Biographies

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In addition to biographies, this department publishes autobiographies, memoirs, brief obituaries, and extended obituaries, called eloges. Each is intended to celebrate a life. They should be discursive but concise, learned and anecdotal, touching and informative, and occasionally imbued with compassionate humor. Naturally, they should include a thoughtful summation of the subject's life and virtue, as well as — where applicable — the cause of death. Unsigned items are the work of the editor.

We want these works to provide a mosaic of the social history of computing that will prove valuable and informative to future scholars. Thus, subjects are not limited to the famous but may commemorate the activities of lesser known participants in computing history. Indeed, the obituaries in particular are not limited to people but may record the demise of organizations, computers, software, and significant concepts.

Readers are invited to submit additional comments concerning already published material, to write signed items for publication, and to suggest subjects that should be memorialized.

Calvin Mooers (1919-1994)

Born October 24, 1919, in Minneapolis, Minn.; died December 1, 1994, in Cambridge, Mass.

Education: BA in mathematics, University of Minnesota, 1941; MS in mathematics, Massachusetts Institute of Technology, 1948.

Professional activities: After graduating from the University of Minnesota, Calvin Mooers joined the Naval Ordnance Laboratory (NOL), where he worked until 1946. He left NOL for graduate study at MIT, where in 1948, as a student, he developed Zatocoding, a system for information retrieval. He formed Zator Company to market Zatocoding and conduct research. Mooers transferred most of Zator's research activities to Rockford Research Inc., a nonprofit research institute he founded in the early 1960s. Mooers developed and formally defined the Text Reckoning and Compiling (TRAC) language in 1964. He played an influential role in the formulation and adoption of ASCII and later became a vigorous advocate for copyright protection of software. Mooers developed TRAC-II in the early 1980s and continued to be active professionally.

Awards: In 1978 Mooers received the American Society for Information Science's Award of Merit for his pioneering work in the field of information retrieval.

OBITUARIES

Calvin Mooers was born on October 24, 1919, and died on December 1, 1994, of a heart attack. He conducted research on the development and use of information retrieval systems and created the Text Reckoning and Compiling (TRAC) programming language, "which was designed specifically to handle unstructured text in an interactive mode, i.e., by a person typing directly into a computer."[1]

Mooers became interested in mathematics from his involvement with amateur radio and through the encouragement of Viola Marti, his high school mathematics teacher. While he was still a high school student, his teacher introduced him to the mathematics professors at the University of Minnesota. They encouraged Mooers' abilities, and after three years at the university, he began taking graduate courses in mathematics and physics. In the spring of 1941, Professor Lynn H. Rumbaugh, from whom Mooers had taken theoretical physics, recruited him to join the Naval Ordnance Laboratory (NOL) as a physicist, where he worked on degaussing (the protection of ships against magnetic mines). While at NOL he met Charlotte Davis from the Acoustic Division. They married in 1945 and their union continued for 49 years until his death. At the end of World War II, NOL reorganized and Mooers became part of NOL's newly created Computer Division, where he worked under John Vincent Atanasoff.[2]

Frustrated by his belief that "we were just not getting anywhere at NOL in our computer project," Mooers left NOL in 1946 for graduate school at MIT, hoping to capitalize on his computing experience. He set out to explore the use of digital processes and mathematics to impose control on the technical reports then flooding out of government laboratories. At MIT, Mooers discussed his ideas with James W. Perry, a chemist interested in indexing and finding chemical information. Perry arranged at an American Chemical Society meeting for Mooers to present his ideas on the development of a machine capable of Boolean searching. In his paper, Mooers advocated that chemists should be involved in the development of

such a machine.[3]

His research led him to invent Zatocoding,[4] which he described as

> a complete system. In terms of contemporary lingo, . . . [i]t was non-electronic, which equals mechanical; it was digital; it would be called a knowledge-based system; it was a selector device (you didn't pick the cards out by hand); it was automatic, in other words, a motor drove it; and it exploited the Zatocoding technique, which can be characterized as selection based upon fuzzy sets.

