

UC Irvine

UC Irvine Previously Published Works

Title

Computers and Thought—The Back Story

Permalink

<https://escholarship.org/uc/item/37p845z2>

Journal

IEEE Annals of the History of Computing, 33(4)

ISSN

1058-6180

Author

Feldman, J

Publication Date

2011

DOI

10.1109/mahc.2011.69

Copyright Information

This work is made available under the terms of a Creative Commons Attribution License, available at <https://creativecommons.org/licenses/by/4.0/>

Peer reviewed

Computers and Thought—*The Back Story*

Julian Feldman

University of California, Irvine

Editor: David Walden

The collection of papers on artificial intelligence and simulation of cognitive processes that became the book *Computers and Thought* (C&T) started out as a set of readings for an AI course that Ed Feigenbaum and I taught in the Business School at the University of California, Berkeley, in the early 1960s. (That AI Berkeley course had both business school students and other Berkeley students. At that time, given the history of computer science at Berkeley, teaching an AI course in the business school didn't seem bizarre.) One of the book's authors, Herb Simon, was one of the founding faculty members of the Graduate School of Industrial Administration at Carnegie Tech (where Ed and I had been graduate students). Another author, Allen Newell, had also been a grad student there, and he later became a faculty member. GSIA and the Massachusetts Institute of Technology were the two "founding" institutions for AI in the late 1950s. GSIA was a new model business school—computers, math, and so forth. In fact, the major market for its PhD's was other business schools.

I don't remember all the reasons that led us to try to get the C&T collection published. Part of the motivation was an anti-AI movement claiming that AI was all smoke and mirrors. We had a collection of papers representing real accomplishments—a potent counter-argument. Virtually all the papers in the book had been published previously, as indicated in the acknowledgments section in the front of the book.

Getting it Published

We approached several publishers. One publisher who had done several books out of the GSIA turned us down on the advice of an AI pioneer who didn't think that the proposed book would sell the 5,000 copies the publisher needed to cover costs. McGraw-Hill agreed to do the collection at the urging of their Northern California rep, but after signing a contract, McGraw-Hill got cold feet and wanted to cut the size of the volume by a third or so. We held firm, and Ed promised to consider McGraw-Hill for future projects. McGraw-Hill agreed to go ahead with the full collection.

Editor's Note

A while back, it occurred to me that some books have significantly influenced computer history, just as various technological developments have. Consequently, I solicited notes from several authors of books that I believe have significantly impacted the computer field. One result of my solicitation was the Anecdote in the April–June 2011 (vol. 33, no. 2) issue by Gordon Bell (with Daniel Siewiorek) about the book *Computer Structures*.¹ Julian Feldman's Anecdote in this issue on the book *Computers and Thought*,² which he coedited with Edward Feigenbaum, is another response to my solicitation. (A longer history of *Computers and Thought* can be found in the preface of the 1995 AAAI Press reprint of the book published in collaboration with the MIT Press.)

Computers and Thought is the second computer book I bought when I first started working with computers at San Francisco State College in 1963.³ I avidly studied the book, and it made me want to go into computer R&D rather than seek an easier-to-find, post-graduation job as a business programmer.

Three other books also greatly influenced me as I developed as a programmer in the computer R&D field:

- *Mathematical Methods for Digital Computers*, vol. 1, ed. by Anthony Ralson and Herbert S. Wilf, John Wiley & Sons, New York, 1960.

- *Programming Systems and Languages*, ed. by Saul Rosen, McGraw-Hill, 1967.
- *The Art of Computer Programming*, vols. 1–3, by Donald Knuth, Addison-Wesley, 1968, 1969, and 1973.

Of course, there were other classic (and less-than-classic) books in that era. However, what I think made books such as these so valuable was that each provided a fairly comprehensive overview of the state of the art of an entire area of computer knowledge. This was reasonably doable then. It is monumentally difficult now.

References and Notes

1. G. Bell and A. Newell, *Computer Structures: Readings and Examples*, McGraw Hill, 1971, and D. Siewiorek, G. Bell, and A. Newell, *Computer Structures: Principles and Examples* 2nd ed., McGraw-Hill, 1982.
2. E.A. Feigenbaum and J. Feldman, *Computers and Thought*, McGraw-Hill, 1963.
3. The first book was Daniel McCracken's *A Guide to Fortran Programming*, Wiley, 1961.

