Smithsonian Institution Archives

Fred L. Whipple Oral History Interviews, 1976

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Collection Overview

Repository:	Smithsonian Institution Archives, Washington, D.C., *osiaref@si.edu*
Title:	Fred L. Whipple Oral History Interviews
Identifier:	Record Unit 9520
Date:	1976
Extent:	4 audiotapes (Reference copies).
Creator::	Whipple, Fred L. (Fred Lawrence), 1906-2004, interviewee
Language:	English

Administrative Information

Prefered Citation

Smithsonian Institution Archives, Record Unit 9520, Fred L. Whipple Oral History Interviews

Historical Note

Fred Lawrence Whipple (1906-2004), received the B.A. in mathematics with a minor in physics and astronomy from the University of California at Los Angeles in 1927 and the Ph.D. in astronomy from the University of California at Berkeley in 1931. His early training focused on comet orbits. After teaching for a year at Stanford University, he joined the staff of the Harvard College Observatory in 1931 and remained in Cambridge throughout his career. During the 1930s his work focused on double station meteor research. From 1943 to 1945, he developed radar countermeasures for the U. S. Army Radiation Laboratory of the Office of Scientific Research and Development. After World War II he worked on development of the Super-Schmidt cameras to photograph meteors and continued research on the influx of material from comets into the interplanetary medium. His comet research culminated in publication of the Icy Comet Model in 1950. During the forties he also conducted studies of meteor hazards to spacecraft, inventing the meteor bumper, and served on the Rocket and Satellite Research Panel. In the early fifties, with Wernher von Braun and Cornelius J. Ryan, he coauthored a series of popular articles on the conquest of the space frontier.

His teaching career at Harvard University progressed from Instructor, 1932-1938; Lecturer, 1938-1945; Associate Professor, 1945-1950; Professor, 1950-1970; Chairman of the Department of Astronomy, 1949-1956; to Phillips Professor of Astronomy, 1970-1977. Thus when Whipple was appointed Director of the Smithsonian Astrophysical Observatory (SAO) in July 1955, he moved its headquarters to the Cambridge campus and continued as Professor and member of the Harvard College Observatory staff. He reorganized the Smithsonian's observatory and reoriented its research program. Under his directorship, the staff grew from a handful to more than five hundred, including over sixty scientists.

At the request of the National Science Foundation and the National Academy of Sciences, Whipple began development of Baker-Nunn cameras to track artificial satellites during the International Geophysical Year (1957-1958). With the help of Armand N. Spitz, he also developed the Moonwatch optical tracking

program, which utilized teams of volunteers observing satellites with hand-held telescopes. When Sputnik was launched in October of 1957, the Moonwatch teams were the only U. S. mechanism available to track the Russian satellite. The SAO subsequently received large contracts from the National Aeronautics and Space Administration to operate the Satellite Tracking Program (STP), an optical tracking system with Baker-Nunn camera stations located all over the globe. Whipple's satellite tracking work earned him the 1963 Distinguished Civilian Service Award from President John F. Kennedy.

The Prairie Network, an optical tracking system designed to photograph meteorites and fireballs in order to calculate their orbits, created by Whipple and Richard E. McCrosky, began observations in 1964. Coordination of STP camera observations with Jodrell Bank Observatory radio data on flare stars led to the first identification of radio noise from any star besides the sun.

SAO relied on early computers such as the Mark IV, IBM 7090, and CDC 6400 for rapid processing of massive quantities of data. Baker-Nunn and Super-Schmidt camera data were directly processed by automated means, which made possible the 1966 SAO Star Catalog, coordinated by Katherine L. Haramundanis. Whipple required direct publication from computer tapes, a first for the U. S. Government Printing Office. Observations from the STP were progressively refined during the sixties through new laser tracking techniques and advances in automated data processing, to provide improved geodetic and geophysical data. In the early sixties, stellar atmosphere models were developed with the aid of an IBM 7090 and after 1966 a CDC 6400, in anticipation of far ultraviolet light data from orbiting observatories. Based on this experience in upper atmosphere research, Whipple was appointed project director for the orbiting astronomical observatories from 1958 to 1972.

