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ビデオヒストリー
—科学技術史の研究ツールとしてのビデオの有効性—
Videohistory
-The Utility of Video as a Research Tool for the History of Science and Technology-

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Abstract

This paper will reexamine the utility of video as a research tool for the history of science and technology. The Lemelson Center for the Study of Invention and Innovation at the Smithsonian Institution's National Museum of American History has carried out oral and video history projects that increase historical documentation on invention and innovation in the United States. The present paper will focus on the first systematic attempt at videohistory at the Smithsonian Institution: the Smithsonian Videohistory Program "Science in National Life" (1988–1992).

Introduction

The "Technological Innovations in Japan" Project has been collecting valuable experiences in the realm of technological innovations throughout the 20th century, analyzing these experiences, and interpreting the results. Some teams of the Project have paid attention to Oral History; however almost none of them have focused on videohistory.

On the other hand, the Lemelson Center for the Study of Invention and Innovation at the Smithsonian Institution's (SI) National Museum of American History (NMAH) has carried out oral history and videohistory projects that increase the historical documentation of invention and innovation in the United States.

Such documentation includes Nobel Voices, a series of video history interviews with laureates (2000–2001). The NMAH and the Deutsches Museum, Bonn collaborated in June 2000 to conduct video interviews with 33 Nobel laureates in Lindau, Germany; Washington, D.C.; and elsewhere in the United States. The video documentation subsequently formed the core of the Nobel Voices Video History Project and the exhibition Nobel Voices: Celebrating 100 Years of the Nobel Prize. In the interviews, the laureates speak about their passion for their work, their childhood inspirations, the spirit of discovery, and the personal meaning of the Nobel Prize.

This paper will reexamine the utility of video as a research tool for the history of science and technology. Its focus will be on the first systematic attempt of videohistory at the SI: the Smithsonian Videohistory Program "Science in National Life" (1988–1992).

Smithsonian Videohistory Program (SVP)

The SI had long employed traditional methods for documenting the history of contemporary science (science since World War II), including the identification, preservation, and organization of textual records (correspondence, minutes of meetings, project reports, data books, observing logs, photographs, and motion picture film) as well as the use of carefully organized and directed audio interviews with people who had played significant roles in the history of recent science. Some Smithsonian staff had employed videotaping as a means of documentation; however, no systematic attempt at videohistory had taken place until the launch of the SVP.

In 1986, the Alfred P. Sloan Foundation awarded the SI a grant to videotape interviews about "Science in National Life" with a specific focus on the history of science and technology. With these funds, the latter created the SVP. Research staff at the SI participated in a four-year experiment in using video to document American twentieth century science and technology and created a

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body of visual evidence, such as the documentation of artifacts, environments, and group interactions, that supplemented traditional historical documentation. The work was later extended for a fifth year.

By 1992, eighteen members of the research staff from the National Air and Space Museum, the NMAH, the Smithsonian Astrophysical Observatory, and the Smithsonian Institution Archives (SIA) had originated twenty-two projects, resulting in over 250 hours of tape, in diverse areas such as instrument building in the space sciences, the development of the Manhattan Project, the emergence of robotics technology, a study of computer hardware and software design, past efforts and the current status of conserving endangered species, and the changing industrial technology of two century-old New England Companies.

Costs averaged $1,500 per day for a single camera crew and over $5,000 per day for a multi-camera studio shoot. Individual projects, organized by session (either single or multiple), took at least one year to complete, including all phases of planning, production, and archival processing. In some cases, projects consisting of multiple sessions took several years before they were finished and opened for public use.

Videotapes, transcripts, and supporting materials are deposited in the SIA. The SVP added data to the archival resources at the SIA, provided material for exhibitions and education, and developed a body of experience from which others may draw conclusions about the value of using video in historical research. The material has been analyzed, numerous requests for copies of videotape have been received, and results received eager reception when shared in national and international forums. The materials will continue to benefit scholars, the field of history, and the methodology of videohistory.

These projects make up, in part, the Smithsonian Videohistory Collection (Table). The Alfred P. Sloan funding ended in 1992, but the Program continues to operate under the direction of Pamela M. Henson of the SIA.

