didn't mean he was bored to death, it meant you said something that sent his thinking off in a new direction. I could sit silently for minutes until he came back, and he usually had something unusual to report from his brief journey, even if it wasn't relevant to my recent topic. He always had his mind open for such idea expeditions. As a graduate student, when I failed to make compound X after numerous attempts, often getting compound Y and in good yield, he sat thinking for a long time. I waited with folded arms thinking, let's see him figure this one out. I've considered every angle and we can't stop Y from forming. But it turned out all he was pondering was, what can we do with compound Y?

Press as many buttons as you can. It was common to go many months without meeting with Don when you worked in his labs. After my first few months of research, I met with him and told him that I spent several months trying to make my target compound. I finally gave up after convincing myself it was unstable. And I then succeeded in making a more stable analog in a matter of weeks. I said, "maybe I should have met with you sooner. You probably would have told me to switch targets earlier." He said "No, but I would have suggested you try to make both from the start." Lesson: Get as many plates spinning as you can handle. And keep testing how many you can handle.

Figuring out how to work well with Don was an art in itself. I soon learned the game, or at least my take on it. He'd encourage you on everything; he'd never say quit. He didn't like talking about quitting on a project. Some poor folks would stick with an unpromising project for their entire tenure. But it was not because he had bad judgment. He would push an idea on you hard, but he expected you to be very skeptical of it. He expected you to research it, both in the library and shopping it around the senior members of the group, especially

sage Roger Helgesen. But he'd never tell you to do so. Much was left unsaid, between the lines. You had to find your way, and he would be an advisor, a consultant, and at times, if necessary, an adversary.

Don prided himself on being single-minded. It took me a while to realize he meant this as a good thing. He said when he was younger he knew he could be a good father or a good researcher, but not both. So he decided not to have kids. I had a meeting with him one day in 1986. It was election day. I asked him if he had voted. "Nah" he said, "who's running?" "Well, Cranston for one," I said. "Who's that?" he asked. Alan Cranston was a Senator of California from 1969–1993 (there are only two Senators per state). DJC had his mind on other things. After all, he did win the Nobel Prize one year later.

Don was subtle in his judgments. He judged you by how you dealt with adversity. By how well you used resources, especially people. He watched the way you played with CPK models: did you really dig into them or did you just give them the once over? Anyone who ever met Don in his office was struck by the body language. He sat with his feet up on his desk amidst a smattering of CPK models. At some point he'd be describing one and he'd hold it out in such a way, toward you, but pointing to it with that crazed smile, that you never knew if he meant you to take it or just admire it from his hands. I still wonder.

Don was easy-going and made you feel at ease, but sometimes there was a reality check. I was chatting with him while I was visiting UCLA in 1998 (myself then a recently tenured professor). He asked how my group was doing and I remarked proudly that one of my first students was now a postdoc at Harvard with George Whitesides. He said, "That's great! You know, I tried to hire George once." I began to feel my pseudo peer-like relationship with him begin to slip back into my more familiar junior status as our relative "stature" with respect to Whitesides was becoming apparent. "Really? You mean back in 1982 when he moved to Harvard?" I replied with all the glibness I could muster. 1982 was before I was even a graduate student, but I tried to sound like it was in our mutual

recent past. “No,” he said, “when he started out.” Meaning in 1963. Cram was a national force while I was still in diapers. Actually, long before that.

Don had an uncanny talent on his feet. And, although many people were in awe of him, some found him to be uninformed, confused, and slow. Yet few people who spent time with Don did not at some point find their jaw drop as he responded to a question you thought he had no clue about. I recall going to Caltech with a bunch of the Cram group shortly after he won the Nobel Prize, in late 1987 or early 1988 (toward the end of my graduate tenure) to see him give a seminar. It was the first seminar he had given on carcerands, and this included some of my work. I was struck by how unfamiliar he seemed to be about the details of the work. He was asked some tough questions, ones I would have had trouble answering, even with all the details at the ready. And yet

he managed to answer the questions better than I could have (even if I weren't intimidated by the venue). Despite a lack of details, he had a depth of knowledge that was staggering, and he had a good number of ways of dealing with more balls being thrown at him to juggle. He could answer a different question. He could tell a story. He could cite old literature in detail and leave you to make the connection. He could challenge you to come up with a better explanation. And he always had the glint in his eye and the easy smile that said you can't hurt me because I find this interesting and so do you, and what could be more fun than that!

For lectures by Donald J. Cram that reflect his philosophies, see: www.chem.ucla.edu/research/org/CRAM/Cram_index.html

For monographs and reviews of Donald J. Cram's work in his own words, see:

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