



DUNHAM TO RELATE ASTEROIDAL SATELLITE DISCOVERY



DR. DUNHAM

Dr. David W. Dunham, of Computer Science Corporation and President of the International Occultation Timing Association, will speak at the October 6 meeting of National Capital Astronomers. He will recount the discovery of asteroidal satellites by their occultation of stars.

NOTE that (only) the October 6 meeting will be held in the Rock Creek Nature Center, Glover and Military Roads, NW, because of the temporary closing of the Department of Commerce Auditorium.

The first discovery of an asteroidal satellite was a direct result of Dunham's predictions and transcontinental plea for observations.

Dunham will describe the methods of prediction and observation of occultations of stars by asteroids, and discuss the value of the observations for determining the sizes and shapes of

asteroids and the diameters and multiplicity of the occulted stars.

He will present predictions and observational plans for some interesting occultations occurring during the next year.

David Dunham received his B. A. in astronomy from the University of California, Berkeley, in 1964 and his Ph.D. in celestial mechanics from Yale University in 1971, when he refined the orbital elements of the satellites of Uranus from a comprehensive analysis of the available observations. He joined Computer Science Corporation in 1976, and worked with celestial mechanicians of Goddard Space Flight Center to perform mission analyses which led to the successful insertion of the third International Sun-Earth Explorer into a halo orbit around the Sun-Earth L_1 libration point. Since 1964, he has worked closely with the U. S. Naval Observatory on lunar occultations, especially grazes. From 1972 to 1975 he analyzed photoelectric lunar occultation data at the University of Texas.

Dr. Dunham is a member of the American Astronomical Society, the International Astronomical Union, the American Association for the Advancement of Science, the Astronomical Society of the Pacific, and National Capital Astronomers, and founder of the International Occultation Timing Association.

OCTOBER CALENDAR — *The public is welcome.*

Monday, October 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.

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

CALENDAR Continued on page 6

CALENDAR — *continued*

- Saturday, October 6, 6:15 PM — Dinner with the speaker at Cafe Burgundy, 5031 Connecticut Avenue, NW. Reservations unnecessary.
- Saturday, October 6, 8:15 PM — NCA monthly meeting at the Rock Creek Nature Center, Glover Road south of Military Road, NW. Follow signs.
- Friday, October 12, 8:00 PM — Observing with the NCA 14-inch telescope with Bob Bolster, 6007 Ridgeview Drive, south of Alexandria off Franconia Road between Telegraph Road and Rose Hill Drive. 960-9126.
- Saturday, October 13, 7:30 PM — *Exploring the Sky*, presented jointly by NCA and the National Park Service. Use the new NCA 14-inch telescope. Glover Road south of Military Road NW, near Rock Creek Nature Center. Planetarium if cloudy. Information: Bob McCracken, 229-8321.
- Saturday, October 20, 5:00 PM — NCA fall picnic at Hopewell Observatory. See page 8.

SEPTEMBER LECTURE

Dr. Stamatis M. Krimigis, of Johns Hopkins Applied Physics Laboratory, presented some of the data from recent probes into Jupiter's magnetosphere, at the September 8 meeting of National Capital Astronomers.

Beginning with an overview of the program, Krimigis discussed briefly the earlier probes. He noted that Pioneer 12 has just proved that the craft can transit the ring plane of Saturn; it will be retargeted to Uranus (1986), then possibly to Neptune (1989).

Voyager II has considerably improved the understanding of the activity in the vicinity of Jupiter reported by earlier probes. Krimigis described the instrumentation of the field and particle investigation. Charged particles are magnetically deflected to a series of silicon detectors according to their masses and velocities. A magnetometer maps the ambient field. The low-energy-particle telescope with its two detectors identifies particles by measuring their energy and penetration; this instrument provided compositional spectroscopy all along the trajectory of the craft. The investigation probed radio waves within the magnetosphere and enroute, plasma waves in the magnetosphere, and the composition, particle velocities, and morphology of the magnetosphere.

Models constructed from knowledge of the Earth's magnetosphere and data from earlier probes were expanded — and substantially altered — by Voyager II.

Approaching the magnetosphere 130 kV electrons were measured. The boundary was signaled by a sharp increase in intensity by a factor of 10^4 , and eventually well over 10^6 . A large number of unexpected heavy ions were sensed; at times there were many more heavy ions than protons. Inside the orbit of Io, intensity dropped by 10^{-2} . Passing between Io and Jupiter, very large magnetic fluctuations transverse to the field were interpreted as a 10^6 -Ampere current flow between Jupiter and Io. A simultaneous almost complete decrease in the 10-MeV electron flux was accompanied by an increase in the low-energy flux. Interpretation of this observation awaits reduction of further data.

Because the rotational and magnetic axes of Jupiter are not coincident, diurnal field variations of 10^3 times were measured near the planet. The tangential component of field motion drags the inner plasma around in corotation with the planet out to the magnetopause on the Sun side and to about 150 planetary radii on the far side. At these limits, an abrupt breakout to radial flow creates the magnetospheric wind. Plasma particle velocities were measured that indicate unexpected temperatures — as high as 5×10^8 degrees.