C&T was one of the early academic books in computer science. Many friends and others had ideas about books on computer science topics, but nobody was sure of the market, so we received many requests for early sales data. The early success of *C&T* broke a path for other computer science books.

Determining appropriate royalties on anthologies is a difficult issue. We didn't think we deserved to keep all the royalties—assuming there would be any—so we decided early on to take a bit for our expenses and turn over the rest of the money to some worthwhile endeavor. The authors and the publishers had not hesitated in granting permission for us to reprint the papers. I think the fact that most of the expected royalties were going to be used for good deeds, and the editors would not keep all the royalties, might have helped. Also, we knew all the living authors. That probably helped too.

Allen Newell agreed to be a committee of one under the ACM to distribute the money. This led to a series known as the “Computers and Thought Lectures,” which Newell used the royalty money to fund. He selected the lecturers, and the talks were given at various meetings. In some sense, this series continues today as part of the IJCAI Computers and Thought Award, which includes a lecture by the award recipient (see http://en.wikipedia.org/wiki/IJCAI_Computers_and_Thought_Award).

Later Editions

After the first printing, Allen Newell caught one big proofreading error. We didn't realize that the end of Samuel's checker game had been dropped from the first printing. It was restored in later printings.

Since then, *C&T* has been translated into Russian, Polish, Spanish, and Japanese. We thought we might collect some Russian royalties, but the Russian publisher decided the royalties belonged to the authors, not the editors. I even went to an AI meeting in Moscow in the winter of 1967, partially in expectation of getting some rubles. I did get a tour of Moscow courtesy of the translator of the Russian edition.

For the AAAI-MIT press edition published in 1995, Ed wrote a new preface for the AAAI paperback edition. The reader can consult that preface for a longer history of the book.

And just a few weeks ago, one of my faculty colleagues in information and computer

Computers and Thought **was one of the early academic books in computer science.**

science at the University of California, Irvine, asked me to autograph a copy of *C&T*.

Julian Feldman is a professor emeritus of information and computer sciences and the founding chair of the information and computer science program at the University of California, Irvine. Contact him at feldman@ics.uci.edu.

Online Shopping in the 1980s

Michael Aldrich

In 2008, the UK online home shopping market was worth more than £50 billion, £2.6 to £3.9 billion of which was from grocery shopping. This development was founded on advances made in the 1990s such as ubiquitous access to the World Wide Web, reasonably secure use of credits cards across the Internet, and so on.

A decade earlier, Redifon Computers had introduced online shopping—then known as teleshopping. Redifon found a business-to-business market for online shopping in 1981 and a business-to-consumer market in 1984, presaging the home shopping industry we see today.¹

The Technology, Circa 1979

In 1979, Redifon Computers was part of the UK Rediffusion Group of companies. The company was based in Crawley in Southern England. It manufactured minicomputers and designed systems for companies including Inland Revenue, British Aerospace, and Harrods. These were typically real-time systems utilizing minicomputers and desktop terminals with visual display units.

At the time, I was Redifon's board director in charge of marketing, and I became CEO on 1 January 1980. We investigated an interesting piece of equipment from the domestic electronics world. In the 1970s, there was a lot of interest in home information systems, and the British public telephone service (now British Telecom) developed the Prestel



Figure 1. 1979 preproduction online shopping system. Redifon used the Prestel (Press the Television) data-transmission protocol to make televisions into real-time terminals for the first online shopping system. (Courtesy of Aldrich Archive.)

(Press the Television) system, whereby news, weather, and other text information was fed through a telephone line to a domestic television. Redifon was not in the home information business, but the company had been sent a modified television for evaluation. One of our engineers, Peter Champion, opened up the TV and found it contained a chip set with a chip modem, a character generator, and an auto-dialer that could hold four telephone numbers.

My background was in computer marketing; I had worked for Burroughs and Honeywell after studying history at university. One day in the summer of 1979 I was walking with my wife and wishing that we could avoid the boring weekly shopping expedition.

