J. C. R. Licklider

From Wikipedia, the free encyclopedia

Joseph Carl Robnett Licklider (March 11, 1915 – June 26, 1990), known simply as J.C.R. or "Lick" was an American computer scientist, considered one of the most important figures in computer science and general computing history.[1]

Contents

- 1 Biography
- 2 Work
    - 2.1 Psychoacoustics
    - 2.2 Information technology
    - 2.3 Semi Automatic Ground Environment
    - 2.4 Man-Computer Symbiosis
    - 2.5 Global computer network
    - 2.6 Project MAC
- 3 Publications
- 4 References
- 5 Further reading
- 6 External links

Joseph Carl Robnett Licklider	
Born	March 11, 1915
	St. Louis, Missouri, USA
Died	June 26, 1990 (aged 75)
	Arlington, Massachusetts
Nationality	American
Other names	J.C.R
	Lick
	"Computing's Johnny Appleseed"
Education	Washington University in St. Louis
	University of Rochester
Known for	Artificial Intelligence
	Cybernetics
	"Intergalactic Computer Network" (Internet)

Biography

Licklider was born in St. Louis, Missouri, USA.[2] He was the only child of an insurance salesman and his wife. He displayed early engineering talent, building model airplanes. He carried on with his hobby of refurbishing automobiles throughout his life.

He studied at Washington University in St. Louis, where he received a BA in 1937, majoring in physics, mathematics and psychology, and an MA in psychology in 1938. He received a PhD in psychoacoustics from the University of Rochester in 1942, and worked at the Psycho-Acoustic Laboratory at Harvard University from 1943 to 1950.

He became interested in information technology, and moved to MIT in 1950 as an associate professor, where he served on a committee that established MIT Lincoln Laboratory and established a psychology programme for engineering students.

In 1957 he received the Franklin V. Taylor Award from the Society of Engineering Psychologists. In 1958, he was elected President of the Acoustical Society of America, and in 1990 he received the Commonwealth Award for Distinguished Service.[3]

In October 1962, Licklider was appointed head of the Information Processing Techniques Office (IPTO) at

ARPA, the United States Department of Defense Advanced Research Projects Agency.

In 1963, he was named Director of Behavioral Sciences Command & Control Research at ARPA. In April of that year, he sent a memo to his colleagues in which he outlined the early challenges presented in trying to establish a time-sharing network of computers with the software of the era.[4] Ultimately, his vision led to ARPANet, the precursor of today's Internet.

In 1968, J.C.R. Licklider became director of Project MAC at MIT, and a professor in the Department of Electrical Engineering. Project MAC had produced the first computer time-sharing system, CTSS, and one of the first online setups with the development of Multics (work on which commenced in 1964). Multics provided inspiration for some elements of the Unix operating system developed at Bell Labs by Ken Thompson and Dennis Ritchie in 1970.

He retired and became Professor Emeritus in 1985. He died in 1990 in Arlington, Massachusetts.[3]

Work

Psychoacoustics

In the psychoacoustics field, Licklider is most remembered for his 1951 "Duplex Theory of Pitch Perception," presented in a paper[5] that has been cited hundreds of times,[6] was reprinted in a 1979 book,[7] and formed the basis for modern models of pitch perception.[8]

Information technology

Licklider became interested in information technology early in his career. Much like Vannevar Bush, J.C.R. Licklider's contribution to the development of the Internet consists of ideas, not inventions. He foresaw the need for networked computers with easy user interfaces.

His ideas foretold of graphical computing, point-and-click interfaces, digital libraries, e-commerce, online banking, and software that would exist on a network and migrate wherever it was needed. He has been called "computing's Johnny Appleseed" for having planted the seeds of computing in the digital age.

Licklider was instrumental in conceiving, funding and managing the research that led to modern personal computers and the Internet. His seminal paper on *Man-Computer Symbiosis* foreshadowed interactive computing, and he went on to fund early efforts in time-sharing and application development, most notably the work of Douglas Engelbart, who founded the Augmentation Research Center at Stanford Research Institute and created the famous On-Line System.

Semi Automatic Ground Environment

He worked on a Cold War project known as Semi Automatic Ground Environment (better known by its acronym "SAGE"), designed to create a computer-aided air defense system. The SAGE system included computers that collected and presented data to a human operator, who then chose the appropriate response. In 1957, he became a Vice President at Bolt Beranek and Newman, Inc., where he bought the first production PDP-1 computer and conducted the first public demonstration of time-sharing. He was elected president of the Acoustical Society of America in 1958.

A SAGE operator's terminal.

He played a similar role in conceiving of and funding early networking research, most notably the ARPAnet. His 1968 paper on *The*

Computer as a Communication Device predicts the use of computer networks to support communities of common interest and collaboration without regard to location.

