



Photo courtesy A. Ingersoll

ANDREW P. INGERSOLL
(1940 –)

INTERVIEWED BY
SARA LIPPINCOTT

April 13 and 26, 2004

ARCHIVES
CALIFORNIA INSTITUTE OF TECHNOLOGY
Pasadena, California



Subject area

Planetary science

Abstract

Interview in two sessions conducted by Sara Lippincott in 2004 with Andrew P. Ingersoll, Earle C. Anthony Professor of Planetary Science at the California Institute of Technology. Discusses parents' social activism in the 1930s. His youth and education at Amherst College (B.A. physics, 1960) and Harvard University (M.A. physics, 1961; PhD 1966); his early interest in atmospheres, oceans and meteorology; working with A. Arons and H. Stommel at Woods Hole on ocean acoustics. Recruited to Caltech in 1966 in planetary science; early atmospheric studies of Venus, Jupiter (Great Red Spot) and Mars; collaborates with G. Munch and G. Neugebauer. Involvement with NASA's *Pioneer 11* and *Voyager* imaging team at JPL; results of *Voyager*'s "Grand Tour" of Saturn, Uranus, and Neptune; his theories on winds and turbulence in outer space. The Shoemaker-Levy comet, Hubble Space Telescope observations, and Jupiter's effect on protecting the Earth from comets. Works with the Soviet *Venera* space program on Venus' atmosphere; visit to the Soviet Union in the 1980s. *Galileo* and photographing Jupiter's atmosphere; Europa lander to study its subterranean ocean. Discusses recent evidence of water on Mars, terraforming Mars, and colonizing planets. Concludes with administrative work at Caltech: Executive officer for planetary sciences (1987-1994); G. Wasserburg as division head

(1987-1988); Caltech committees; Caltech's core curriculum and the need for greater emphasis on research time. Teaching atmospheric dynamics; discussion of global warming; research in oceanography and the precession of the equinoxes.

Administrative information

Access

The interview is unrestricted.

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Contact information

Archives, California Institute of Technology
Mail Code 015A-74
Pasadena, CA 91125
Phone: (626)395-2704 Fax: (626)793-8756
Email: archives@caltech.edu

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INTERVIEW WITH ANDREW P. INGERSOLL

BY SARA LIPPINCOTT

PASADENA, CALIFORNIA

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TABLE OF CONTENTS

INTERVIEW WITH ANDREW P. INGERSOLL

Session 1

1-35

Family background: parents' Depression-era work to help disadvantaged farmers; mother raised and educated in Alabama; father in Brooklyn. A strong family tradition of social activism: supporters of organized labor, World War II cause, FDR, civil rights. Born in Chicago in 1940; family moves to Brooklyn in 1945; attends elementary and high schools in Brooklyn and Flatbush. Enters Amherst in 1956 at age 16. Recollections of working with A. Arons and H. Stommel at Woods Hole on ocean acoustics. (1-18)

By sophomore year, interested in geophysics and meteorology. Summer of 1957, studies dissolved gas in seawater at Woods Hole. Summer of 1958, hitchhikes through Europe and Great Britain. Summer of 1959, back at Woods Hole; meets future wife Sarah Morin. Writes senior thesis on geophysical fluid dynamics with Arons as advisor. Enters Harvard as graduate student in physics in 1960. Recollections of E. Lorenz's pioneering work in mathematical physics. Receives PhD in 1966. G. Wasserburg makes offer of assistant professorship at Caltech. (18-35)

Session 2

36-93

Recruited for planetary science. Recollections on the study of Venus' atmosphere and the runaway greenhouse effect, Jupiter's Great Red Spot, and the composition of Mars' polar caps and atmosphere. Together with G. Munch and G. Neugebauer works with infrared radiometry to determine Jupiter's temperature and composition. (36-52)

Describes his first graduate student, G. Orton's work regarding Jupiter's temperature. Becomes principal investigator for *Pioneer 11*'s Saturn encounter, summer 1979. Discusses R. Dicke and H. Goldenberg's observations of solar oblateness and the counter argument by Ingersoll and G. Chapman of the existence of photospheric faculae. (52-60)

Discusses involvement with *Voyager* imaging team: E. Stone as chief scientist; together with R. Beebe studies Jupiter's atmosphere and its effect on the Great Red Spot; frequent meetings at JPL. *Voyager*'s "Grand Tour" of Saturn, Uranus, and Neptune and continued involvement with the imaging team. New insights amassed from the Grand Tour: new knowledge regarding the moons of the outer solar system; Uranus' eight-degree axis tilt and its effect on Uranus' cloud bands; Neptune's strong winds. Ingersoll's observations and theory: winds stronger as you move farther outward in the solar system; sunlight generates turbulence; hence, less sunlight, less turbulence, stronger winds in Neptune's atmosphere. (60-71)

Discusses the Shoemaker-Levy comet, the Hubble Space Telescope observations, and Jupiter's effect on protecting the Earth from comets. Works with the Soviet *Venera* space program regarding analysis of balloon motion in Venus' atmosphere; anecdotes of his visit to the Soviet Union in the 1980s. (72-76)

Discusses *Galileo* and photographing Jupiter's atmosphere. Interest in a Europa lander to study its subterranean ocean; participation with T. Johnson and R. Greeley. Discusses recent evidence of water on Mars, terraforming Mars, and colonizing planets. (77-84)

Executive officer for planetary sciences (1987-1994); G. Wasserburg as division head (1987-1988); participation on other Caltech committees. Discusses the core curriculum and the need for greater emphasis on research time than classroom time, the advisor system, and the planetary science option at Caltech; also discusses the present climate regarding greater funding for research but less support for the undergraduate program. Currently teaching courses in atmospheric dynamics; discussion of global warming; research in oceanography and the precession of the equinoxes.
(84-93)

CALIFORNIA INSTITUTE OF TECHNOLOGY
ORAL HISTORY PROJECT

Interview with Andrew P. Ingersoll
Pasadena, California

by Sara Lippincott

Session 1 April 13, 2004

Session 2 April 26, 2004

Begin Tape 1, Side 1

LIPPINCOTT: Tell us a little bit about where you were born and your family, and where you grew up. Do you want to start at the very beginning, and then we'll go on to your early interest in science?

INGERSOLL: Sure. I'll start before I was born. My parents were radicals from the 1930s, and that posed a sort of dilemma for me—at least, I saw it that way—because they truly believed that you could save the world, and they worked toward saving the world.

LIPPINCOTT: Were they Socialists?

INGERSOLL: They were Communists, and they were active in workers' rights and farmers' rights in the Midwest. My favorite subject was physics, and science, so I felt, as a teenager, that I wasn't following my parents' path and wasn't saving the world—at least not the way they were saving it. So that was the dilemma. The fact that I was good at science and loved it was the overwhelming thing that pushed me into science. It was sort of inspired; it was what I'd been meant to do.

LIPPINCOTT: Where do you think that impulse came from? There was no genetic component to it, was there? That is, were your parents scientists?

