



Smithsonian Institution Archives

The Manhattan Project
Videohistory Collection, 1987-1990

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Washington, D.C.
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Collection Overview

Repository:	Smithsonian Institution Archives, Washington, D.C., osiaref@si.edu
Title:	The Manhattan Project Videohistory Collection
Identifier:	Record Unit 9531
Date:	1987-1990
Extent:	29 videotapes (Reference copies). 75 digital .wmv files and .rm files (Reference copies).
Creator::	Manhattan Project (U.S.)
Language:	English

Administrative Information

Preferred Citation

Smithsonian Institution Archives, Record Unit 9531, The Manhattan Project Videohistory Collection

Historical Note

The United States government began underwriting investigations of the feasibility of atomic weapons in October 1941. Within a year, promising research at several universities, particularly at the Metallurgical Laboratory of the University of Chicago, showed that it was possible to produce atomic bombs based on the chain-reacting fission of uranium 235 isotope or of plutonium. This led to the reorganization of the Manhattan District, or "Project," of the U.S. Army Corps of Engineers to make these bombs a reality. Brigadier General Leslie R. Groves directed and coordinated the Project from 1942 to 1945, spending 2.3 billion dollars on nuclear reactors and chemical separation plants at Hanford, Washington, and Oak Ridge, Tennessee, and on the weapon research and design laboratory at Los Alamos, New Mexico. The first plutonium bomb was successfully detonated at Alamogordo, New Mexico, on July 16, 1945. The B-29 bomber *Enola Gay* exploded the first uranium bomb, "Little Boy," over Hiroshima, Japan, on August 6, 1945; the B-29 *Bock's Car* exploded the second plutonium bomb, "Fat Man," over Nagasaki, Japan, two days later.

Introduction

The Smithsonian Videohistory Program, funded by the Alfred P. Sloan Foundation from 1986 until 1992, used video in historical research. Additional collections have been added since the grant project ended. Videohistory uses the video camera as a historical research tool to record moving visual information. Video works best in historical research when recording people at work in environments, explaining artifacts, demonstrating process, or in group discussion. The experimental program recorded projects that reflected the Institution's concern with the conduct of contemporary science and technology.

Smithsonian historians participated in the program to document visual aspects of their on-going historical research. Projects covered topics in the physical and biological sciences as well as in technological design and manufacture. To capture site, process, and interaction most effectively, projects were taped in offices, factories, quarries, laboratories, observatories, and museums. Resulting footage was duplicated, transcribed, and deposited in the Smithsonian Institution Archives for scholarship, education, and exhibition. The collection is open to qualified researchers.

Descriptive Entry

Stanley Goldberg, consulting historian for the Smithsonian's National Museum of American History (NMAH), recorded eighteen video sessions with fifty-five participants involved in the engineering, physics, and culmination of the Manhattan Project. Goldberg examined the research and technologies necessary to realize the uranium and plutonium bombs. He supplemented interviews with visual documentation of the industrial plants that refined and separated the isotopes, and of the machinery that delivered and dropped the bombs. Interviewees explained the other steps of designing, building, testing and detonating an atomic bomb. Discussions with participants also elicited a social history of the Project as recalled by various men and women responsible for different duties in different locales. Between January 1987 and June 1990 the sessions were recorded on-site or in-studio in Hanford, Washington; Boston, Massachusetts; Oak Ridge and Louisville, Tennessee; Alamogordo and Los Alamos, New Mexico; Washington, D.C.; and Suitland, Maryland. The sessions are divided into five series: Hanford, Oak Ridge, Cambridge, Los Alamos, and Alberta.

This collection consists of eighteen interview sessions, separated into five series, totaling approximately 47:00 hours of recordings, and 1188 pages of transcript.

Please note that Sessions 14 and 15 in Series Four are comprised of dual sets of tape from two cameras positioned at different angles.

Names and Subject Terms

This collection is indexed in the online catalog of the Smithsonian Institution under the following terms:

Subjects:

- Atomic bomb
- Interviews
- Military history
- Oral history
- Physics
- Science -- History
- Technology -- History
- Women -- History
- World War, 1939-1945

Types of Materials:

- Transcripts
- Videotapes

Names:

- Agnew, Harold M.

Albaugh, Frederic W., 1913-1999
Ashworth, Frederick L., 1912-2005
Babcock, Dale F.
Bacher, Robert F. (Robert Fox), 1905-2004
Bainbridge, Kenneth T. (Kenneth Tompkins), 1904-1996
Banic, George M., Jr.
Bethe, Hans A. (Hans Albrecht), 1906-2005
Black, Colleen, 1925-2015
Bolling, Connie
Borst, Lyle B., 1912-
Bradbury, Norris, 1909-1997
Cease, Wilson A.
Chapman, Vivian Russell
Christy, Robert F., 1916-2012
Clinton Engineer Works (Oak Ridge, Tenn.)
Creutz, Edward C., 1913-2009
Denton, Lawrence
Enola Gay (Bomber)
Fat Man (Bomb)
Feld, Bernard Taub, 1919-
Foster, Richard F.
French, A. P. (Anthony Philip), 1920-
Frisch, David H., 1918-1991
Frisch, Rose E. (Rose Epstein)
Goldberg, Stanley, interviewer
Googin, John M., 1922-1994
Greager, Oswald H.
Hanford Engineer Works
Hawkins, David, 1913-2002
Hornig, Donald F., 1920-2013
Hornig, Lilli S.
Huber, Paul
Keim, Chris P.
Larson, Clarence E. (Clarence Edward), 1909-
Larson, Jane W.
Little Boy (Bomb)
Livingston, Audrey B.
Livingston, Robert S.
Los Alamos Scientific Laboratory
Manhattan Project (U.S.)
Mark, Carson
Matthias, Franklin T.
McCue, William P.
Morrison, Philip
National Air and Space Museum (U.S.)
National Air and Space Museum (U.S.). Paul E. Garber Preservation, Restoration, and Storage Facility
Parsons, James A.
Perkins, Leonard F., Sr.
Project Alberta
Ramsey, Norman, 1915-2011
Reines, Frederick, 1918-1998
Serber, R. (Robert)
Smith, Alice Kimball

