



ATOMIC CLOCKS PROBE RELATIVITY THEORY



DR. RICHARD KEATING

An important scientific application of atomic technology will be the topic of the May 6 meeting of NCA. Dr. Keating, of the U. S. Naval Observatory Time Service Division, will discuss the nature of atomic timekeeping and outline the development history of atomic clocks. He will then review their recent applications to testing the general theory of relativity. The importance of atomic clocks in this work lies in the circumstance that the earth does not serve as an inertial coordinate system.

Richard E. Keating grew up in Nebraska, receiving a bachelor's degree in mathematics and physics from Creighton University. He was a Woodrow Wilson Fellow at the University of Maryland studying plasma physics. There he earned his Ph.D. in astrophysics in 1966. Since 1965, Dr. Keating has been working at the U. S.

Naval Observatory on the art of timekeeping. He is a member of the American Physical Society, the American Geophysical Union, and American Institute of Astronautics and Aeronautics.

MAY CALENDAR

Monday, May 1, 8, 15, 22, 29, 7:30 PM — Telescope-making classes at the Chevy Chase Community Center, Connecticut Avenue and McKinley Street, NW. Information: Jerry Schnall, 362-8872.

Thursday, May 4, 18, 8:30 PM — Neighborhood Astronomy on the observing deck of the Chevy Chase Community Center, Connecticut Avenue and McKinley Street, NW. Information: Rene Lamadrid, 585-5569.

Friday, May 5, 12, 19, 26, 7:30 PM — Telescope-making classes at American University, McKinley Hall basement. Information: Jerry Schnall, 362-8872.

Saturday, May 6, 6:15 PM — Dinner with the speaker at Bassin's Restaurant, 14th Street and Pennsylvania Avenue NW. No reservations needed.

Saturday, May 6, 8:15 PM — NCA monthly meeting at the Department of Commerce Auditorium, 14th and E Streets, NW. Dr. Richard Keating will speak on atomic clocks and relativity.

Election of new officers follows the lecture. Voters may register before the meeting. **ALL MEMBERS PLEASE BE PRESENT SO THAT THERE IS A QUORUM.**

Saturday, May 13, 7:00 PM — All-NCA star party at Mr. and Mrs. Jerry Hudson's, Knoxville, Maryland, about an hour northwest of D. C. Black skies prevail in this rural area. Snacks and refreshments will be offered. Those who can take riders or telescopes please stop by the Chevy Chase, Maryland Library, 8001 Connecticut Avenue, north of East-West Highway, at 6:00 PM. Information and directions: Jean Radoane, 434-0443. **DRESS WARMLY!**

Saturday, May 20, 9:00 PM — "Exploring the Sky," produced jointly by NCA and the National Park Service. South of Military Road on Glover Road, NW, near Rock Creek Nature Center. Planetarium program if cloudy. Information: Bob McCracken, 229-8321.

1972 NCA ELECTION

At the May meeting, members will elect officers for the fiscal year beginning July 1, 1972. The Nominating Committee presents the following slate:

President — Dr. John A. Eisele
Vice President — Dr. Henning W. Leidecker
Secretary — Estelle Finkle
Treasurer — Richard A. Horwitz
Sergeant at Arms — Lawrence C. Torrance
Trustee — William R. Winkler

George Gould was nominated for President at the April meeting by petition. It will be possible to nominate by petition at the May meeting also. Signatures representing 10 full votes are required.

The trustees have agreed that voting will take place after the lecture and that a single ballot form will be used this year. Members may register for voting and obtain ballots before the meeting. **ALL MEMBERS PLEASE BE PRESENT TO ASSURE A QUORUM.**

NCA APRIL LECTURE

Dr. R. A. Hanel of the Laboratory for Planetary Atmospheres, Goddard Space Flight Center, spoke on April 1 about preliminary results from the Mariner 9 infrared spectrometer in orbit around Mars. The instrument observes at wavelengths from several micrometers to 50 micrometers and weighs 50 pounds on earth. In this wavelength region, the Martian spectrum approximates that of a 145° K blackbody. A prominent emission feature between 600 and 700 cm^{-1} wave numbers is identified as condensed CO_2 at 2 millibars pressure over the north polar hood. Water vapor lines were not detected there.

