



HARRINGTON: MERCURY—ESCAPED VENUSIAN SATELLITE?



DR. HARRINGTON

At the November 6 meeting of NCA, Dr. Robert S. Harrington of the Astrometry and Astrophysics Division of the U. S. Naval Observatory will recount a dynamical investigation of the conjecture that Mercury is an escaped satellite of Venus.

The crater distribution asymmetry observed on Mercury has led to the suggestion that it once was a satellite of another planet, presumably Venus. If Mercury had once been such a satellite, it would have escaped, due to tidal acceleration. The details of the nature of this escape, as well as the subsequent dynamical behavior of the system, can only be examined through numerical experimentation. At no point in any of the several stages of evolution of the system is there anything to rule out the hypothesis, and, indeed, the present configuration is the most

likely to be expected if Mercury had once been a satellite.

Robert S. Harrington, born in Newport News, Virginia, received his B. A. in physics in 1964 from Swarthmore College, where he studied under Peter van de Kamp. He earned his Ph. D. at the University of Texas in 1968 with his dissertation, "The Dynamical Evolution of Triple Star Systems."

Since 1967, he has been with the Astrometry and Astrophysics Division of the U. S. Naval Observatory, where his primary responsibility is the management of both the USNO parallax program and the minor planet and comet observing program. He continues with the double-star work, however, and his chief research efforts remain in theoretical multiple-star dynamics.

NOVEMBER CALENDAR — *The public is welcome.*

Monday, November 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.

*Wednesday, November 3, 10, 17, 7:30 PM — Guggenheim Lectures in Astronomy, National Air and Space Museum, Smithsonian Institution.

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

Saturday, November 6, 6:15 PM — Dinner with the speaker at Bassin's Restaurant, 14th Street and Pennsylvania Avenue, NW. Reservations unnecessary.

Saturday, November 6, 8:15 PM — NCA monthly meeting at the Department of Commerce Auditorium, 14th and E Streets, NW. Dr. Harrington will speak.

Saturday, November 20, 8:00 PM — Discussion group on lunar occultations, led by David Dunham. Room 2062, Department of Commerce, 14th and E, NW.

*The three remaining lectures of the current series are, November 3, *Ultraviolet Astronomy*, Andrea Dupree; 10, *Gamma-ray Astronomy*, Trevor Weeks; 17, *The New Cosmology*, William Press. Early arrival recommended.

OCTOBER LECTURE

Mrs. Winifred Cameron of Goddard Space Flight Center and Lunar Recorder for the Association of Lunar and Planetary Observers (ALPO) spoke to NCA at the October 2 meeting.

Describing the ALPO Lunar Transient Phenomena (LTP) program which she organized in 1972, she noted that naked-eye observations of transitory brightening of certain lunar features were recorded as early as 557 AD. Of the more recent observations, about 10 percent have been recorded by photography, photometry, polarimetry, or spectrography.

The old reports are usually vague. As Lunar Recorder for the ALPO she devised an observing program to standardize the observations, reports, and normals, and to discriminate between lunar and atmospheric effects.

Of 200 reported sites, about 100 are questionable or unconfirmed, some having been reported only once. Of the 1400 observations, most involve only 100 sites, distributed chiefly about the peripheries of the maria, with very few in the highlands. Those few are associated with dark material confirmed by the Apollo program to be of volcanic origin, as previously surmised. No LTP sites have been seen to coincide with seismic epicenters. About a dozen sites account for 80 percent of the observations, a half-dozen for 60 percent. A third of all the observations are from the Aristarchus area, one of the few sites of radioactivity found by the Apollo mission, but no connection has been established.

Observers are assigned four LTP sites, one comparison site, and one seismic epicenter to monitor. Their monthly reports are charted, compared with the normals for the phase, and examined for correlation with other known phenomena.

Causal conjecture involves low-angle illumination, thermoluminescence related to sunrise and sunset, ultraviolet excitation, magnetic-tail effects, solar effects related to magnetic storms on the Earth, and tidal effects. All observations seem to correlate with sunrise, but there are no conclusions.