The review of SVP was published in 1993 as *A Practical Introduction to Videohistory: The Smithsonian Institution and Alfred P. Sloan Foundation Experiment*, edited by the Project's program manager Terri A. Schorzman.

Table Smithsonian Videohistory Collection

Project Title	Year	Record Unit(RU)
Black Aviators Interviews	1989-1990	RU9545
Classical Observation Techniques Interviews	1988, 1991	RU9534
Conservation of Endangered Species Interviews	1990	RU 9553
Development of the Electrical Numerical Integrator and Computer (ENIAC) Interview	1988	RU 9537
DNA Sequencing Interviews	1989-1990	RU 9549
Video Portraits: Margaret J. Geller Interviews	1989-1990	RU 9546
Video Portraits: Riccardo Giacconi	2004	RU 9617
The History of Acuson Ultrasound Machines Interviews	1997	RU 9593
The History of the Cell Sorter Interviews	1991	RU 9554
History of the Polymerase Chain Reaction	1992-1993	RU 9577
International Ultraviolet Explorer Interviews	1990	RU 9543
The Manhattan Project Interviews	1987-1990	RU 9531
Medical Imaging Interviews	1989	RU 9544
Minicomputers and Microcomputers Interviews	1987	RU 9533
Multiple Mirror Telescope Interviews	1989	RU 9542
Naval Research Laboratory Space Science Interviews	1986-1987	RU 9539
New United Motor Manufacturing, Incorporated Interviews	1990	RU 9550
The Rand Corporation	1987-1990	RU 9536
Robotics Interviews	1989-1990	RU 9552
Smallpox Virus Sequencing Project	1991	RU 9564
Smithsonian Institution Paleontology	1987-1988	RU 9530
Soviet Space Medicine Interviews	1989	RU 9551
Twentieth Century Small Arms Development Interviews	1988-1990	RU 9532
Twenty-Fifth Anniversary of Mariner 2 Interview	1987	RU 9535
Vermont Structural Slate Company Interviews	1989	RU 9547
Waltham Clock Company Interviews	1989	RU 9548

(http://siarchives.si.edu/research/videohistory_catalogindex.html)

The Use of Artifacts and Environments during a Video Session—An Interview on the Development of the Electrical Numerical Integrator and Computer (ENIAC)

The use of artifacts and environments during a video session is crucial in the creation of effective documentation. Historians were encouraged to "think visually," by deciding how they might use objects, places, and materials to best illustrate or explain the results of scientific thought and technological invention. Those who asked concrete, focused questions were the most successful at obtaining visual information.

The Electrical Numerical Integrator and Computer (ENIAC; Fig. 1), the largest and most powerful early computer, was displayed at the NMAH. It was designed to compute the paths of artillery shells, and to solve computational problems in fields such as nuclear physics, aerodynamics, and weather prediction. The U.S. Army Ordnance Department funded the Moore School for Electrical Engineering at the University of Pennsylvania to build the computer between 1943 and 1945. J. Presper Eckert and John W. Mauchly were the principal designers. ENIAC computed a thousand times faster than any existing device.

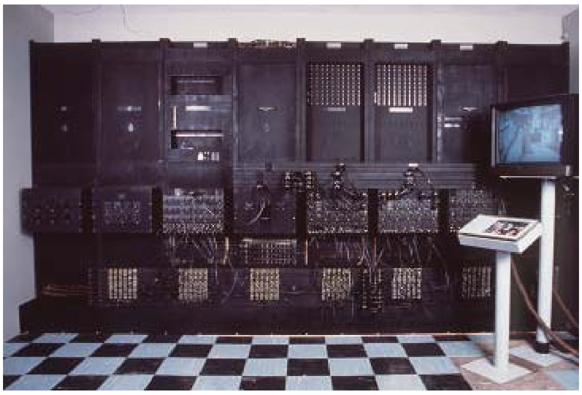

Figure 1 ENIAC on Display
(http://americanhistory.si.edu/collections/comphist/eniac.pdf)

In the "Computing Gallery, Computers Before 1946," of NMAH on February 2, 1988, Curator David Allison interviewed J. Presper Eckert with regard to significant aspects of the design, development, and operation of ENIAC (Fig. 2). Specifically, the session documented both technical and non-technical aspects of the design of ENIAC, including Eckert's engineering background, early uses of calculators to perform ballistics calculations, materials testing, the assembly of components, and the differences between ENIAC and later computers.