Water vapor lines were observed over the sunlit south polar cap, and the 15 micrometer band was in emission. Here, the surface was colder than the atmosphere, the opposite of normal earth conditions.

The infrared spectra show that the south polar dust has a much higher SiO_2 content than that of the Sahara Desert, with finer, more numerous particles. Nine volcanic areas have been discovered on Mars. Pressure values can be derived from infrared measurements, and from them the altitudes of terrain features. Mountains towering 6 km above the surrounding terrain have been pinpointed, while Hellas lies 3 km below the surrounding area. A very powdery, low specific-heat surface is inferred for Mars. Dr. Hanel used Mariner 9 and Lunar Orbiter photographs to draw spectacular comparisons of surface features on Mars and the moon.

As our speaker lectured, Mariner 9 was being shut down and will operate only intermittently until autumn as its orbit takes it ever more into the planetary shadow where solar cells cannot replenish batteries.

MARCH AND APRIL DISCUSSION GROUPS

On March 25, Bob Bolster showed slides from several of his trips to Kitt Peak National Observatory, Arizona. Many were views of the major telescopes and the optical shops that the tourist never sees. Bob's gorgeous outdoor scenes of the area might best be described as "*Arizona Highways*-like".

On April 15, Larry White and Sterling Anderson discussed their backyard observatories for 10- and 12 $\frac{1}{2}$ -inch reflectors, respectively. Both are located in Annandale, Virginia.

Larry built a 10 x 14-foot divided roll-off roof building, to house a 10-inch f/7 Newtonian and a 5-inch moonwatch refractor on separate piers. Parts of the building were done by professional contractors. The total cost was \$1600. He

advises against the use of hard-to-maintain redwood siding and of pier-leveling plates less than $\frac{1}{2}$ -inch thick.

Sterling built a 12 x 14-foot single roll-off roof building of basketweave redwood to house a 12 $\frac{1}{2}$ -inch Newtonian. He did all work himself for a total cost of \$252.00.

Larry White then reviewed current research on Stonehenge. This ancient English astronomical observatory was built in three stages between 1800 and 1600 BC. Its main purpose was to predict lunar eclipses at the solstices and equinoxes. Dick Horwitz and Wilbur Lund showed photos of Stonehenge. Both have visited there.

WE WELCOME THE FOLLOWING NEW MEMBERS:

Regular

Arthur J. Brown
512 Quaint Acres Drive
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Dr. John A. Eisele
3310 Curtis Drive, Apt. 202
Hillcrest Heights, Md. 20023
423-1586

MERAL CONVENTION

The Astronomical League Middle East Region Convention will be held at the Ramada Inn, U. S. Route 11, near Harrisburg, Pennsylvania, Friday June 9 to Sunday June 11. Registration is \$2.00, and blanks may be obtained from Bob Wright at the NCA meeting or by mail.

Prizes will be awarded in an astrophotography contest. If interested, contact Bert Asper, RD 3, Mechanicsburg, Pennsylvania 17055.

If interested in presenting a paper, contact Edgar Lodi, 1810 East Street, York, Pennsylvania 17402.

Winifred Cameron and Capt. John Holcomb of NASA and Professor John Cavanaugh of the University of Maryland are featured speakers. There will also be a talk by Walter Scott Houston and observing at the Host Society's observatory.

FOR SALE

Criterion RV-6 6-inch reflector. R. A. slow motion, Unitron finder, five eyepieces and Barlow, triple-turret eyepiece holder. Was \$333 new, asking \$300. Robert F. Johnston, 6554 Lee Valley Drive, Springfield, Va. 451-5661.

NOTE ON WOMEN'S LIB

At a recent meeting of the Washington Academy of Sciences, It was announced that the WAS annual dinner would no longer be held at the Cosmos Club because the club does not admit women members. This WAS policy change was urged by a number of women scientists.

WOULD YOU BELIEVE

NCA member Alan Gottlieb, who is now a student at Stetson University in Deland, Florida, found that the school had a fine, but unused and long-neglected observatory with a 12-inch telescope. He promptly got permission to restore it, and within a few months had done a magnificent job. He held a star party where he inspired so much enthusiasm that he was able to follow through and get astronomy added to the school curriculum. His most unbelievable accomplishment was his recent success in getting a switch installed to turn off several offending mercury vapor street lights when the observatory is in use! Alan, come home! We need you!

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* S T A R D U S T



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