

★ S T A R D U S T

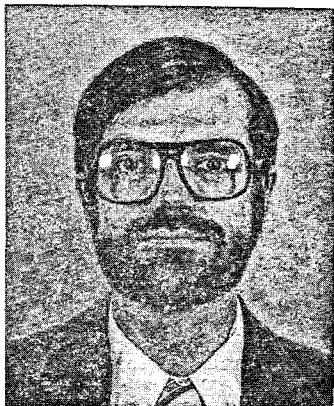


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TATAREWICZ ESSAYS ON GOVERNMENT AND SPACE SCIENCE



MR. TATAREWICZ

Joseph N. Tatarewicz, Smithsonian Pre-doctoral Fellow, will speak at the 8 January meeting of National Capital Astronomers. He will discuss the role of government in the development of planetary astronomy.

Note that the January meeting date will be the second Saturday, not the usual first.

With the dramatic technological advances of this century, astronomical emphasis seemed to shift from the planets to the stars and their associations. Nonetheless, a few astronomers continued to apply the rapidly developing techniques to planetary study. Photography, radiometry, and spectrometry increasingly revealed atmospheric constituents, orbital elements, and internal heat sources. Radio and radar astronomy, spaceflight technology, and increased federal involvement in science soon combined

under the catalysis of international political developments to draw far greater attention to the Moon and planets. Tatarewicz will consider the effects of these factors on scientific disciplines and institutions.

Joseph N. Tatarewicz received his B.A. in philosophy from Towson State University in 1972, and the M.A. from the Catholic University of America in 1976, and the M.A. in history of science from Indiana University in 1981. He is currently completing his doctoral thesis at the National Air and Space Museum. He is a member of the History of Science Society, the Society for the Social Studies of Science, the Planetary Society, and National Capital Astronomers.

JANUARY CALENDAR — *The public is welcome.*

Tuesday, January 4, 11, 18, 25, 7:30 PM — Telescope-making classes at Chevy Chase Community Center, Connecticut Avenue and McKinley Street, NW. Information: Jerry Schnall, 362-8872.

Friday, January 7, 14, 21, 28, 7:30 PM — Telescope-making classes at American University, McKinley Hall basement. Information: Jerry Schnall.

Friday, January 7, 14, 21, 8:00 PM — NCA 14-inch telescope open nights with Bob Bolster, 6007 Ridgeview Drive, south of Alexandria off Franconia Road Between Telegraph Road and Rose Hill Drive. Call Bob at 960-9126.

Saturday, January 8, 6:15 PM — Dinner with the speaker at the Thai Room II, 527 13th Street, NW. Reservations unnecessary.

Saturday, January 8, 8:15 PM — NCA monthly meeting at the Department of Commerce Auditorium, 14th and E Streets, NW. Joseph Tatarewicz speaks.

Saturday, January 15, 8:00 PM — Discussion group at the Department of Commerce, 14th and E Streets, NW: Astronomical software. See page 19.

DECEMBER LECTURE

The December 1982 meeting of National Capital Astronomers heard Dr. John C. Mather describe NASA's Cosmic Background Explorer (COBE) satellite. Dr. Mather organized the group which proposed COBE in 1974.

COBE, scheduled to be launched in 1989, is to map the residual 3 Kelvin radiation from the "Big Bang" era in great detail and with high accuracy. Its three cryogenic detectors will also map other infrared sources from 1 micrometer to 1 centimeter. The diffuse radiation, the primary target, must be distinguished from these. In so doing, it is sure to find other quite unanticipated things. COBE's expected mission lifetime is about a year.

In the expanding universe, looking back in time is also looking to great distances. We see quasars 10^{10} light years away; we therefore also see them 10^{10} years ago. COBE's target is still farther and earlier; the primeval plasma. In examining the 3 Kelvin radiation, then, the COBE is exploring a very young, very small universe, enormously hotter than it is today.

In the early universe radiation dominated; most of the mass was in the form of radiation. Matter now dominates, but the remnant background radiation is still as strong a source as all others. It was discovered only in the 1960's, because it was not expected to be observable.

COBE will also study other longwave radiation sources. At the 3K emission peak of the background these are not negligible. The galaxy radiates at greater than 1 cm, interstellar dust heated by starlight, and the local zodiacal light radiate largely at shorter wavelengths, and not uniformly distributed in space.

The 3K background seems to be completely isotropic; there is currently no contrary evidence, except possibly what results from galactic motion within the universe. Testing and refinement of this result is a major mission of COBE.

COBE will be in a near-polar orbit at 900 km altitude. Its three instruments will be shielded from the Earth, the Sun, and the telemetry transmitter.

The three instruments are a Far-Infrared Absolute Spectrophotometer (FIRAS), the Diffuse Background Experiment (DIRBE), and the Differential Microwave Radiometer (DMR). The FIRAS and DIRBE are cooled to 1.6K by a liquid helium cryostat. The satellite spins at 1 rpm to enable the DMR and DIRBE to scan the sky.

FIRAS will measure all sources between 100 and 1 cm. A cooled Fourier-transform spectrometer will scan the spectrum. A 3K black-body reference will maximize sensitivity to distortions of the cosmic background.

DIRBE will detect any extragalactic background radiation and measure foreground sources, distinguishing these by their spectral and spatial characteristics. An off-axis Gregorian telescope will focus 1-degree resolution images onto a chopper. Energy will be divided among 10 band filters covering the 1-to-300- μ range. Sensitivity better than 10^{-11} W/cm²/sr/Hz^{1/2} will be reached at all wavelengths. An on-board microprocessor will remove peaks from charged particles.