Zatocoding used a series of specially notched cards. Each notch was a descriptor representing information in the document to which that card referred. Mooers later commented that Zatocoding

> antagonized librarians . . . I was describing an operation which [replaced] live human librarians. . . . This was contrary to their vitalistic idea. They believed you had to have a living human brain to perform such a selection. Yet, I was trying to demonstrate that you could do it mechanically. I did it, and it worked!

To develop practical applications for Zatocoding and market them, Mooers formed the Zator Company with his brother Howard in 1947. "After a year and half it was clear that it [Zatocoding] would not be an overnight success, . . . so we parted amicably." Mooers remained in Cambridge, conducting information retrieval research and marketing Zatocoding until the mid-1960s, when he again turned his professional attention to computers. Much later, the American Society for Information Science (ASIS) recognized Mooers' pioneering efforts in information retrieval, a term he had coined, when it presented him with its Award of Merit in 1978.

During the 1950s and early 1960s, Mooers conducted a number of information retrieval studies for government agencies. Raymond J. Solomonoff joined Zator Company in 1957, adding artificial intelligence to its research capabilities, and Zator received one of the first federal grants for artificial intelligence research from the Air Force Office of Scientific Research. In 1959, Mooers began to develop the Text Reckoning and Compiling (TRAC) language. He founded the Rockford Research Institute, a nonprofit corporation, in the early 1960s to facilitate his and Solomonoff's grant-funded research.

In 1964, Mooers defined TRAC. Jean Sammet, in her *Programming Languages: History and Fundamentals*, noted that

> TRAC has combined concepts of LISP, COMIT, and macro facilities in a very unusual way. . . . The basic concept in TRAC is that a program consists of strings containing sequences of functions which can be nested indefinitely deeply. Evaluations of these proceed from the innermost level outward, and from left to right within a level, to cause the execution of a program. Furthermore, since the executable statements are treated in the same way as a general character string, a procedure can act upon itself as well as other executable statements, thus giving completely general self-referencing capabilities.[1]

Mooers hired L. Peter Deutsch to program TRAC on a PDP-1 at Bolt, Beranek and Newman (BBN) and submitted a descriptive account to *Communications of the ACM* in 1965. He recalled,

> the editors, when it came in, evidently were amazed since they had never heard of me. Of course they hadn't heard of me. I hadn't talked about programming languages. I wasn't one of the "big names." So I came in with this finished piece of work, and they sent two of their big wheels out to look me over. One of them was Carlos Christensen and the other was Robert Floyd, a big wheel in parsing programming languages. They came to visit me at the office to find out who this guy Mooers was and how come they'd never heard of him. I brought them into the office and took them into the back room and turned on the teletype and we were in remote communications — with a remote computer at BBN on which TRAC was running and I demonstrated it. So they were all ready to deflate a hoax! Quite different was the fact of the matter. So my paper was published.[5]

Mooers tried to make a commercial success out of TRAC and found "there were no rights in computer software, the ideas were 'foreign.' There was the belief in the legal profession that neither copyright nor patent would apply." Although he tried to protect TRAC as a trademark and service mark, "TRAC probably became the most widely bootlegged computer intellectual property that existed . . . the first issue of *Dr. Dobb's Journal*, one of the early publications in the personal computer field, has a vitriolic editorial against Mooers and his rapacity in trying to charge people for his computing language." Mooers' advocacy of protecting the intellectual property of software included a brief exchange of ideas with Bill Gates. Mooers later worked with Thorpe Wright and Andy Diamond at the firm Data Concepts on the application of TRAC to write insurance policies. After using TRAC to complete a policy-writing program named SIMPL!E, Data Concepts declared bankruptcy before it could realize commercial success.

After his work with Data Concepts, Mooers spent time "reformulating . . . the whole TRAC methodology" and defined TRAC-II in 1983. Franco Vitaliano "got very interested in the intellectual achievement . . . of TRAC-II and he thought he could commercialize it. . . . Franco was able to catch the attention of many people, but was not really able to sell it." Mooers and Vitaliano parted ways after several years, and Mooers continued to develop TRAC-II. He used it as the basis for developing a system he demonstrated at BBN for paging through documents via Telnet, similar to the capabilities later exploited with Gopher; but, as his wife Charlotte commented, "this, again, was a situation where there was a window of

opportunity that wasn't taken."