Plasma density mapping normalized to ambient helium confirmed the source of sulphur and oxygen to be the volcanoes of Io.

Krimigis suggests that the implications of finding a mechanism whereby such a plasma can reach temperatures of several hundred million degrees may have a profound influence on the theory of other plasma-related objects such as pulsars, possibly revealing unexpected sources of cosmic rays. rhm

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STERNS RECEIVES AWARD FOR VOLUNTARY SERVICE TO USNO



At a U. S. Naval Observatory staff award ceremony on September 20, Mabel Sterns, a long-time member of National Capital Astronomers, was recognized for her voluntary service to the Observatory.

Although Miss Sterns is not a member of the Observatory staff, she was included in the ceremony in which Captain Joseph C. Smith, Superintendent, awarded her a plaque citing her work for several hours a week during the past year in compiling and cataloging the Observatory's collection of historic photographs.

In her gracious acceptance, Miss Sterns recounted the birth of National Capital Astronomers in an organizational meeting held at the Observatory in 1937.

(U. S. Naval Observatory photograph by Mihran Miranian)

GRAZING OCCULTATION EXPEDITIONS PLANNED

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

UT Date	Time	Place	Vis Mag	Pcnt Sunlit	Cusp Angle	Min Aper
10-10-79	03:56	Gum Tree, VA	5.7	76	11N	5 cm
10-12-79	09:20	Waldorf, MD	7.7	55	6N	8 cm
10-28-79	01:52	Upr Marlbro, MD	8.7	44	4S	20 cm

NCA MEMBERSHIP, MAILING LISTS BEING UPDATED

Secretary Fran Trexler is compiling a new NCA directory, and the NCA mailing list is being updated. Now is the time to correct any irregularity in your address. Notify Mrs. Trexler, 5609 Ottawa Street, Oxon Hill, MD 20021.

NCA WELCOMES NEW MEMBERS

Brown, Raymond N. and Family
8714 Liberty Lane
Potomac, MD 20854

Cornwell, Donald M., Jr.
2604 Ryder Avenue
Forestville, MD 20028

Dyregrov, David
PO Box 255
Waterford, VA 22190

Johnson, Debra
9119 Springhill Lane, Apt 201
Greenbelt, MD 20770

Wagner, Peter K. and Family
6308 Landon Lane
Bethesda, MD 20034

Willingmyre, Daniel W.
9601 51st Avenue
College Park, MD 20740

Story, Vincent
8250 Hawkins Creamery Road
Gaithersburg, MD 20760

NOTE TEMPORARY CHANGE IN MEETING PLACE

The October 6 lecture will be held at the Rock Creek Nature Center, Glover and Military Roads, NW, because of the temporary closing of the Department of Commerce Auditorium. Only the October 6 lecture is affected.

Note also that dinner with the October speaker will be held at Cafe Burgundy, 5031 Connecticut Avenue, NW, just south of Nebraska Avenue. Reservations are unnecessary.

NCA FALL PICNIC OCTOBER 20, 4:00 PM, AT HOPEWELL OBSERVATORY

The autumn NCA picnic will be held on Saturday, October 20 at Hopewell Observatory.

Bring food, telescopes, red flashlight covers, and guests. Coffee, tea, hot chocolate, and soft drinks will be provided by The Hopewell Corporation.

From Beltway Exit 9, west on I-66 to Gainesville, right on Rt 55 2 miles to Haymarket, cross US 15, continue on 55 about 0.8 mile to Rt 681, turn right, cross bridge, continue to end of 681 (about 3 miles). Left on Rt 601 (gravel) 1.2 mile, right on Rt 629 (gravel) 1.0 mile, turn right onto narrow paved drive, up drive 0.3 mile to microwave station, around fence on right, continue on road through woods a few hundred feet to observatory.

You will be welcome regardless of weather; make your own decision. For further information call Bob McCracken, 229-8321 before October 20.

EXCERPTS FROM THE IAU CIRCULARS

1. July — A team effort by the European Southern Observatory, the University of Tokyo, and MIT produced five simultaneous observations of optical and X-ray bursts from MXB-1636-53. The optical observations were made with the 1.5-m Danish telescope at E. S. O., the X-ray observations with the Japanese spacecraft Hakucho.

2. July 24 — C. T. Kowal, Hale Observatories, discovered a 19th-magnitude comet (1979h) in Sagittarius.

3. July 26 — C. T. Kowal discovered two additional 18th-magnitude comets in Capricornus with the 1.2-m Schmidt telescope.

4. August 22 — Eleanor Helin, California Institute of Technology, discovered two asteroidal objects in Capricornus with the 1.2-m Schmidt telescope. rnh

* S T A R D U S T



Published eleven times yearly for NATIONAL CAPITAL ASTRONOMERS, INCORPORATED, a non-profit, public-service organization promoting interest and education in astronomy and related sciences. President, Mary Ellen Simon. STAR DUST: Robert H. McCracken, 5120 Newport Avenue, Washington, DC 20016. Deadline: 15th of preceding month.

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