

More on Licklider

[Various papers in this special issue include stories about J.C.R. Licklider, a whole book has been written about him,¹ and there have been prior papers by and about Licklider in this journal.² However, in researching the papers, various other Licklider stories have come to light or been remembered. These additional stories are collected here.]

Notes from John Swets³

J.C.R. (Joseph Carl Robnett) Licklider was called “Lick” by almost everyone. When a conference leader once introduced him by saying “everyone here knows Joe Licklider,” the discomfort in the room was palpable. He was no Joe.

John Senders remembers that when Lick was habitually late on contract reports, his contractors complained that all they were getting was “a Lick and a promise.” And John has reminded me that Lick had a home-made display panel outside his office, with different-colored light bulbs indicating how (un)interruptible he was, called a “Lick-liter.”

When Lick was using analogue equipment to study hearing and speech, he arranged his labs with 6-foot relay racks along the four sides. The rooms were always large enough to hold a ping-pong table in the center. At MIT the late-afternoon question was how many round-robin games we could play before we were expected upstairs at the faculty club lounge.

He was also fond of Coca Cola, as the dozens of cases of empty bottles on his porch would indicate. During one all-night session at BBN, he was confronted by a coke machine requiring quarters, which he didn't have, to allow pulling a bottle from a vertical array of six bottles lying on their sides pointing out. Staff members the next morning found six bottle caps lying around and six bottles, still in the machine, but drained.

He enjoyed cars. It was a hoot to see him driving down Route 2 in his glass-topped three-wheel Messerschmidt, especially with a single passenger, as would fit, hunched behind him. He graduated to a Mercedes coupe.

Lick was said to give prospective employees at all levels the Miller (not George) Analogies Test and to hire anyone with a good score. I think rather he hired people who shared his sense of humor — and then elevated their intelligence as necessary. His wit was sophisticated but at the same time he and Karl Kryter could take turns telling jokes (say, at late-night sessions in his suite at Acoustical Society meetings) and be so amused

¹ *The Dream Machine: J.C.R. Licklider and the Revolution That Made Computing Personal*, M. Mitchell Waldrop, Viking Press, New York, 2001.

² J.C.R. Licklider, "Man-Computer Symbiosis," *IEEE Annals of the History of Computing*, vol. 14, no. 1, January-March 1992, pp. 24-30; C.I. Kita, "J.C.R. Licklider's vision for the IPTO," *IEEE Annals of the History of Computing*, vol 25, no. 3, July-Sept. 2003, pp. 62-77.

³ John A. Swets, "The ABC's of BBN: From Acoustics to Behavioral Sciences to Computers," this issue.

by their own stories as to have difficulty finishing. On occasion Lick would take familiar punch lines and impromptu construct new stories leading up to them.

He did that one time when he was the banquet speaker at a one-week special summer course I arranged at MIT, selecting the punch lines by spearing a stack of Hollerith cards with a knitting needle. I had called him at home when he was late for cocktails, only to hear him say "Oh John, when can we get together sometime?" (Lick, how about 15 minutes?) He arrived in time to give a talk on dynamic modeling of human cognitive processes, which was well received if not close to the announced topic.

He spoke at a meeting I chaired at BBN of the Society of Experimental Psychologists in 1985. The sheet of notes he held trembled apparently too much to be readable, but then notes never kept up with his mind.

On a visit I made to ARPA for another purpose, he took me to the office of Assistant Attorney General J. Stanley Pottinger (I remember the name because he has since written some novels) where I was given audiotapes of the Kent State student and national guard confrontation to carry back for analysis by Jim Barger, Chuck Dietrich, and their colleagues at BBN.

I was gratified to attend a celebratory dinner for Lick during his second ARPA stay attended mostly by his government pals; a retirement dinner at MIT's faculty club (when the undergraduates he had taken into his laboratory were surprised to learn "who he was"); a memorial service in MIT's Kresge Auditorium, with a string quartet playing Dixieland music; and to participate with George Miller, Karl Kryter, and others in a memorial session at an Acoustical Society meeting arranged by his former PAL colleague, Irwin Pollack.