DMR will map the cosmic background radiation and detect spatial gradients at 31.4, 53, and 90 GHz. The frequencies are chosen to minimize interference from known astronomical and man-made sources. Random errors will be minimized by a year of observations, and biases by thorough shielding from local sources. Relative temperatures to .0003 K in 7° fields of view will result. Two orthogonally polarized receivers at each frequency will increase signal-to-noise ratio and provide redundancy. They will be connected alternately at 100 Hz to two antennas pointed 60° apart, each 30° off the spin axis.

COBE will transmit data at 4,000 bits per second. The data will be reduced and deposited in the National Space Science Data Center within a year of the conclusion of the mission. Exhaustion of the liquid helium will terminate the mission in about a year.

John B. Lohman

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OCCULTATION EXPEDITIONS PLANNED

Dr. David Dunham is organizing observers for the following grazing lunar occultations in January. For further information call Dave at 585-0989.

UT Date	Time	Place	Vis Mag	Pcnt Sunlit	Cusp Angle	Min Aper
01-03-83	03:18*	Richmond, VA	5.7	81	3N	10 cm
01-18-83	23:51	Thornburg, VA	8.4	19	14S	15 cm
01-22-83	22:30	Cape May Court House, NJ	6.7	58	14S	8 cm
01-22-83	23:13	Clarksburg, MD	8.7	58	13S	20 cm
01-23-83	23:53	Snowden, NC	6.5	69	13S	5 cm

* Led by Dr. Wayne Warren. Call 474-0814.

JANUARY DISCUSSION GROUP TO FEATURE ASTRONOMICAL SOFTWARE

Whether or not you use a computer, this session should be useful to you. Join us at the Department of Commerce, Conference Room D (on the hall near the auditorium door) on Saturday, 15 January, at 8:00 pm. Emphasis will be on the development of useful sources of quick answers to unique problems, e.g., the local sidereal time at your site, the altitude and azimuth of an object at a particular location and time, calculated from right ascension and declination, or a ray trace of a particular optical system. Come and suggest others, learn what is available, where to obtain it, and how to put it to use.

Bring problems, questions, programs, algorithms, software, printouts, trade, share, discuss, and let's develop a computational group of long-range usefulness.

NCA WELCOMES NEW MEMBERS

Jesus C. Balleza
6125 Windward Drive
Burke, VA 22015

Mr. & Mrs. Gerald T. Christner
13635 Darnestown Road
Gaithersburg, MD 20878

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6136 32nd Street, NW
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Fairfax Station, VA 22039

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2110 N. Kensington Street
Arlington, VA 22205

Thomas H. Reppert
218 Castleton Terrace
Upper Marlboro, MD 20772

Mr. & Mrs. C. Scott Weber
10405 Thrift Road
Clinton, MD 20735

COSTS ARE UP; DUES MUST FOLLOW

Increased costs of *Sky & Telescope* and printing indicate a needed increase in dues. The trustees have accordingly set new rates effective 1 January 1983: Regular, \$26; Group, \$28; Junior with *Sky & Telescope*, \$20; Junior without, \$8. (All members will continue to receive *Star Dust*, one copy to groups.)

ON LIGHT POLLUTION

NCA has received a request from Rutgers University for information for a study on light pollution. They will be advised of June LoGuirato's success in Virginia, and Dr. Victor Slabinski's newspaper campaign.

Slabinski says, "It is better to extinguish a street light than to curse the brightness!"

EXCERPTS FROM THE IAU CIRCULARS

1. September 23 — Henson, Kemp, and Krauss, University of Oregon, observed an extremely low minimum in the light curve of V1343 Aquilae (SS433), the lowest of 305 measurements they have made over the past 4 years.

2. November 14 — A. Lowe, Royal Astronomical Society of Canada, and D. P. Hube, Devon Astrophysical Observatory, observed the occultation of BD+24 542 by (690) Wratislavia using 30- and 50-cm reflectors. Durations of 13 and 8 seconds were timed, and no secondary events were seen.

3. November 15 — P. Maley, T. Williams, and A. Kelly observed the occultation of BD +38 542 by (375) Ursula from near Houston, Texas. Durations of 13.6 to 16.7 seconds were timed, and no secondary events were seen.

4. November 22 — Laques, Lecacheaux, and Vedere, Meudon Observatory, recorded an 11.3-second occultation of BD+29 579 by (93) Minerva on videotape using the Pic du Midi 2-meter telescope. Leborgne visually observed a 7.5-second occultation from 15 km north of Pic du Midi.

SMITHSONIAN OFFERS PROGRAMS

A series of Wednesday night talks will begin on 19 January at 7:30 pm in the Air and Space Museum Planetarium. Von Del Chamberlain will speak on archaeoastronomy among the early American Indian tribes. On 26 January the annual Werner Von Braun Memorial Lecture will be given by William H. Pickering, former director of Jet Propulsion Laboratory, now president of a research corporation in Pasadena.

FREE SOFTWARE OFFERED

John Godbey, NCA, has written a program for an Atari with 24k, which calculates the rising and setting times and positions of many objects, and the phases of the Moon and planets. For a tape, send a blank cassette and return mailer, or for a printout, a self-addressed stamped envelope to John Godbey, 6730 Swarthmore Drive, Alexandria, VA 22307. Telephone (703) 768-6068.

★ STAR DUST

WASHINGTON, D. C.



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