All of a sudden, I thought about that television and about hooking it up to the supermarket and getting the supermarket to deliver the groceries. My reasoning was that we had a domestic TV that could communicate, and we had a computer that not only could handle transaction processing from multiple users but also communicate (network) with other computers. We could build a networked real-time transaction processing system. Using an inexpensive domestic TV with a remarkably simple human interface, it could be used by anyone without

training. With its ability to dial into any computer via a normal domestic telephone line, and using a standard communications and human interface, it could be used for multiple applications. It was not restricted to talking to just one computer for one function (like the airline reservation systems). It had genuine open market independent tele-shopping capabilities.

Looking into the possibility more deeply, the product development and marketing costs would also be low. We already had the basic hardware and software, and we had a potential client base of large corporations and public and government institutions.

We did our first market research at an exhibition at the Data Entry Management Association Conference in New Orleans in September 1979. Our stand consisted of a table covered in green cloth with the TV on top. Under the table concealed by the cloth was Peter Champion, our intrepid engineer, lying on his back ready to patch through the connection at the right moment during the presentation. It was a bit cheeky, but it worked. The visitors were interested, intrigued, and excited. We hurried back to the UK and set to work building an I/O controller, courtesy of Roger Newman and his team, and a software interface by Jim Bethell.

Prestel was an implementation of videotex technology—basically analogue TV plus asynchronous digital data communication by telephone line—for a nationwide UK public information service (see Figure 1). Its origins were therefore the telecom and consumer electronics industries rather than the computer industry, which largely ignored it. As a result, it became a kind of IT playground where different organizations fashioned it according to their own needs and interests, and experimentation was widespread. Knight-Ridder in the US thought it could be used to deliver newspapers. France Telecom used it to substitute printing Telephone Directories, installing 10 million terminals and building the largest and most successful pre-Internet service in the world. Redifon never used the Prestel system. Redifon used the Prestel data-transmission protocol so that televisions could become real-time terminals, creating a new type of system.

But such was the publicity surrounding the technology that viewdata and videotex were confused in the marketplace. Redifon called it videotex most of the time, but sometimes it was easier to explain it as “viewdata plus.”

**The market wasn't ready
for joined-up digital
business in the 1980s.
Today's Internet
shopping is beyond
our wildest dreams.**

provided news services. Both the Gateshead and Bradford initiatives were designed to help people unable to shop in the normal way.

My original idea—and what has become the practice for millions—was that remote shopping become a form of normal shopping. Among other things, online shopping required a revolution in payment systems—that is, Mrs. Snowball paid in cash because credit cards were not yet in universal use.

John Phelan was the application developer for both the Gateshead and Bradford systems. For these projects to succeed, it was necessary to develop many of the concepts that have since become commonplace: account login; an online shopping basket; the tailored prescreening of shopping usage providing repeatable shopping lists; and collective roll-up of multishopping stores succeeded into an easy-to-use, plain-to-see, and understandable shopping list with associated billing. Goods were collected and dispatched within hours of receiving an order, or collection of orders, with simple-to-use technology and a softened customer-facing software interface.

Context and Reflection

Redifon Computers was briefly renamed Rediffusion Computers, and then in November 1984, it became and remains ROCC Computers. The company went on supplying systems for business work and at least one of the original shopping systems was in use until 2000.

Online shopping was only part of the story we told the world as we released these systems. In April 1980, Redifon released its Office Revolution concept—enabling corporations to connect all their communicating correspondents by digital networks (what today is called e-business). Both the specifics

of online shopping and the generality of the office revolution were linked by two basic ideas. First, both business and shopping were essentially constructs of time, place, and space. Second, transportation costs were going up and telecom costs were coming down. Thus, shopping and business could be conducted 24/7, worldwide, in the telecom ether (or cyberspace, as it is now called).

These developments and prospects excited me to such an extent that I wrote a series of papers and a book⁵ describing them and trying to assess their impact on society. Reading those publications from the 1980s, the social impact of the developments has been pretty well as predicted even if the videotex technology proved short lived. The market wasn't ready for joined-up digital business in the 1980s. Business processes needed to be reengineered, as they were in the 1990s. Today's Internet shopping is beyond our wildest dreams.

As a fusion of PC, TV, and telecoms in 1980, the Teleputer is very much an idea of the moment.⁶ The current generation of Teleputers, however, will be based on cell phones rather than a desktop PCs.

High-bandwidth broadband from cable TV in the UK was another pioneering concept that became a practical reality. Information technology as interactive and participative mass communication is the basis of social networking. Today millions of families are doing something like this with a PC and a phone rather than a TV, as I originally used.