Remembrance from John Senders (4/16/03)⁴

The story of BBN and my association with it really starts in 1945. At that time I had been in Harvard for one year and was in the Psychology Department. One of the people there was J.C.R. Licklider who was also associated with the Psycho-Acoustic Laboratory and sporadically with MIT. I took a graduate course in Mathematical Statistics taught by Lick. It originally had been scheduled to be a course in Statistics but he didn't really know any statistics of the cookbook kind and instead taught us Mathematical Statistics. This provided me with a foundation that has withstood the test of time and has made me superficially competent in any kind of statistics. The class was a graduate class even though I was an undergraduate but he generously allowed me to go in and it had a most interesting collection of graduate students - George Miller, Leo Postman, Ward Edwards, Virginia Loftus (my wife) and myself, plus of course 2 or 3 more whose names have slipped from memory. In any event I did well in the class and Lick and I became good friends. I graduated in 1948 and in 1950 Ginny and I moved to Yellow Springs, Ohio. She became immediately involved with the Aeromedical Laboratory Psychology Dept. as

⁴ John Senders was deeply involved in BBN's early days in computing; his contributions are discussed particularly in Sheldon Baron's paper ("Control Systems R&D at BBN," this issue).

did I, by association, and skipping over all the inbetween bits I eventually ended up working there.

Occasionally Licklider's name would surface. He was involved in a great many things connected with the military research establishment and I would occasionally meet him at APA meetings. I went from the Aeromedical Laboratory to the Arctic Aeromedical Laboratory at Fairbanks, Alaska in 1956 and then from there to Minneapolis, Honeywell in 1957 to set up a Human Factors Group at Honeywell. I continued to run into Licklider at meetings so that we maintained some correspondence and had occasional conversation. Then in 1962 I had become utterly bored with Honeywell and devised for myself what I termed an "industrial sabbatical." I joined Bob Gottsdanker at Santa Barbara and had a wonderful time. While I was there, Licklider telephoned from Los Angeles and said that he would like to talk with me, and could he come up? I accepted that proposal with pleasure. He came and talked and made a really good invitation to BBN. He told me about all the marvelous projects that they were working on there and told me more particularly that it was general policy that new people set up their own programs; a department would be established for them; and they would run the department; and then if they left, why, the department very likely would be folded up. That sounded like the kind of place I wanted to be and gave Honeywell one year's notice before leaving them in the lurch because we had a great set of projects there, most of which I had brought in and I couldn't let these drop without notice.

Lick told me that the single operating rule of BBN was that if you met someone as smart as yourself you hired him/her. I was suitably flattered and used the same rule from time to time in succeeding years. I recall making a forceful but unsuccessful effort to get Donald Broadbent to join us. Unfortunately Oxford had too strong a pull. But I did get Nickerson immediately after hearing his performance at the first meeting on Sensation and Performance at Soesterberg.

I left Honeywell and arrived at BBN in 1963. Licklider greeted me with the announcement that here was my office, here was my secretary, all I had to do was get to work and would I mind, please, helping him on a project that seemed to have stalled. I asked "What's the project?" and he said it was the 'Library of the 21st Century'. This meant absolutely nothing to me. I had not been a computer jock. I knew analog computers but I had managed to resist the digital computer, for no reason except sheer stubbornness. So I was introduced into the Library of the 21st Century and Licklider told me the sad tale of his having promised to deliver an estimate of the digital storage requirements for the contents of all the world's libraries and that 3 people had tried to do it and that none of them had succeeded and they had quit on him and gone elsewhere, unable to figure out what to do, and would I do that. So I thought about it for about 5 seconds and said "Sure. I can do that." (I did and published it ahead of schedule).

Lick's office was interesting. There was a set of lights on the outside wall near the door this was called the "Lick-lighter" and a green light meant he could be disturbed; a red light meant that he would prefer not to be, although in general I must say that he was accessible if one really needed him.

He worked on so many simultaneous projects that he had devised the scheme of having a large number of strong clipboards, each one devoted to a project. These would hang on a strip of wood with nails along one side of the room so that the 15 or 20 things he was simultaneously working on were all visually available to him and he had merely to hang up what he was doing and take the clipboard he wanted, and there would be everything he needed. Of course, in those days things were not on a computer. Everything was on paper and sometimes it got to be pretty thick. But mostly, the mere fact that it was on paper made it easy to know where things were and what was to be done with them.