Smith, Cyril Stanley, 1903-1992
Sweeney, Charles W.
Tinian Island Airbase
Vanstrum, Paul R.. 1920-2010
Wahlen, Ralph K.
Weinberg, Alvin Martin, 1915-2006
Wigner, Eugene Paul, 1902-1995
Wilson, Jane S.
Wilson, Robert R., 1914-2000
Wright, Wakefield A., 1915-2007

Geographic Names:

Hiroshima-shi (Japan) -- History -- Bombardment, 1945
Nagasaki (Japan)
Nagasaki-shi (Japan) -- History -- Bombardment, 1945
Trinity Test Site (N.M.)

Container Listing

Series 1: Hanford

Interviewees in this series contributed in various roles to the refinement of plutonium 239 isotope at the Hanford Engineer Works in the state of Washington. In January of 1943, General Groves chose the site for construction of three full-scale plutonium piles for the mass production of plutonium 239--an isotope for the chain reaction in an atomic bomb--as well as water-treatment plants for cooling the reactors. The E.I. Du Pont de Nemours Company also built four remote-controlled "canyons" for the chemical separation of plutonium from uranium 238. Sessions were shot at the Columbia Cable Television studio and on-site at the Hanford Reservation.

Participants for Session One assisted in operations at the "B" site nuclear reactor as operators or support personnel. Lawrence Denton began work at the Hanford construction camp in September 1942 as a receiving and shipping clerk. Wilson A. Cease came to Hanford as a Du Pont employee in March 1944, and worked as a security patrolman in the area where uranium slugs were canned and sealed. Jess R. Brinkerhoff and Ralph K. Wahlen were both employed by the Remington Arms plant in Salt Lake City, Utah, and transferred to Hanford. Brinkerhoff arrived in November 1943, and worked in the fire department before becoming a power operator in a water treatment plant. Wahlen was employed in the fuel piece canning area. R.M. Buslach arrived in Hanford after the war and worked in plant maintenance for the General Electric Company.

Session Two participants worked for the Du Pont Company as chemical engineers at Hanford. Wakefield A. Wright and Vivian Russell Chapman were first transferred from Alabama Ordnance Works by Du Pont to the Manhattan Project facilities at Oak Ridge, Tennessee, for training before arriving in Hanford in 1944. William P. McCue was employed at the Oklahoma Ordnance Works before training at the Argonne National Laboratory in Chicago, Illinois, and relocating to Hanford. The responsibilities of these three men at Hanford included training the crews and supervising the operators in the nuclear reactors and chemical separation plants.

Session Three brought together a group of Hanford administrators. Oswald H. Greager had been a chemist for Du Pont after receiving his Ph.D. in that field from the University of Michigan in 1929. He came to Hanford in October 1944, from the Separations Development Division at the Clinton Engineer Works in Oak Ridge, Tennessee. Greager, on military duty at Hanford, served as Technical Officer and supervised the work of the contractor in the chemical separation area. Richard F. Foster joined the project in September 1943, on a contract with the Office of Scientific Research and Development at the University of Washington College of Fisheries. He studied the effects of radiation on the Columbia River and eventually became concerned with evaluating radiological doses received by people from all environs at Hanford. Leonard F. Perkins, Sr., came to Hanford in the spring of 1944 as an employee of the United States General Accounting Office to audit the contract of the Du Pont Company. In 1946, he transferred to the Atomic Energy Commission and returned to Hanford in 1951 to direct government-contracted construction there until 1973. During World War II Frederic W. Albaugh worked in the Metallurgical Laboratory at the University of Chicago as a group leader in the plutonium chemistry section. He arrived in Hanford to head its plutonium chemistry section in 1947 and continued to work there in various administrative capacities until 1971. Colonel Franklin T. Matthias, who had worked under General Groves in construction contracting for the Pentagon, was largely responsible for the site selection of Hanford. Groves appointed Matthias in February of 1943 to be commanding officer of the Hanford facilities.

The discussions detailed the nature of the workload at Hanford, the living conditions, and the administration of the Project. The sessions were shot on three-quarter-inch U-matic tape and provided visual documentation of the "B" site nuclear reactor, tools used for the charge/discharge process, and period photographs of the interiors of the chemical separation "canyons."

Interviews

Interviews

Session 1: January 13, 1987

Interviews

At the Hanford Reservation "B" site nuclear reactor face and in the reactor control room, featured Brinkerhoff, Buslach, Cease, Denton, and Wahlen on the operation of the first large-scale reactor, c. 1942-1945, including: discussion and demonstration of procedures for making the reactor operational; canning of uranium slugs and the charge/discharge process of the reactor; cooling system operations and general reactor maintenance; methods for controlling the reactor's power levels and operating the various safety systems. Visual documentation included: period photographs of Hanford Reservation under construction; "B" reactor face; reactor control room and instrument boards; specialized tools developed for canning uranium slugs.

Interviews

Transcript, pp. 1-61, of videotape recording, 2 hours.