The telegraph service of the International Astronomical Union came to the SAO in 1965 under the coordination of Owen J. Gingerich and later Brian G. Marsden. It utilized SAO's sophisticated communications network and led eventually to the creation of the Center for Short-Lived Phenomena by Robert A. Citron.

Development of an observatory site at Mt. Hopkins, Arizona, began in 1966. Chosen by Whipple for its altitude and seeing conditions, the site was dedicated in 1981 as the Fred Lawrence Whipple Observatory. On this site, in conjunction with the U. S. Air Force and University of Arizona, he developed the technically innovative Multiple Mirror Telescope (MMT), which commenced observations in May of 1979.

In addition to his own research program on comets, meteors, and interplanetary materials, Whipple coordinated the SAO research programs in celestial mechanics, geodesy, meteoritics, radio astronomy, neutrino searches, stellar atmosphere models, and the atomic clock project to test the theory of relativity. He encouraged NASA's lunar program and development of the space telescope.

Whipple was distinguished both for his theoretical work in astrophysics and his technical innovations in such areas as tracking cameras, multiple mirror telescopes, and meteor bumpers. A member of the National Academy of Sciences, Whipple received the Academy's J. Lawrence Smith Medal in 1949 for his meteor research. He was awarded the Kepler Medal by the American Association for the Advancement of Science in 1971 and the Joseph Henry Medal of the Smithsonian Institution in 1973. Through his work on numerous federal and private boards, panels, and commissions, Whipple was influential in the development of national programs for research in astrophysics and creation of a space exploration program.

Whipple retired from administration of SAO in 1973 but continued active research as a Senior Scientist from 1973 to 1977. Upon his retirement in 1977, he was appointed Emeritus Phillips Professor of Astronomy at Harvard.

Introduction

The Smithsonian Institution Archives began its Oral History Program in 1973. The purpose of the program is to supplement the written documentation of the Archives' record and manuscript collections with an Oral History Collection, focusing on the history of the Institution, research by its scholars, and contributions of its staff. Program staff conducts interviews with current and retired Smithsonian staff and others who have made significant contributions to the Institution. There are also interviews conducted by researchers or students on topics related to the history of the Smithsonian or the holdings of the Smithsonian Institution Archives.

Whipple was interviewed for the Oral History Collection because of his central role in the modernization of the SAO and his outstanding contributions to science. For additional information, see the following related collections in Smithsonian Archives: the records of the Smithsonian Astrophysical Observatory; the Fred Lawrence Whipple Papers; and Record Unit 9542, Multiple Mirror Telescope videohistory interviews.

Descriptive Entry

Whipple was interviewed on June 24 and 25, 1976 by Pamela M. Henson. The interviews cover his education; radar countermeasure work during World War II; role in the development of national programs for astrophysics and space exploration; research program on comets, meteors, and interplanetary material; administration of SAO; development of Mt. Hopkins, MMT, and optical tracking programs; and reminiscences of colleagues such as Imre G. Izsak, Craig M. Merrihue, and Carlton W. Tillinghast.

Names and Subject Terms

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

Subjects:

Astronomy
Astrophysics
Interviews
Meteorites
Oral history
World War, 1939-1945

Types of Materials:

Audiotapes
Transcripts

Names:

Fred Lawrence Whipple Observatory
Harvard College Observatory
Henson, Pamela M., interviewer
Mt. Hopkins Observatory
Multiple Mirror Telescope Observatory
Smithsonian Astrophysical Observatory. Project Celescope
Smithsonian Astrophysical Observatory. Satellite Tracking Program