Business-to-consumer online shopping did not become commercially viable until the late 1990s when a critical mass of installed home computers was reached, improved telecommunications with the Internet opened up continents, and service providers appeared in volume. The terms online shopping, e-commerce, and e-business came into use during the 1990s. From 2000 onward, improved availability of bandwidth (broadband) at affordable prices, improved encryption for payment processing, improved search engines, exponential growth in service providers, and near saturation in installed home computers in first world countries made business-to-consumer applications ubiquitous. Tesco, the participant in the original Gateshead experiment of 1984, is probably the world's largest online grocer. It is also a major online shopping provider for non-food items.

My own focus now is on continuing to collect the technical history relating to on-line shopping and other aspects of history from the times I was active in the information technology industry. There are huge challenges in tracking old clients for their recollections and trying to re-create the original shopping system in a sustainable form for a museum. In an effort to do just that, the Michael Aldrich Archive has been working to re-create the 1984 shopping machine used by Mrs. Snowball using original vintage hardware and software. We expect the system to be operational by the end of 2011. This effort has been possible due to the dedication of a virtual team of contributors spread throughout the UK. Much of our time has been spent gathering and sorting necessary artifacts. After all, we live in a world where we recycle long before we reevaluate.⁷

Michael Aldrich had a 38-year career in the IT industry, 20 years of which were spent as CEO of the international computer company Redifon/Rediffusion/ROCC Computers. He retired as CEO in 2000 and became non-executive chairman. Contact him at michael.aldrich@rocc.co.uk.

References and Notes

1. This anecdote focuses on UK activities with which I had firsthand involvement and does

not try to place these activities in a larger historical or international context.

2. Redifon manufactured and sold several versions of Teleputers (which combined televisions and computers) in the 1980s, including the Teleputer/3, http://www.aldricharchive.com/downloads/TELEPUTER_SPECIFICATIONS.pdf.
3. J. Reynolds and M. Lowe, "Commemorating the Life and Work of Professor Ross Davies, 1940–2005," *Int'l J. Retail & Distribution Management*, vol. 35 no. 8, 2007, pp. 616–619.
4. For an interview with Mrs. Snowball, see <http://www.aldricharchive.com/snowball.html>.
5. M. Aldrich, *Videotex – Key to the Wired City*, Quiller Press, 1982.
6. A. Hamilton, "The Return of the Teleputer," *Time*, 11 Nov. 2002; <http://www.time.com/time/magazine/article/0,9171,1003620,00.html>.
7. Many of the original documents associated with the developments I describe here are held by the Aldrich Library, University of Brighton, England. Some are reproduced as part of the Michael Aldrich Archive, <http://www.aldricharchive.com/index.html>.



Selected CS articles and columns are also available for free at <http://ComputingNow.computer.org>.

ADVERTISER INFORMATION • OCTOBER/DECEMBER 2011

Advertising Personnel

Marian Anderson: Sr. Advertising Coordinator
Email: manderson@computer.org
Phone: +1 714 816 2139 | Fax: +1 714 821 4010

Sandy Brown: Sr. Business Development Mgr.
Email: sbrown@computer.org
Phone: +1 714 816 2144 | Fax: +1 714 821 4010

Advertising Sales Representatives (display)

Central, Northwest, Far East:
Eric Kincaid
Email: e.kincaid@computer.org
Phone: +1 214 673 3742
Fax: +1 888 886 8599

Northeast, Midwest, Europe, Middle East:
Ann & David Schissler
Email: a.schissler@computer.org, d.schissler@computer.org
Phone: +1 508 394 4026
Fax: +1 508 394 1707

Southwest:
Mike Hughes
Email: mikehughes@computer.org
Phone: +1 805 529 6790

Southeast:
Heather Buonadies
Email: h.buonadies@computer.org
Phone: +1 973 585 7070
Fax: +1 973 585 7071

Advertising Sales Representatives (Classified Line)

Heather Buonadies
Email: h.buonadies@computer.org
Phone: +1 973 585 7070
Fax: +1 973 585 7071

Advertising Sales Representatives (Jobs Board)

Heather Buonadies
Email: h.buonadies@computer.org
Phone: +1 973 585 7070
Fax: +1 973 585 7071