Interviews

Video Recording of Interview: Total Recording Time: 2 hours

Note:

- Original Masters: 6 U-matic videotapes
- Preservation Masters: 6 Motion jpeg 2000 and 6 mpeg digital files
- Dubbing Masters: 6 U-matic videotapes
- Reference Copies: 1 VHS videotape, 6 Windows Media Video and 6 Real Media digital files

Interviews

Session 2: January 13, 1987

Interviews

At the Columbia Cable Television station studio, Kennewick, Washington, featured Chapman, McCue, and Wright on their roles in producing plutonium at Hanford, c. 1942-1945, including: how they came to Hanford; conditions and operating procedures in the chemical separation "canyons"; charge/discharge procedures for the reactor; development of specialized equipment; accidents and problems involving radioactive material; living conditions during and after construction. visual documentation included: period photographs of Hanford reactors and canyons under construction.

Interviews

Transcript, pp. 1-56, of videotape recording, 2 hours.

Interviews

Video Recording of Interview: Total Recording Time: 2 hours

Note:

- Original Masters: 2 U-matic videotapes
- Preservation Masters: 2 Motion jpeg 2000 and 2 mpeg digital files
- Dubbing Masters: 2 U-matic videotapes

- Reference Copies: 1 VHS videotape, 2 Windows Media Video and 2 Real Media digital files

Interviews

Session 3: January 14, 1987

Interviews

At the Columbia Cable Television station studio, featured Albaugh, Foster, Greagher, Matthias, and Perkins on administration at Hanford, c. 1942-1945, including: selection of site; staffing and conditions during the construction period; Manhattan District accounting and purchasing procedures; measures to abate or control potential radioactive hazards; efforts to ascertain impact of Hanford operations on the Columbia River and local fisheries.

Interviews

Transcript, pp. 1-39, of videotape recording, 2 hours.

Interviews

Video Recording of Interview: Total Recording Time: 2 hours

Note:

- Original Masters: 2 U-matic videotapes
- Preservation Masters: 2 Motion jpeg 2000 and 2 mpeg digital files
- Dubbing Masters: 2 U-matic videotapes
- Reference Copies: 1 VHS videotape, 2 Windows Media Video and 2 Real Media digital files

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Series 2: Oak Ridge

Interviewees in this collection contributed in various roles to the refinement of uranium 235 isotope at the Clinton Engineer Works in Oak Ridge, Tennessee. Built concurrently with the Hanford Reservation, the Clinton complex was designed for continued research and the refinement of the fissionable isotope uranium 235 from uranium 238. The sessions were shot at a studio of Kennedy Maxwell Productions, and on-site at the Y-12 Electromagnetic Separation Plant and the K-25 Gaseous Diffusion Plant.

Participants for Session Four were instrumental in designing and running the nuclear reactors at Oak Ridge and Hanford. Dale F. Babcock received his Ph.D. in physical chemistry at the age of twenty-three from the University of Illinois in 1929. Du Pont employed his services as a research chemist until 1942, when he became a technical specialist on the explosive potential of plutonium. Before the war, Lyle B. Borst stayed at the University of Chicago as a Research Associate after his doctoral studies in physics. In 1943 he was appointed chief physicist of the Clinton Laboratories near Oak Ridge, where he remained until 1946. Edward C. Creutz received his Ph.D. from the University of Wisconsin in 1939, taught physics at Princeton University, and joined the Manhattan Project as a group leader between 1942 and 1946. After he received his M.A. from Columbia University in 1939 Albert Wattenberg was a spectroscopist for Schenley Products, Incorporated. He spent a year with the Office of Scientific Research and Development at Columbia University before moving to the Metallurgical Laboratory in Chicago as a group leader under Enrico Fermi in January 1942.

Alvin M. Weinberg, born in 1915, earned his three degrees in physics at University of Chicago by 1939. He stayed there during the war at the Metallurgical Laboratory and moved to Oak Ridge in 1945. Eugene P. Wigner was born in Hungary in 1902. He earned his doctorate in physics at the Technical University of Berlin in 1925 and came to the United States at the behest of Princeton five years later. Together with Leo Szilard he played a key role in sparking President Franklin D. Roosevelt's interest in atomic power, and during the war he designed the Hanford reactors. Wigner won the Nobel Prize for physics in 1963.

The four participants of Session Five helped operate the isotope separation machinery designed by the physicists and engineers. Colleen Black was nineteen years old when she arrived in July 1944 and was assigned to find pipe leaks at the K-25 Plant. The other three worked in the Y-12 Plant. Connie Bolling was teaching at Coburn High School, Virginia, in 1943 when he gave six weeks' notice to join a government project that, in his understanding, was to end the war. He trained cubicle and vacuum pump operators and remained after 1945 in the effort to maximize calutron output. Jane W. Larson arrived in September 1943 as a historian, before switching to technical editor, reporting on the effort to maintain vacuum consistency. She also worked part-time for the Oak Ridge Journal. Audrey B. Livingston, born in 1926, started in 1944 as a cubicle operator.

Participants for Session Six helped design, build and operate the calutrons in the Y-12 Plant. George M. Banic, Jr., worked on high voltage power supplies for the General Electric Company in Schenectady, New York, and came to Oak Ridge in March 1944, to help with the stable isotope program. He stayed after the war to continue isolating isotopes at the pilot plant until it closed in 1975. Clarence E. Larson and Robert S. Livingston received their Ph.D.s from the University of California at Berkeley and continued their research at the Radiation Laboratory there until 1943. Larson took charge of the technical staff at the Y-12 plant at Oak Ridge through 1950 when he became director of the Oak Ridge National Laboratories. Livingston oversaw Stone and Webster Engineering Corporation's design of the Y-12 Plant and continued working at Oak Ridge until his retirement in 1981. John M. Googin sought out a position in nuclear chemistry while finishing his B.S. at Bates College in Maine. He started work at Oak Ridge as a process chemist in the summer of 1944, assisting in the recycling of uranium waste. Chris P. Keim received his Ph.D. in chemistry from the University of Nebraska in 1940. In 1944 he left his fellowship at the Mellon Institute to become a research physicist for the stable isotope program at the pilot plant. Keim continued working at Oak Ridge until his retirement in 1971.

