AT&T vs BELL LABS

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ABSTRACT

Early work in digital computer art and animation was performed at Bell Telephone Laboratories, Incorporated (Bell Labs) during the 1960s. However, AT&T objected to attempts to publicize this work. Senior management at Bell Labs defended the work on graphics (and other topics), and it was publicized through articles, exhibitions, and presentations. This "battle" between AT&T and Bell Labs is documented in this article.[1]

BACKGROUND

The American Telephone and Telegraph Company supported Bell Telephone Laboratories, Incorporated (Bell Labs) to perform basic research to benefit communications and the Bell System. Although much of that research was directly related to telecommunications, some topics seemed less related, and AT&T confronted Bell Labs over these topics during the mid 1960s.

When a researcher at Bell Labs wrote a paper or article for outside publication, it was distributed within Bell Labs for review and approval. For example, the patent area at Bell Labs reviewed nearly all such papers for any patent implications. Since AT&T supported basic research at Bell Labs, someone at AT&T was routinely sent papers in order to be approved. That person was Howard C. Craig, the Engineering Director of R&D Studies at the AT&T Engineering Department in New York City.[2] According to the AT&T archivist, Craig held this title through 1971 and then was no longer listed in the 1972 AT&T directory.

It is not clear what stimulated the confrontation. It might have been longstanding or perhaps renewed, or even initiated, because of the April 1965 showing of "Computer-Generated Pictures" at the Howard Wise Gallery in New York City.[3] When AT&T found out about the coming show, strongly objected, and they even attempted to cancel the show. In the end, the show went on, but all the works were copyrighted in the names of the artists Julesz and myself, who were instructed not to mention Bell Labs.

THE CONFRONTATION

In a lengthy August 1965 document, Mr. Craig questioned Bell Labs about work in "fringe areas and personal interests."[4] He stated: "… an industrial laboratory supported by a publicly-owned and government-regulated business must limit its support to activities of potential benefit to the business." He questioned the "… increase in effort on 'sidelines,' primarily areas of computer use, psychology and medicine." He specifically objected to the publication of the results of any research in such areas as dental

adhesives, computer art, computer music, the composition of DNA, the acoustics of concert halls, programs for simplified English, and the flow of blood through veins. He concluded, "… many of the Bell Laboratories' scientists do not have a clear understanding of the scope of the work expected of them…"

In a memo dated July 30, 1965 to William O. Baker, Vice President, Research at Bell Labs, Max V. Mathews mentioned how AT&T was objecting to "BTL publishing work concerning certain "byproducts" of our research." Mathews wrote Baker: "Bruce Strasser and Eliot Read are preparing to do battle with [AT&T]."

John R. Pierce, who was Executive Director of a division within Baker's research area, and also the father of *Telstar*, wrote a two-page memorandum to all the directors in his division.[5] A copy was distributed to Baker and E. C. Read. Pierce began by quoting Alexander Graham Bell's directive to: "Leave the beaten track occasionally and dive into the woods. You will be certain to find something that that you have never seen before." These words were carved into the wood base of the bust of Alexander Graham Bell that was in the lobby of the main entrance to the Murray Hill, NJ facility of Bell Labs. Pierce then cautioned "But don't publish it or tell reporters that you did it at the Bell Laboratories unless you have an official release." Pierce further observed, "In following Bells' advice, we do indeed find many new things, and most of these seem to me to be relevant to our business. Not all people have the same idea of relevance, however." He then cautions that the Public Relations and Publications Division should be informed of and involved with matters than involve the press.

I had performed an experiment comparing a computer-generated image with a painting by Piet Mondrian and wrote a paper, which I wanted to submit to the journal *The Psychological Record*.[6] I applied for a prepublication release, but AT&T did not approve "because it stressed esthetic and artistic responses and there was no indication of the relevance to communications." In a memorandum dated September 14, 1965, Pierce informs Baker that he "told Noll to go ahead and publish his paper."[7] Pierce then goes on to critique Craig's infamous memorandum of September 9, 1965.

In a memorandum to W. O. Baker dated January 21, 1966, E. C. Read lists the specific papers and publicity that were the source of difficulties with AT&T's Howard Craig.[8] Included were: a paper about computer music by Pierce, Mathews, and Risset; Noll's Mondrian paper; interviews of Billy Kluver by various reporters; and even an article by Pierce about satellites. Read concludes that only a small number of the almost 900 papers from the research area met with difficulties from Craig and hence "the recent outcry is far out of proportion to the problem."

AFTERMATH

In what can now perhaps be seen as open defiance of AT&T, Dr. William O. Baker ordered Bell Labs to sponsor a symposium on the topic of "The Human Use of Computing Machines." About 200 academics from around the United States were invited to attend the two-day symposium at Bell Labs in Murray Hill, NJ from June 20-21, 1966.[9] One of the presentations at the symposium described and showed computer-animated movies, including my computer-generated ballet.[10] Many examples of the use

of computers in research were given to educate and interest the academics when they returned home to their institutions. A two-dimensional perspective work of computer art by me was used as the graphic theme for the symposium, and a 3D stereogram (along with a pair of polarized glasses) of a pattern by Bela Julesz was given to all the attendees as a memento of the symposium.