Stanford University
Whipple, Fred L. (Fred Lawrence), 1906-2004

Container Listing

Interviews

Interviews **Interview 1: June 24, 1976**

Interviews Covers Whipple's education and early career, c. 1924-1960, including: his early career at Harvard, focusing on double station meteor work in the 1930s and development of Super-Schmidt cameras in the 1940s; satellite work, beginning in 1946 with studies of meteor hazards to spacecraft and the meteor bumper, the Rocket and Satellite Research Panel, International Geophysical Year, use of Super-Schmidts to track satellites, and establishment of the STP; his appointment as director of SAO in 1955 and its transfer to Cambridge, Massachusetts; his educational background at University of California; early research projects on the flux of material into interplanetary medium and development of the Icy Comet Model; his involvement in rocket research, beginning with upper atmosphere meteor research; popular articles on conquest of the moon and space frontier, written with Cornelius J. Ryan, Wernher von Braun, and others in 1953-54; involvement with government organizations, such as the Upper Atmosphere Rocket Research Panel, the Scientific Advisory Board to the U. S. Air Force, National Advisory Committee on Aeronautics, and National Aeronautics and Space Administration; his role in World War II, especially his work at the U. S. Army Radiation Laboratory developing radar countermeasures; his views concerning defense department sponsorship of basic research at the Office of Scientific Research and Development and the Naval Research Laboratory, and the later establishment of the National Science Foundation; his views on funding of basic research in the national interest; his role in the development of the field of meteoritics; relations with scientists in Iron Curtain countries during the McCarthy era; establishment of the STP after 1957; the research program at SAO, including unsuccessful attempts to pursue x-ray and radio astronomy, development of meteor and interplanetary materials research, and development of the MMT at Mt. Hopkins, Arizona; administration of SAO, including funding, staffing, and administrative support of research; relationship of SAO to the larger astronomical community; development of the Moonwatch optical tracking program in 1957, its role in tracking Sputnik, and the role of amateurs in astronomy.

Digital Content: The Super-Schmidt Camera installed at a station at Organ Pass, New Mexico, c. 1960. [Image no. 91-6390]

Digital Content: Under a banner for Operation Moonwatch, people are lined up at the entrance to a Satellite Demonstration set up in Biloxi, Mississippi, c. 1958. [Image no. 91-6389]

Interviews Transcript, pp. 1 - 48, of audio recording, 2.0 hours.

Interviews Recording of Interview: Total Recording Time: 2.0 hours

Note:
- Original Masters: 2 5" reel-to-reel analog audiotapes

- Reference Copies: 2 audiocassette tapes

Interviews **Interview 2: June 25, 1976**

Interviews Discusses Whipple's research and tenure as director of the SAO, 1955-1976, especially: the Prairie Network, established to photograph meteorites and fireballs in order to calculate their orbits; comparisons of photographic and radio data on flare stars to identify radio noise from stars; development of stellar atmosphere models in the 1960s; automated data processing at SAO for research and to publish large data sets, such as the *Star Catalog*; importance of rapid publication of data, such as the standard earths; refinement of observational techniques used in the STP, Prairie Network, Radio Meteor Project, Orbiting Solar Observatory, and Orbiting Astronomical Observatories; his involvement in the lunar program; a national program for astrophysics in relation to NSF and NASA; SAO's minimal involvement with the Division of Radiation; SAO research projects on Greenland micrometeorite studies, neutrino searches, and atomic clock tests of the theory of relativity; development of an observatory on Mt. Hopkins, Arizona, with "pin money"; construction of the MMT on Mt. Hopkins in 1971; decrease in national funding for astrophysics in late 1960s and effects on SAO; transfer of the central bureaus to SAO, including the International Astronomical Union telegraph service and the Center for Short-Lived Phenomena; SAO research in the sixties, including support for the space telescope project, Edward L. Fireman's high energy research on meteorites, and the radio meteor program; reminiscences of colleagues, including Craig M. Merrihue, Imre G. Izsak, and Carlton W. Tillinghast; his role in the Apollo program and reminiscences of the first lunar landing in 1969; formation of the Center for Astrophysics after Whipple's retirement in 1973; his research strategy to encourage innovative work in meteoritics, geodetics, x-ray and radio astronomy; his current research on comet theory and tektites.

Interviews Transcript, pp. 49-88, of audio recording, 1.5 hours.

Interviews Recording of Interview: Total Recording Time: 1.5 hours

Note:
- Original Masters: 2 5" reel-to-reel analog audiotapes
- Reference Copies: 2 audiocassette tapes