Session Seven participants helped design and operate the K-25 Plant for the gaseous diffusion of uranium 235. Paul R. Vanstrum and James A. Parsons majored in chemical engineering at Columbia University

where they participated in the manufacture of part of the diffusion barrier. Vanstrum began working for Union Carbide Corporation, the K-25 operating contractor, after graduation and transferred to Oak Ridge in August 1944. He stayed at the K-25 Plant until it closed in 1964. Parsons continued to work on the manufacture of diffusion barriers in New York until September 1944, when he went to Oak Ridge as a foreman. Paul Huber also had a degree in chemical engineering and began work at Oak Ridge in 1944.

Goldberg focused discussions on the theory and practice of reactor construction; nature of the workload; living conditions; and security measures at Oak Ridge. The sessions were shot on one-inch tape and provided visual documentation of the Y-12 and K-25 plants, and calutron components, as well as period photographs of Oak Ridge.

Interviews

Interviews

Session 4: March 3, 1987

Interviews

At the Kennedy Maxwell Productions studio, Louisville, Tennessee, featured Babcock, Borst, Creutz, Wattenberg, Weinberg, and Wigner on the conversion of fission theory to the construction of nuclear reactors, c. 1939-1944, including: pre-war fission research; Albert Einstein's letter to President Franklin D. Roosevelt; the Chicago pile or reactor (CP-1); problems with canning uranium slugs for reactors at Oak Ridge and Hanford; conflicts between university-based physicists and engineers employed by DuPont; xenon poisoning of early reactors; impact of security measures on research; acquisition of raw materials; motivation of physicists by German progress in fission research. Visual documentation included: painting of first successful testing of Chicago pile; period photographs of X-10 reactor at Oak Ridge.

Interviews

Transcript, pp. 1-138, of videotape recording, 4 hours.

Interviews

Video Recording of Interview: Total Recording Time: 4 hours

Note:

- Original Masters: 4 1" reels
- Preservation Masters: 4 Motion jpeg 2000 and 4 mpeg digital files
- Dubbing Masters: 4 U-matic videotapes
- Reference Copies: 2 VHS videotapes, 4 Windows Media Video and 4 Real Media digital files

Interviews

Session 5: March 3, 1987

Interviews

At the Kennedy Maxwell Productions studio featured Black, Bolling, Larson, and Livingston on the plant operators' lives and work at Oak Ridge, c. 1943-1949, including: living conditions during and after construction; layout of Oak Ridge and Clinton Engineer Works; job training at Y-12 and K-25 Plants; racial segregation; knowledge of goal of the Manhattan Project; security measures; reactions to news of Hiroshima bombing. Visual documentation included: period photographs of Oak Ridge and Clinton Engineer Works.

Interviews

Transcript, pp. 1-74, of videotape recording, 2 hours.

- Interviews Video Recording of Interview: Total Recording Time: 2 hours
 Note: • Original Masters: 2 1" reels
 • Preservation Masters: 2 Motion jpeg 2000 and
 2 mpeg digital files
 • Dubbing Masters: 2 U-matic videotapes
 • Reference Copies: 1 VHS videotape, 2
 Windows Media Video and 2Real Media
 digital files
- Interviews **Session 6: March 4, 1987**
- Interviews At the Kennedy Maxwell Productions studio, featured Banic, Larson,
 Googin, Keim, and Livingston on the development of calutrons for uranium
 separation, c. 1943-1945, including: early designs at the University of
 California at Berkeley; improvement of calutron equipment; obtaining and
 returning silver from the U.S. Treasury Department; training of operators; the
 magnet short-circuit crisis; chemistry of recycling uranium waste; security
 measures and their effect on research; shipping uranium 235 to Los Alamos;
 safety precautions; reactions to Hiroshima bombing and the Smyth Report.
 Visual documentation included: schematic drawings and period photographs
 of the Y-12 Plant; models of calutron components.
- Interviews Transcript, pp. 1-111, of videotape recording, 4 hours.
- Interviews Video Recording of Interview: Total Recording Time: 4 hours
 Note: • Original Masters: 4 1" reels
 • Preservation Masters: 4 Motion jpeg 2000 and
 4 mpeg digital files
 • Dubbing Masters: 4 U-matic videotapes
 • Reference Copies: 2 VHS videotapes, 4
 Windows Media Video and 4 Real Media
 digital files
- Interviews **Session 7: March 5, 1987**
- Interviews In the Diffusion Cell and Control Area of the K-25 Gaseous Diffusion
 Plant, Oak Ridge, Tennessee, featured Huber, Parsons, and Vanstrum
 on the design and operation of the first gaseous diffusion plant, the K-25,
 c. 1943-1945, including: principles of the diffusion process; manufacture
 of pumps, diffusers, and seals; design and construction of K-25 building;
 working conditions; training of operators; operation of K-25 from control
 room; operation of a diffusion cell; safety precautions. Visual documentation
 included: schematic drawing of diffusion process; period photographs of K-25
 equipment and controls.
- Interviews Transcript, pp. 1-50, of videotape recording, 2 hours.
- Interviews Video Recording of Interview: Total Recording Time: 2 hours