Man-Computer Symbiosis

In 1960, Licklider wrote his famous paper *Man-Computer Symbiosis*, which outlined the need for simpler interaction between computers and computer users. Licklider has been credited as an early pioneer of cybernetics and artificial intelligence (AI). [1] (http://www.thocp.net/biographies/licklidder_jcr.html) Unlike many AI practitioners, Licklider never felt that men would be replaced by computer-based beings. As he wrote in that article: "Men will set the goals, formulate the hypotheses, determine the criteria, and perform the evaluations. Computing machines will do the routinizable work that must be done to prepare the way for insights and decisions in technical and scientific thinking."

Global computer network

Licklider formulated the earliest ideas of a global computer network in August 1962 at BBN, in a series of memos discussing the "Intergalactic Computer Network" concept. These ideas contained almost everything that the Internet is today. His paper *The Computer as a Communication Device* (http://gatekeeper.dec.com /pub/DEC/SRC/publications/taylor/licklider-taylor.pdf) , Science and Technology, April 1968, illustrates his vision of network applications.

Licklider submitted the paper *Televistas: Looking ahead through side windows* (http://web.mit.edu/~schultze /www/Licklider-Televistas-Carnegie-1967.pdf) to the Carnegie Commission on Educational Television in 1967. In this paper, he describes a radical departure from the "broadcast" model of television. Instead, he advocates a two-way communications network. The Carnegie Commission led to the creation of the Corporation for Public Broadcasting. Although the Carnegie Commission's report explains that "Dr. Licklider's paper was completed after the Commission had formulated its own conclusions," President Johnson said at the signing of the Public Broadcasting Act of 1967 (http://www.cpb.org/aboutpb /act/remarks.html) , "So I think we must consider new ways to build a great network for knowledge-not just a broadcast system, but one that employs every means of sending and of storing information that the individual can use."

Project MAC

In October 1962, Licklider was appointed head of the Information Processing Techniques Office (IPTO) at ARPA, the United States Department of Defense Advanced Research Projects Agency. He would then convince Ivan Sutherland, Bob Taylor, and Lawrence G. Roberts that an all-encompassing computer network was a very important concept. During his two-year term of office, he granted funding to develop Project MAC at MIT, a large mainframe computer that was designed to be shared by up to 30 simultaneous users, each sitting at a separate typewriter terminal. He also granted funding to similar projects at Stanford University, UCLA, UC Berkeley, and the System Development Corporation, all in California, and to the Augmentation Research Center at the Stanford Research Institute, headed by Douglas Englebart, who later invented the computer mouse.

Publications

Licklider has written several articles and books:

- 1942. *An Electrical Investigation of Frequency-Localization in the Auditory Cortex of the Cat*. Ph.D. Thesis University of Rochester 194.2
- 1965. *Libraries of the future*. Cambridge, Mass., M.I.T. Press

Articles, a selection:

- 1960. "Man-Computer Symbiosis" (http://memex.org/licklider.pdf) . In: *Transactions on Human Factors in Electronics*, volume HFE-1, pages 4–11, March 1960.
- 1965. "Man-Computer Partnership". In: *International Science and Technology* May 1965.
- 1968. "The Computer as a Communication Device" (http://memex.org/licklider.pdf) . In: *Science and Technology*. April 1968.

References

1. **^** Waldrop, M. Mitchell (2001). *The Dream Machine: J. C. R. Licklider and the Revolution That Made Computing Personal*. New York, NY: Viking Penguin. pp. 449. ISBN 0-670-89976-3. Robert Taylor, founder of Xerox PARC's Computer Science Laboratory and Digital Equipment Corporation's Systems Research Center, noted that 'most of the significant advances in computer technology—including the work that my group did at Xerox PARC—were simply extrapolations of Lick's vision. They were not really new visions of their own. So he was really the father of it all.'
2. **^** Internet Pioneers: J.C.R. Licklider (http://www.ibiblio.org/pioneers/licklider.html) , retrieved online: 2009-05-19
3. ^ *a* *b* JCR Licklider (1915-1990) (http://www.columbia.edu/~jrh29/years.html)
4. **^** Licklider, J.C.L. "Memorandum For Members and Affiliates of the Intergalactic Computer Network." Washington, DC: April 23, 1963. http://www.kurzweilai.net/articles/art0366.html?printable=1 Accessed July 30, 2009
5. **^** Licklider, J. C. R. (1951). "A duplex theory of pitch perception." *Experientia* (Basel) 7, 4, 128–134.
6. **^** "Google Scholar" (http://scholar.google.com/scholar?hl=en&lr=&safe=off& q=%22duplex+theory+of+pitch+perception%22++licklider+1951&btnG=Search) . http://scholar.google.com /scholar?hl=en&lr=&safe=off&q=%22duplex+theory+of+pitch+perception%22++licklider+1951&btnG=Search.
7. **^** Earl D. Schubert (1979). *Physiological Acoustics*. Stroudsburg PA: Dowden, Hutchinson, and Ross, Inc..
8. **^** R. D. Patterson, J. Holdsworth, and M. Allerhand (1992). "Auditory Models as Preprocessors for Speech Recognition" (http://books.google.com/books?id=X5f-VgTo0fAC&pg=PA73& dq=%22Duplex+Theory%22+%22Pitch+Perception%22++models&as_brr=3&ei=TxwuSLSYDJLKsQP-8q38Ag&sig=AUSrkUiV-7mLrQsrqF4iYKelMqQ#PPA67,M1) . in Marten Egbertus Hendrik Schouten. *The Auditory Processing of Speech: From Sounds to Words*. Walter de Gruyter. ISBN 3110135892. http://books.google.com/books?id=X5f-VgTo0fAC&pg=PA73& dq=%22Duplex+Theory%22+%22Pitch+Perception%22++models&as_brr=3&ei=TxwuSLSYDJLKsQP-8q38Ag&sig=AUSrkUiV-7mLrQsrqF4iYKelMqQ#PPA67,M1.