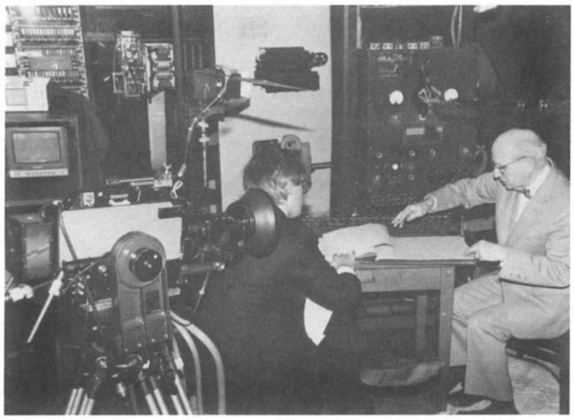

Figure 2 David Allison, left, and J. Presper Eckert, right, talked about Eckert's role in designing the ENIAC computer. Various parts of the computer were available for discussion (Schorzman 1993:32).

Eckert demonstrated the operation of the accumulators, plug-in units, wiring conduits, and function tables with the original artifacts displayed in the gallery. "Segments from the interview demonstrated modes of documentary camera work that included extreme close-ups of artifacts, which illuminated Eckert's explanation of his design" (Schorzman 1989: 119).

This collection consists of one interview session, totaling approximately 2:20 hours of recordings, and 55 pages of transcript. Much of the session was recorded for inclusion in the "Information Age" exhibit, which opened at NMAH in May, 1990. From the perspective of a museum curator, Allison thought that ENIAC should be displayed in a manner that illustrates its origins and initial operation. This is what they endeavored to do in their display of ENIAC in the Information Age exhibition at NMAH. They installed it in a room setting that gave visitors at least a general sense of the size and scope of ENIAC as a machine. How users relate to a machine that fills a room is quite different from how they relate to something that sits in their laps. In Allison's view, among the most important changes in the history of computing are the changes in the size and scale of computers.

Allison found that ENIAC allowed Eckert to explain the design and operation of the machine as he referred to it in detailed description. The result was an inventor's explanation of a thought process applied to a technical process. Allison believed that Eckert's philosophy was "realized in the artifact." One of the project reviewers noted that Eckert provided information that was not available in any other form for the device (accumulator digit storage units); "it is a recording of a man, proud of his technical accomplishment, describing it in terms that make that technical triumph clear…" (Schorzman 1993: 31).

Conclusion

This exploratory program, SVP, sought to determine whether and how video may assume a permanent role in the fuller documentation of the science and technology of our times.

David DeVorkin (National Air and Space Museum), chairman of the program's advisory committee, emphasized the importance of visual information in each specific video project—information that "captured and preserves a dynamic visual portrait of the people and environments that make up modern science and technology."

However, it is not enough simply to hand an object to an interviewee or to go to a historic site. The interviewer has to formulate new types of questions to elicit visual information. Abstract and generalized questions should be replaced with specific ones; "why" questions should be replaced by "how" questions.

The footage created in the program is deposited in the SIA, and it has been used for archival and research purposes and, in some instances, for exhibition. Some people were concerned about the SVP's emphasis on collecting material for indefinite future historical interest rather than for specific and immediate purposes. Exhaustive collection of video footage—without a specific use in mind—seemed far too extravagant for the average research project. Production for a specific purpose, others stated, might limit information that could be historically valuable. The result would be a narrowly defined product that would thus limit its use as a true archival resource.

One of the Smithsonian reviewers of this videohistory suggested that with the combination of content and craft, videohistory created a "texture and flavor" that "other sources simply cannot match" (Schorzman 1993: 81). Most reviewers pointed out that videohistory documentation must adhere to high technical and intellectual standards if it is to be useful. Non-affiliated SI reviewers also suggested that technical quality was important.

Compared to their audiotaped counterparts, videohistory interviews are expensive. Nevertheless, videohistory should be considered as a research tool for the history of science and technology as far as costs match.

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(Allison, David K., "Using the Computer: Episodes across 50 Years")

http://www.siarchives.si.edu/research/videohistory_descriptions.html (Smithsonian Video History Collection Summaries)