John R. Pierce was friendly with Arthur C. Clarke. Clarke requested Pierce's ideas for some aspects of the movie "2001: A Space Odyssey." Pierce and I designed a video telephone booth for the movie. Pierce suggested that the Bell System seal be placed on the outside of the booth. The movie was released in early 1968. AT&T objected because the use of the Bell seal implied that the Bell System was providing telecommunication service outside the United States, which court decree forbade it from doing. Pierce defended the use of the seal – but AT&T's objection was too late anyway since the film was being shown all over the planet. Pierce clearly was well aware of the concerns of some parties at AT&T and seemed to be defying them. Pierce was known for his confrontational approach, and few wanted to tangle or disagree with him.

Leon Harmon and Kenneth C. Knowlton were using little computer-generated images to digitize a much larger picture. They photographed a nude model and then created one of their computer-generated pixilated images of her. Their "The Nude" was reproduced on the first page of the Second Section of *The New York Times* on October 11, 1967.[11] Amazingly, AT&T did not object, even though Bell Labs was mentioned. Perhaps the situation was changing at AT&T. The work was credited to Harmon and Knowlton, in keeping with the policy initiated in 1965 that art created by people at Bell Labs was to be owned by the "artists" or "composers" and not Bell Labs. Such a policy made sense and perhaps pacified the critical people within AT&T – clearly Bell Labs was not in the business of making art and composing music.

In 1968, the documentary film "Incredible Machine" was made by AT&T and released to movie theatres through the United States.[12] The opening title sequence was computer animated. The computer-generated ballet programmed by me is shown at the end of the film. Ken Knowlton and artist Stan VanDerBeek are shown discussing aspects of the programming of their collaborative computer-animated art movies. There are other sequences in which synthetic speech and graphics research are described – and all justified as forms of communication of humans with computer machines. The movie – though supported by AT&T – can today be seen as a response to the critical parties within AT&T.

DISCUSSION

Although computer art, animation, and music seemed central to the concerns and complaints of AT&T, other areas were also targeted – such as psychology and concert-hall acoustics.

The Bell System was a regulated monopoly, and some people at AT&T were very sensitive to possible questions and criticism from regulators and shareowners. The way to avoid such problems was to focus on research that seemed central only to communications. However digital computers clearly were going to be very important in

the future. Communications between computers and between humans and computers (what was then known as "man-machine communication") would be the way of the future – and thus important topics for research. The 1968 documentary movie "Incredible Machine" strongly presented and defended this kind of research.

The Bell System was a public utility and monopoly. Nearly all of the research and development efforts at Bell Telephone Laboratories, Inc. directly supported the central interests of the Bell System in providing telecommunication services. But Bell Labs in the 1950s and 1960s had become something broader – almost something of a national research laboratory serving the public more broadly. The goal of many young engineers and scientists was to work at Bell Labs – the nation's premier private R&D facility. At its peak around 1983, there were about 22,000 people working at Bell Labs, with about six percent in research.

AT&T was a big bureaucracy. Some individuals within AT&T were overly concerned with the smallest whiff of work that was not focused on their narrow definition of communications. But there seemed to be others within AT&T who had a broader vision – and it was them who Baker must have convinced to turn the tide. Baker spoke often to Bell executives – not only at AT&T, but also at various Bell telephone companies and Western Electric. He convinced them of the value of basic research, and the freedom to explore – of diving "into the woods."

REFERENCES

[1] The memoranda quoted in this article were discovered in the papers of Dr. William O. Baker as they were being examined and prepared for archival purposes. The William O. Baker Papers currently are at the Seely G. Mudd Manuscript Library at Princeton University.

[2] Email dated September 29, 2014 from AT&T Corporate Archivist.

[3] Noll, A. Michael, "Howard Wise Gallery Show of Digital Art and Patterns (1965): A 50th Anniversary Memoir," Accepted for publication in Leonardo (2014).

[4] "Scope of BTL Basic Research," H. M. Craig, August 9, 1965.

[5] "Memorandum to Division 12 Directors," John R. Pierce, September 3, 1965.

[6] Noll, A. Michael, "Human or Machine: A Subjective Comparison of Piet Mondrian's 'Composition with Lines' and a Computer–Generated Picture," *The Psychological Record*, Vol. 16. No. 1, (January 1966), pp. 1-10.

[7] Memorandum by J. R. Pierce, dated September 14, 1965, Subject: Paper by A. Michael Noll, etc., To: W. O. Baker.

[8] Memorandum by E. C. Read to W. O. Baker dated January 21, 1966.

[9] Finston, Mark N., Reporter at Large Column, The Star-Ledger, June 22, 1966, p. 22.

[10] Knowlton, K. C., A. M. Noll, & F. W. Sinden, "Movies from the Computer," Reprint of an Abstract from a talk at a Symposium on "The Human Use of Computing Machines," June 20-21, 1966 (3 pages).

[11] Lieberman, Henry R., "Art and Science Proclaim Alliance in Avant-Garde Loft," *The New York Times*, October 11, 1967, p. 49.

[12] http://techchannel.att.com/play-video.cfm/2011/4/22/AT%26T-Archives-Incredible-Machine