And one of Lick's major concerns was that he said he was getting a reputation being late on all his contracts and grants (we all were I am sure) and people were beginning to complain that all you got from BBN was a "lick and a promise" Meanwhile I found myself launched into electronic storage and publication as a new speciality, which I didn't particularly want but I was stuck with it. Suddenly, as the Library project neared completion, Lick announced that he was moving to ARPA (now DARPA) for some unstated purpose and forthwith left. And this was only about 3 months after I got there so one of the principal reasons for my moving to BBN had suddenly disappeared and I was left holding my own bag, which I enjoyed very much but I was a bit shocked by the fact that my one-time instructor/mentor (he did direct my undergraduate honours) and friend, had suddenly abandoned me at BBN and gone to Washington. However, of course, what he did at ARPA was tremendously important and we continued to correspond but, since I wasn't as digitally oriented as he was, I really didn't understand a great deal of what he was doing. I remember traveling to Washington once with him. We sat side by side in the airplane and he was busy scribbling on a pad all the way. I asked what he was up to and was told he was writing sub-routines for some quite sophisticated computer program — probably on the IBM-704.

Despite the relatively primitive equipment that we had that Lick was working on, the things that were done have yet to appear in modern word processing and data handling systems. We had a 50 megabytes drum memory about the size of a 40-gal oil drum and was a staggering amount of memory for that time. We were able to store 3 full text documents, complete with line graphics, and the programs that Lick was writing to make it possible to merge the data on the 3 documents in a variety of formats with automatic adjustment of scales and data so that all the data were combined into a single figure and a single table.

Many years later Ann and I were driving through Cambridge, in the late '90's. I suddenly felt that I should call Lick. I knew that he lived not very far from where I was at that moment, so I telephoned and found, to my delight, that I had caught him on his birthday, and, to my distress, that he was very ill. We spoke briefly and had a few minutes of remembering old things which brought us both a great deal of pleasure. I wish that I had called 10 years earlier and renewed our friendship at a time when he was in better health. Not too long after that he died.

I attended the memorial meeting at MIT and spoke briefly to Louise. Lick had played 3 significant roles in my life: tutor, thesis advisor and very good friend. I listened to what other people had to say about their own experiences with Lick and enjoyed their reminiscences as much as my own.

A pair of notes from Rollo Silver (10/22/02) and John Swets (9/12/02)

Silver: At BBN, Lick had such trouble getting [Alan] Tritter⁵ to do projects he assigned him, at one point Lick gave Tritter two weeks to finish a project after which Lick would reduce his pay ten percent for every day he was not done. Tritter failed to finish, his salary decreased, and he left BBN. In the *Dream Machine* book, Lick is described as being a wonderful person. However, there was another side of him, He had a tough streak, as exemplified by this example with Tritter.

Swets: One of Lick's original ideas was to put Ed [Fredkin, also notorious for not getting to what he was asked to do] on a piece rate — i.e., no salary (drawing on Skinner's reinforcement theory, which was the idea behind certain teaching machine programs such as for foreign-language vocabulary) — to get Ed to achieve certain goals, mostly publishable articles.

Notes from Ray Nickerson (4/5/2004)

Although Licklider's affiliation with BBN was the main reason for my attraction to the company. I did not know well personally. I knew of him as an authority on hearing, by virtue of having to read his chapter in Steven's Handbook of Experimental Psychology — the primary text for graduate students in experimental psychology — when a graduate student. I met him when, in the early 1960s three colleagues and I, all of whom worked at a U.S. Air Force lab that had just acquired a PDP-1, visited BBN for a few days. The PDP-1 came sans software. BBN and MIT were the only facilities that had a PDP-1 at the time, at least so far as we knew, so our laboratory management made arrangements with BBN to let a few of us hang out there for a while to learn what we could from people there who could program the machine. During the short time of this visit, Licklider impressed us all with his energy and his enthusiasm as a hands-on computer user.

By the time I went to work at BBN a few years later, Licklider had left (for his first stint at ARPA), but his legacy had not. I had a chance to interact with him at meetings on a few occasions in subsequent years, but not enough to claim to have come to know him well or to justify referring to him as a friend — much as I wish I could. But even the casual acquaintance left some memories that are worth sharing.