In the 1990s, Mooers explored using TRAC-II in combination with object-oriented programming on personal computers and remained an active participant in the field.

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Author's note: All quotations, except as noted, are from the Calvin N. and Charlotte D. Mooers oral history interview, June 22, 1993, OH 254, Charles Babbage Institute.[6] Calvin Mooers' papers (CBI 81) are also available at the Charles Babbage Institute.

References

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2. C.N. Mooers, "Atanasoff at the Naval Ordnance Laboratory," *IEEE Annals Hist. Comp.*, Vol. 15, No. 2, 1993, pp. 54-55.

3. C.N. Mooers, "The Zator-A Proposal: A Machine for Complete Documentation," 1947, reprinted with preface as Zator Technical Bulletin No. 65, 1951.

4. C.N. Mooers, "Putting Probability to Work in Coding Punched Cards: Zatocoding," Zator Technical Bulletin No. 10, 1947, reprinted as Zator Technical Bulletin No. 30, 1950.

5. C.N. Mooers, "TRAC, a Procedure-Describing Language for the Reactive Typewriter," *Comm. ACM*, Vol. 9, No. 8, 1966, pp. 215-219.

6. C.N. Mooers and C.D. Mooers, Calvin N. and Charlotte D. Mooers oral history interview, June 22, 1993, OH 254, Charles Babbage Institute.

Commodore Corporation, the innovative computer industry pioneer that gave the world the PET, the VIC-20, the Commodore 64, and the Amiga, finally died, possibly a suicide, in 1994 at the age of 30 after a long period of illness brought on by self-neglect. Its achievements have been largely forgotten.

Founded in 1954 as a typewriter repair service by Auschwitz survivor Jack Tramiel, Commodore followed Tramiel's power-to-the-people slogan, "Computers for the masses, not the classes," and, years before there were any PC clones, produced computers that anyone could afford. Tramiel, an aggressive businessman who seemed to love price wars, created the expectation among those in the then-tiny desktop computer market that computers should keep getting cheaper and better. In spite of the carping question "What are these toys good for?" Commodore introduced millions of well-to-do young adults to personal computing.

In 1977 the Commodore PET (Personal Electronic Transactor), designed by Chuck Peddle, stood with the Apple II and the Tandy TRS-80 as one of the first three ready-to-run, off-the-shelf personal computers and established Commodore as a major vendor. The PET, a bargain at $795, had a built-in monitor, a tape drive, and a trapezoidal case.

The VIC-20 (1981) was the first color computer under $300. Its production hit 9,000 units per day — a phenomenal rate then and still enviable today.

Commodore's high point was the Amiga 1000, so far ahead of its time that few appreciated it.

The Commodore 64 (1982) is said to be the best-selling computer model of all time, with estimated sales between 17 and 22 million, more than all the Macs put together and dwarfing IBM's best-selling PC and AT. It was the first to have a synthesizer chip (Bob Yannes' Sound Interface Device). The SX-64 (1983) was the first color portable, and the Plus/4 (1984) had integrated software in ROM.

Commodore's high point was the Amiga 1000 (1985), so far ahead of its time that few appreciated it. This first multimedia computer was derided as a game machine because few grasped the importance of advanced graphics, sound, and video. It could display 4,096 colors and had custom chips for accelerated video; built-in video outputs for TVs and VCRs; four-voice, sampled stereo sound; and it was the first computer with built-in speech and text-to-speech conversion. It is still the only system that can display multiple screens at different resolutions on a single monitor. Its operating system, designed by Carl Sassenrath, had preemptive multitasking, messaging, scripting, a GUI, and multitasking command-line consoles. All this was in a $1,200 machine with 256 kilobytes of RAM.

Commodore's passing marks the end of an era when engineers had wide latitude to explore new directions, when users were hobbyists desperately hungry for the newest, fastest, hottest technology, and when the industry was not dominated by standards that dictate design parameters. In the 1970s and early 1980s, when Commodore peaked as a billion-dollar company, the market tolerated a wild proliferation of computers with different and incompatible processors, architectures, and operating systems. We shall not see the frontier days of Commodore again.

Adapted, with permission, from "R.I.P. Commodore 1954-1994" by Tom R. Halfhill, Byte, *August 1994, page 252.*