Further reading

- M. Mitchell Waldrop (2001) *The Dream Machine : J.C.R. Licklider and the Revolution That Made Computing Personal* ISBN 0-670-89976-3 is an extensive biography of J.C.R. Licklider.
- Katie Hafner & Matthew Lyon (1998) *Where Wizards Stay Up Late: The Origins Of The Internet*, Simon & Schuster. ISBN 0-684-83267-4.
- *Man-Computer Symbiosis (http://medg.lcs.mit.edu/people/psz/Licklider.html)* paper, J.C.R. Licklider, March 1960.
- *Augmenting Human Intellect (http://www.bootstrap.org/augdocs/friedewald030402 /augmentinghumanintellect/ahi62index.html)* paper, Douglas Engelbart, October 1962.
- Joseph Carl Robnett Licklider, *Libraries of the Future.* Cambridge, MA, 1965.
- *The Computer as a Communication Device (http://memex.org/licklider.pdf)* - This also includes a .pdf version of the Man-Computer Symbiosis paper.
- Computer Networks: The Heralds of Resource Sharing [2] (http://video.google.com /videoplay?docid=4989933629762859961) video documentary, 1972. Licklider explains online resource sharing, about 10 minutes into the documentary, and reappears throughout.
- From World Brain to the World Wide Web (http://www.gresham.ac.uk/event.asp?PageId=39& EventId=486) , Lecture by Martin Campbell-Kelly at Gresham College, 9 November 2006.
- *Seeding Networks: the Federal Role (http://bpastudio.csudh.edu/fac/lpress/articles/govt.htm)* , Larry Press, *Communications of the ACM*, pp 11–18, Vol 39., No 10, October, 1996. A survey of US government funded research and development preceding and including the National Science

Foundation backbone and international connections programs.

- *Before the Altair — The History of Personal Computing (http://bpastudio.csudh.edu/fac/lpress /articles/hist.htm)* , Larry Press, *Communications of the ACM*, September, 1993, Vol 36, No 9, pp 27–33. A survey of research and development leading to the personal computer including Licklider's contributions.

External links

- J.C.R. Licklider And The Universal Network (http://www.livinginternet.com/i/ii_licklider.htm) — Living Internet
- Oral history interview with J. C. R. Licklider (http://www.cbi.umn.edu/oh/display.phtml?id=87) at Charles Babbage Institute, University of Minnesota, Minneapolis. Licklider, the first director of the Advanced Research Projects Agency's (ARPA) Information Processing Techniques Office (IPTO), discusses his work at Lincoln Laboratory and IPTO. Topics include: personnel recruitment; the interrelations between the various Massachusetts Institute of Technology laboratories; Licklider's relationship with Bolt, Beranek, and Newman; the work of ARPA director Jack Ruina; IPTO's influence of computer science research in the areas of interactive computing and timesharing; the ARPA contracting process; the work of Ivan Sutherland
- Oral history interview with Robert E. Kahn (http://www.cbi.umn.edu/oh/display.phtml?id=119) at Charles Babbage Institute, University of Minnesota, Minneapolis, USA. Kahn discusses the work of various DARPA and IPTO personnel including **J.C.R. Licklider**.

Retrieved from "http://en.wikipedia.org/wiki/J._C._R._Licklider"
Categories: 1915 births | 1990 deaths | People from St. Louis, Missouri | University of Rochester alumni | Washington University in St. Louis alumni | Massachusetts Institute of Technology faculty | Artificial intelligence researchers | Cyberneticists | American computer scientists | Computer pioneers