- Note:
- Original Masters: 2 1" reels
 - Preservation Masters: 2 Motion jpeg 2000 and 2 mpeg digital files
 - Dubbing Masters: 2 U-matic videotapes
 - Reference Copies: 1 VHS videotape, 2 Windows Media Video and 2 Real Media digital files

Interviews **Session 8: March 6, 1987**

Interviews On location at the K-25 Gaseous Diffusion Plant (Control Floor and Pipe Gallery) and the Y-12 Electromagnetic Separation Plant (Cubicle Area and Beta Unit Production Area), Oak Ridge, Tennessee, consisted of approximately thirty minutes of visual documentation of interiors, including: half-mile length of one wing of the K-25 Plant; explanation by Goldberg of construction of K-25; K-25 pipe gallery and catwalk; exterior and interior views of Y-12 calutron units; exterior and interior views of Y-12 control boards during operation. Note: There is no time code for the VHS tape of this session.

Interviews Transcript, pp. 1, of videotape recording, 1 hour.

Interviews Video Recording of Interview: Total Recording Time: 1 hour

- Note:
- Original Masters: 1 1" reel
 - Preservation Masters: 1 Motion jpeg 2000 and 1 mpeg digital files
 - Dubbing Masters: 1 U-matic videotape
 - Reference Copies: 1 VHS videotape, 1 Windows Media Video and 1 Real Media digital files

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Series 3: Cambridge

Interviewees in this collection worked on the physics of atomic bomb design at the Los Alamos Scientific Laboratory in New Mexico. The sessions were taped at the studios of Audvid Film and Tape Production, in Boston, Massachusetts.

Four physicists who played important roles in the "Trinity" atomic bomb test at Alamogordo, New Mexico, were reunited for Session Nine. Kenneth Bainbridge, a physicist at Harvard University, designed and built the Harvard cyclotron which was used at Los Alamos. In 1940 he joined the radar research at the Massachusetts Institute of Technology (MIT), and soon after went to Cambridge University in England to work on radar and uranium experiments. He was recruited for the Manhattan Project and moved to Los Alamos in the summer of 1943. In March 1944, he took charge of the Trinity test and administered it from site selection to detonation. Donald F. Hornig, also a physicist at Harvard before he joined the Los Alamos staff, designed the high-voltage capacitors that fired the Fat Man's multiple detonators. Philip Morrison received his Ph.D. in theoretical physics from the University of California at Berkeley in 1940, and worked on the Project at the Metallurgical Laboratory of the University of Chicago before arriving at Los Alamos in 1944 to serve as Physicist and Group Leader. Robert Wilson had recently completed his Ph.D. at the University of California at Berkeley and taught at Princeton University before he arrived in Los Alamos in April 1943. He headed various subgroups engaged in cyclotron research for the Trinity test.

Session Ten participants worked at Los Alamos with different levels of responsibility. Robert Wilson and Robert Serber were Division Leaders. Serber received his Ph.D. from the University of Wisconsin in 1934, and worked with J. Robert Oppenheimer as a Research Associate at the University of Chicago's "Met Lab" before arriving at Los Alamos. Serber's introductory lectures on the physics and chemistry of the Project in April 1943 became the Los Alamos Primer.

Anthony French received his A.B. in physics from Cambridge University. Before coming to Los Alamos in 1944, he worked at Cambridge's Cavendish Laboratory. David H. Frisch was still a graduate student when he arrived at Los Alamos as a Junior Physicist in 1943. He received his Ph.D. from MIT in 1947.

Four women from Los Alamos convened to discuss their professional and domestic lives in Session Eleven. Lilli S. Hornig received her M.A. in chemistry from Harvard in 1943 and her Ph.D. in 1950. From 1944 to 1946 she served as Staff Scientist in the plutonium chemistry division at Los Alamos, and as Section Leader for high explosives development. Rose E. Frisch received her Ph.D. in physiological genetics from the University of Wisconsin in 1943. At Los Alamos, she monitored the effects of radiation in the medical laboratory. Alice Kimball Smith received her Ph.D. in history from Yale University and taught social studies at Los Alamos High School. After the war she served as historian for the Association of Los Alamos Scientists. Her book, *A Peril and a Hope: The Scientists' Movement in America 1945-1947*, was published in 1965. Jane S. Wilson also taught at the Los Alamos High School.

Physicists who worked on the implosion program gathered for Session Twelve. Bernard T. Feld worked at the Met Lab at the University of Chicago before coming to Los Alamos in 1944. He received his Ph.D. in physics from Columbia University in 1945. Cyril Smith received his D.Sc. in metallurgy from MIT in 1926. He served as associate division leader in metallurgy at Los Alamos from 1943 to 1946. Robert Serber and Philip Morrison appeared again in this interview.

Goldberg encouraged discussion of the culture and the workload at Los Alamos, and the attitudes towards that work and its consequences.