In the late 1950s Lick was interested in audio analgesia and published papers (some with coauthors W.J. Gardner and A. Weisz) on the auditory suppression of pain in the Journal of the American Dental Association, Science and a book, Sensory Communication, edited by W.A. Rosenblith. Years ago I was told— I no longer remember by whom — that this

⁵ Alan Tritter and Rollo Silver were early, fabled BBN employees from the Fredkin era of computing at BBN and working with him.

interest was responsible for Lick's initial attraction to computers. The story goes that his theory of how noise suppresses pain in the jaw involved inhibition of the nerve that mediates mandibular pain by overloading the nearby auditory nerve, and that he wished to attempt to simulate the hypothesized process on a computer. His first attempt, as I got the story, was with an analogue computer. At about this time, Lick became convinced that digital computers held much more promise than the analogue ones he and his colleagues at BBN were using, and he convinced Leo Beranek to acquire a Royal McBee LPG-30 (See Beranek, this issue), and the rest, as they say, is history.

Initially programs for the PDP-1 were stored on punched fan-folded paper tape. Apparently Lick had learned from sad experience that it was much too easy to discard a tape prematurely. His solution to this problem was to ensconce seven large trash barrels in the computer room, each with a day of the week printed on it, and to impose the rule that each barrel was to be emptied only once a week — on the day whose name it bore. This provided a running one-week grace period during which one could retrieve a discarded paper tape that later proved to have been tossed prematurely.

There is a story that Lick once proposed to some government agency — ARPA? — that it support him to do work on speech or natural language understanding by computer for as long as he could keep the computer as facile with language as a child who was born at the time the funding began.

Once (35 years ago?) I heard Lick give an after-banquet talk at some event at the University of Michigan that left the audience scratching their heads. He started by mentioning several topics that he had considered talking about before settling on the one that he ultimately chose. In each case, by way of explaining why he decided not to talk about a particular topic, he managed to give a mini-talk that was worth the price of admission. I do not remember the exact title of the topic he finally settled on, and about which he spent most of his time, but it had to do with cosmology. He tossed out the conjecture that the universe is a simulation and that the computer on which it runs has a 40-bit word size. (He had a reason for this, but I forget what it was.) As I recall, he credited his interest in matters of cosmology with the fact that he was the son of a minister, but my memory is fuzzy on this point, so I may have that wrong. In any case, the audience was extremely attentive, if not completely persuaded by his argument. I remember someone at a table near mine, nudging his neighbor part way through the talk and asking “Who in the world is this guy?”

On one occasion, Lick and I were scheduled to give talks at the same session of some conference (I have forgotten what the conference was). Lick did not appear. When I asked him later what had happened, his explanation was that he had entered the commitment into a personal memory assistant that he had acquired (or developed), but that he had forgotten to check it.

My sense is that relatively few psychologists, excepting those who do research on human-computer interaction, are aware of the role that Licklider played in establishing time-sharing and computer networking technology. When, a few years ago, the American

Psychological Association decided to devote a special issue of the APA Monitor to the Internet, I was astounded to learn that none of the writers was planning on mentioning Licklider, presumably because they were unaware of his relevance to the subject. Informing the editor of his role resulted in the inclusion in the special issue of a sidebar on him.

Note from Dave Walden (4/8/2004)

Although I am sure I had previously met or saw Lick in some connection with the Dynamic Modeling group and Al Vezza at MIT, my first real interactions with him were when he was leading ARPA IPTO the second time, after Larry Roberts left the job. Randy Rettberg and I were involved for BBN in ARPA's efforts to establish transoceanic ARPANET links and Internet experiments. In particular, Bob Kahn of ARPA IPTO brought Lick along to a meeting in London with people from the British Post Office. I particularly remember Lick as being very ,gentle, gentlemanly, and modest: I remember him carefully avoiding use of the word "I," especially in writing but also in speaking; and I remember him emphasizing (relating to some aspect of the ongoing negotiations between ARPA and the BPO that he seemed not completely comfortable with) that he would, of course, live up to any commitment his predecessor in the job at ARPA had made.