Interviews

Interviews

Session 9: December 1, 1987

- Interviews At the Audvid Film and Tape Productions studio, Boston, Massachusetts, featured Bainbridge, Hornig, Morrison, and Wilson on preparations for and execution of the Trinity test at Alamogordo, c. 1944-1945, including: working groups at Los Alamos; instrumentation devised for the Trinity test, the hundred-ton test, the "Jumbo" blast containment canister, and the spontaneous fission of plutonium; Los Alamos reorganization and formation of the G division during the summer of 1944; measurements of the effects of the bombing of Hiroshima. Visual documentation included: copies of Manhattan Project documents; Los Alamos personnel graph; photographs from Bainbridge's Trinity test report.
- Interviews Transcript, pp. 1-95, of videotape recording, 3 hours.
- Interviews Video Recording of Interview: Total Recording Time: 3 hours
Note:
- Original Masters: 3 1" reels
 - Preservation Masters: 3 Motion jpeg 2000 and 3 mpeg digital files
 - Dubbing Masters: 3 U-matic videotapes
 - Reference Copies: 2 VHS videotapes, 3 Windows Media Video and 3 Real Media digital files
- Interviews **Session 10: December 1, 1987**
- Interviews At the Audvid Film and Tape Productions studio, featured French, Frisch, Serber, and Wilson on the organization of Los Alamos and the scientific activities there, c. 1943-1945, including: rationale for forming the Laboratory and considerations for site selection; whether to make Los Alamos a military or civilian camp; background to the Serber lectures of April 1943; performance of Oppenheimer as administrator and colleague; living conditions; changing perceptions of the nature of making an atomic bomb; the spontaneous fission of plutonium and its effect on the organization of the laboratory; the British contingent, and comparisons between the Los Alamos and Cavendish Laboratories; controversies over the use of the bomb; objections to pursuing research for the hydrogen bomb; formation of the Association of Los Alamos Scientists. There is no extra visual documentation in this session.
- Interviews Transcript, pp. 1-79, of videotape recording, 3 hours.
- Interviews Video Recording of Interview: Total Recording Time: 3 hours
Note:
- Original Masters: 3 1" reels
 - Preservation Masters: 3 Motion jpeg 2000 and 3 mpeg digital files
 - Dubbing Masters: 3 U-matic videotapes
 - Reference Copies: 2 VHS videotapes, 3 Windows Media Video and 3 Real Media digital files

Interviews

Session 11: December 2, 1987

Interviews

At the Audvid Film and Tape Productions studios, featured Hornig, Frisch, Smith, and Wilson on the roles of women in both the domestic and scientific life of Los Alamos, c. 1943-1946, including: homemaking facilities and child care arrangements; social and recreational activities in the area; school and library systems; Hornig's role as a scientist in the implosion program and high explosives development; Frisch on radiation research at the medical laboratory; agreement on constraints on women's participation in scientific activities; perceptions of the Trinity test and post-Trinity conflicts between the scientific community and the military. Visual documentation included: period photographs of Los Alamos.

Interviews

Transcript, pp. 1-93, of videotape recording, 3 hours.

Interviews

Video Recording of Interview: Total Recording Time: 3 hours

- Note:
- Original Masters: 3 1" reels
 - Preservation Masters: 3 Motion jpeg 2000 and 3 mpeg digital files
 - Dubbing Masters: 3 U-matic videotapes
 - Reference Copies: 2 VHS videotapes, 3 Windows Media Video and 3 Real Media digital files

Interviews

Session 12: December 2, 1987

Interviews

At the Audvid Film and Tape Productions studios, featured Feld, Smith, Serber, and Morrison on the design and fabrication of a viable implosion system for the plutonium bomb, c. 1944-1945, including: metallurgical experiments to determine characteristics of plutonium; technologies for creating plutonium hemispheres; strategies to prevent plutonium oxidation; design and use of the initiator; preparations at Tinian Island for Nagasaki bombing; division of responsibilities for various bomb components; early surveys at Hiroshima to determine effects of the bomb. Visual documentation included: copies of Manhattan Project documents; gold foil ring for the initiator in the Trinity device; uranium 238 sample.

Interviews

Transcript, pp. 1-67, of videotape recording, 2 hours.

Interviews

Video Recording of Interview: Total Recording Time: 2 hours

- Note:
- Original Masters: 2 1" reels
 - Preservation Masters: 2 Motion jpeg 2000 and 2 mpeg digital files
 - Dubbing Masters: 2 U-matic videotapes
 - Reference Copies: 1 VHS videotape, 2 Windows Media Video and 2 Real Media digital files

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Series 4: Los Alamos

Interviewees in this collection also contributed to the atomic bomb design and testing program in New Mexico. J. Robert Oppenheimer, the physicist from the University of California at Berkeley charged with supervising this part of the Manhattan Project, picked the Los Alamos location because of its isolation and its beauty. The sessions were shot at the Trinity test site and in a Los Alamos conference room.

The participants in Session Thirteen worked on the Trinity test at different levels of responsibility. Kenneth T. Bainbridge administered the test from site selection to the write-up of the official report. He came to Los Alamos in the summer of 1943, having previously worked on radar at Massachusetts Institute of Technology and in England; he had also designed and built Harvard University's first cyclotron. Robert Wilson was not yet thirty when he arrived at Los Alamos in April 1943, where he headed various subgroups using cyclotron research. Wilson had come directly from a Ph.D. at Berkeley and a teaching and cyclotron research post at Princeton. During the Trinity test he helped install the bomb and measured implosion and fission behavior during the explosion.

Session Fourteen participants worked at various levels on the theoretical underpinnings of an atomic weapon. Hans Bethe, head of the Theoretical Division at Los Alamos, left Germany in 1933 for Cornell University before applying his research to the war effort in 1940. He gave up his work on explosives and radar in July 1942 when he became convinced of the feasibility of an atomic bomb. Bethe returned to Cornell after the war and won the Nobel Prize in Physics in 1967. Frederick Reines made his reputation as a doctoral student at New York University when he developed a new equation in applied mathematics. Reines joined the Theoretical staff in late 1943 and remained at Los Alamos as a Group Leader until 1959. Canadian J. Carson Mark came to Los Alamos via research at the Metallurgical Laboratory in Chicago and a doctorate under Oppenheimer at Berkeley. Fellow Canadian Robert Christy arrived by way of George Placzek's Montreal study group and summer seminars in applied mathematics at Brown University in 1941 and 1942.

In addition to Bainbridge, Session Fifteen included experimentalists Robert Bacher and Norris E. Bradbury, and administrator David Hawkins. Bacher led fission studies at Cornell and worked at MIT's Radiation Laboratory before heading the Experimental and Gadget Divisions at Los Alamos. His opposition to militarized working conditions manifested itself further in his post-war efforts for civilian control of nuclear research. Bradbury put his Berkeley Ph.D. to work at the U.S. Navy's Dahlgren Proving Ground for four years before his assignment to the Ordnance Division at Los Alamos. He replaced Oppenheimer as director of the Los Alamos Laboratory in September 1945. Hawkins grew up in New Mexico and went to Berkeley to earn his Ph.D. in philosophy. He returned as administrative assistant to Oppenheimer in the summer of 1943, becoming the primary liaison between the scientists and the military administration of the Project.

Goldberg elicited comparisons of the work experience from the theoretical and experimental physicists as well as discussions of social life at Los Alamos. The series was shot on half-inch Betacam tape and provides visual documentation of the Trinity test site, Los Alamos in 1989, and period photographs of Los Alamos and preparations for the Trinity test.

Interviews

Interviews

Session 13: August 15, 1989

Interviews

At the Trinity test site, Alamogordo, New Mexico, featured Bainbridge and Wilson. Their commentary on the preparations for and detonation of the Trinity bomb, c. 1944-1945, was sparked almost solely by the surviving structures at the site and included: post-blast sample collection test site selection; Jumbo blast containment canister; Julian Mack's camera system;

quality of life at and uses of base camp; U.S. Air Force overflights and bombing practices; effect of the blast on base camp. Visual documentation included: Ground Zero; Jumbo; West 800 camera bunker; Base Camp; McDonald Ranch house; West 10,000 observation bunker.

Interviews

Transcript, pp. 1-60, of videotape recording, 2 hours, 20 minutes.

Interviews

Video Recording of Interview: Total Recording Time: 2 hours, 20 minutes

Note:

- Original Masters: 7 Beta videotapes
- Preservation Masters: 7 Motion jpeg 2000 and 7 mpeg digital files
- Dubbing Masters: 3 U-matic videotapes
- Reference Copies: 2 VHS videotapes, 7 Windows Media Video and 7 Real Media digital files

Interviews

Session 14: August 18, 1989

Interviews

At Fuller Lodge, Los Alamos Scientific Laboratory, featured Bethe, Christy, Reines, and Mark on the theoretical physicist's view of the Laboratory's operation, c. 1943-1945, including: reasons for participation; division of labor between and relationship of theoretical and experimental physicists; insulation from other Project researchers; uranium hydride program; theoretical and experimental emphasis on physical power of atomic blast; implosion research; reactions to the Trinity test; post-blast measurements of yield. Note: Session 14 was taped on two separate recorders, which resulted in two distinct set of images on tapes. The audio, however, is the same. Only one tape is necessary to view the interview.

Interviews

Transcript, pp. 1-51, of videotape recording, 2 hours.

Interviews

Video Recording of Interview: Total Recording Time: 2 hour

Note:

- Original Masters: Camera A: 6 Beta videotapes
- Camera B: 6 Beta videotapes
- Preservation Masters: 12 Motion jpeg 2000 and 12 mpeg digital files
- Dubbing Masters: Camera A: 2 U-matic videotapes
- Camera B: 2 U-matic videotapes
- Reference Copies: Camera A: 1 VHS videotape
- Camera B: 1 VHS videotape, 12 Windows Media Video and 12 Real Media digital files

Interviews

Session 15: August 18, 1989

Interviews

At Fuller Lodge, Los Alamos Scientific Laboratory, featured Bacher, Bainbridge, Bradbury, and Hawkins on the experimental physicist's

experience at the Laboratory, c. 1943-1945, including: methods of recruitment and reasons for participation; debate on civilian or military nature of Lab; differences between internal and external exchanges of information; organization of Laboratory; gun experiments; relationship of Groves and Oppenheimer; weekend recreation; understanding Klaus Fuchs; predicting the Soviet bomb; post-blast depression and efforts to regulate nuclear power.

Interviews

Transcript, pp. 1-62, of videotape recording, 2 hours, 20 minutes. [Note: Session 15 was taped on two separate recorders, which resulted in two distinct set of images on tapes. The audio, however, is the same. Only one tape is necessary to view the interview.]

Interviews

Video Recording of Interview: Total Recording Time: 2 hours, 20 minutes

Note:

- Original Masters: Camera A: 7 Beta videotapes
- Camera B: 7 Beta videotapes
- Preservation Masters: 14 Motion jpeg 2000 and 14 mpeg digital files
- Dubbing Masters: Camera A: 3 U-matic videotapes
- Camera B: 3 U-matic videotapes
- Reference Copies: Camera A: 2 VHS videotapes
- Camera B: 2 VHS videotapes, 14 Windows Media Video and 14 Real Media digital files

Interviews

Session 16: August 19, 1988

Interviews

Consisted of visual documentation of the landscape of Los Alamos in 1945 and 1988, including: nine still photographs of the preparations for Trinity; views of Los Alamos Scientific Laboratory and environs.

Interviews

Transcript, pp. 1-3, of videotape recording, 1 hour.

Interviews

Video Recording of Interview: Total Recording Time: 1 hour

Note:

- Original Masters: 2 Beta videotapes
- Preservation Masters: 2 Motion jpeg 2000 and 2 mpeg digital files
- Dubbing Masters: 1 U-matic videotape
- Reference Copies: 1 VHS videotape, 2 Windows Media Video and 2 Real Media digital files

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Series 5: Alberta

Four participants from "Project Alberta" convened for Sessions Seventeen and Eighteen. This phase of the Manhattan Project dealt with the conversion of the Trinity test device into the practical weapons systems that were used twice on Japan. The interviewees were among those who designed the bombs to fit the B-29, wired them with redundant electronics, rehearsed the mission, established a base on Tinian Island, and released the bombs over Hiroshima and Nagasaki. The sessions were shot at the National Museum of American History in Washington, D.C., and at the National Air and Space Museum's Paul E. Garber Facility in Suitland, Maryland.

Norman F. Ramsey, Jr., received his Ph.D. in physics from Columbia University in 1940. During World War II, Ramsey consulted with various government groups concerned with military technology. In 1943 he moved from the offices of the Secretary of War to Los Alamos, where he became a group leader for bomb delivery. After the war, he returned to Columbia and won the Nobel Prize for Physics in 1959. Harold M. Agnew received his A.B. in chemistry from the University of Denver in 1942. His advisor referred him to Enrico Fermi, under whom his responsibility was for some of the measurements of the atomic explosions over Japan. After the war Agnew earned his Ph.D. in particle physics at the University of Chicago before returning to Los Alamos Scientific Laboratory. He directed the Laboratory there from 1970 to 1979.

Frederick L. Ashworth graduated from the United States Naval Academy and completed the Naval Postgraduate School course in ordnance engineering shortly before the Japanese attack on Pearl Harbor in 1941. After service in the Pacific Theater of Operations, he worked for William S. Parsons and Norman F. Ramsey on the detonation components of the atomic bombs. Ashworth acted as weaponeer on the Nagasaki mission and as General Groves' representative on Tinian Island. His book, *The Atomic Bombings of Hiroshima and Nagasaki*, was published in 1947. Charles W. Sweeney was born in 1920 and grew up in eastern Massachusetts. He enlisted as an air cadet in April 1941, and rose to commander of a bomber squadron in the European Theater of Operations. With nearly three thousand hours of accident-free flight time to recommend him, Sweeney joined Colonel Paul Tibbetts' 509th Composite Group of B-29's in September 1944. He piloted an observation plane at the Hiroshima bombing and dropped the "Fat Man" over Nagasaki from Bock's Car. After he completed his enlistment, he returned to Massachusetts to begin a wholesale leather business and served in the Air National Guard until 1976.

Goldberg used the *Enola Gay* site to draw from the participants details of their involvement with the technologies of Project Alberta. Other questions stimulated recollections of experiences on Tinian Island and on the two missions to Japan. The sessions were shot with half-inch Betacam tape and provide visual documentation of the Little Boy and Fat Man bomb models and the B-29 *Enola Gay*.

Interviews

Interviews

Session 17: June 5, 1990

Interviews

At the National Museum of American History, Washington, D.C., featured Agnew, Ashworth, Ramsey, and Sweeney on their assignments in Project Alberta, c. 1944-1945, including: designing the Fat Man plutonium bomb, contents and aerodynamics; definition of weaponeer's role and mechanics of bomb; William S. Parsons' contributions to Manhattan Project; reasons for interviewees' participation in Manhattan Project; flight training for the 509th Composite Group; preparation of Tinian Island as flight base ("Project Silverplate"); life on Tinian with conventional B-29 bomber crews; comparison of Hiroshima and Nagasaki missions; photography of atomic explosions; disposal of facilities at Tinian after Nagasaki explosion; reaction to use of the bombs. Visual documentation included: the Fat Man bomb casing on display at the Museum.

- Interviews Transcript, pp. 1-109, of videotape recording, 3 hours, 20 minutes.
- Interviews Video Recording of Interview: Total Recording Time: 3 hours, 20 minutes hours
 Note:
 - Original Masters: 10 Beta videotapes
 - Preservation Masters: 10 Motion jpeg 2000 and 10 mpeg digital files
 - Dubbing Masters: 4 U-matic videotapes
 - Reference Copies: 2 VHS videotapes, 10 Windows Media Video and 10 Real Media digital files
- Interviews **Session 18: June 6, 1990**
- Interviews At the Enola Gay restoration project, the National Air and Space Museum's Paul E. Garber Facility, Suitland, Maryland, featured Agnew, Ashworth, Ramsey, and Sweeney on the specific technologies required for Project Alberta, c. 1944-1945, including: designing the Little Boy uranium bomb, contents and aerodynamics; development of bomb release mechanism; Bernard O'Keefe's claim to last-minute rewiring of Little Boy; flight qualities of B-29; pilot-bombardier communication the Nagasaki mission; operation of Norden bombsight; comparison of the two bombs' electronic characteristics; mechanics of monitoring devices at Hiroshima. Visual documentation included: the Little Boy bomb casing on display next to the *Enola Gay*; the bomb bay, cockpit, and weaponeer's cabin of the *Enola Gay*.
- Interviews Transcript, pp. 1-39, of videotape recording, 2 hours.
- Interviews Video Recording of Interview: Total Recording Time: 2 hours
 Note:
 - Original Masters: 6 Beta videotapes
 - Preservation Masters: 6 Motion jpeg 2000 and 6 mpeg digital files
 - Dubbing Masters: 2 U-matic videotapes
 - Reference Copies: 1 VHS videotape, 6 Windows Media Video and 6 Real Media digital files

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