WINKLERS VISIT McMATH-HULBERT SOLAR OBSERVATORY

On September 23, Bill and Jane Winkler toured this noted Lake Angelus, Michigan observatory, which is operated by the University of Michigan with NSF funding. They were graciously guided by Director Helen Dodson Prince and two staff members.

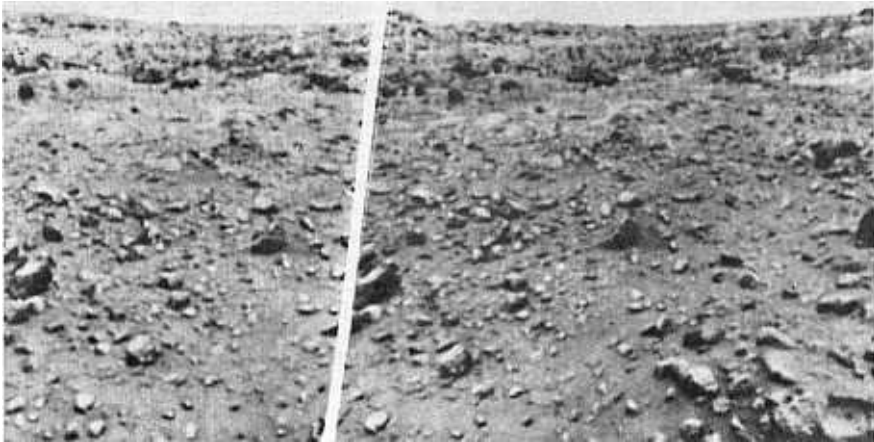
This facility incorporates three solar towers to monitor the Sun continuously in hydrogen alpha using Lyot and Zeiss birefringent filters with a battery of four 6-inch refractors, a spectroheliograph used in the K line of calcium, and with one of the world's great solar spectrographs, using a 70-foot evacuated optical path.

Enjoying the warm hospitality of the McMath-Hulbert staff, the Winklers roamed the complex absorption spectrum displayed by the giant spectrograph, observed the D₃ sodium line in emission in the chromosphere, and examined prominences and disk features simultaneously in H_α, slowly tuning the filter to reveal radial velocities by Doppler differences.

While McMath-Hulbert is not open for public tours, serious visitors can be sure of a warm welcome and a memorable visit.

DISCUSSION GROUP TO FEATURE DUNHAM ON LUNAR OCCULTATIONS

The November NCA discussion will be held at the Department of Commerce in room 2062 on Saturday, November 20, at 8:00 PM. Dr. David Dunham, president of the International Occultation Timing Association, will lead. All members who are interested in occultation observations are encouraged to be present either to participate in or listen to the informal discussion, as desired. In past years NCA teams have been active in pioneering the grazing occultation techniques. Present activity will be discussed as well as plans and techniques for the future.



STEREO FROM MARS

The accompanying stereo pair are two overlapping segments of photos taken by the two Viking Lander 1 cameras. Spaced 32 inches apart, the cameras show slightly different angular aspects of the scene, thus conveying stereo information. They may be viewed either with a standard stereo viewer or by free-vision (naked-eye) stereo by those who have developed the knack. If you have not, you may want to try it. Of course, both eyes must function reasonably well.

When seeing a photograph or a printed page, the eyes perceive the same image; no depth information is conveyed. In the more natural case, when the eyes are seeing the scene directly, the distance between the eyes results in a slight angular difference between the images, interpreted by the brain as depth. The object, then, is to present to each eye an image corresponding to a different angular viewpoint which will convey depth information. The wide separation of the Mars cameras results in depth perception to a much greater distance than would be seen by the eyes.

Relax your eyes and fix your gaze at a great distance, e. g., the horizon. While maintaining this fixation, raise the pictures into the line of sight at about arm's length. Do not focus directly on the pictures. Each picture will, of course, appear double. With a bit of careful manipulation, try to bring the two inside images into coincidence. After a bit of persistence and a few tries, the images will superimpose, and, usually suddenly, the brain will recognize them as views of the same scene; the eyes will seem to lock on, and the full depth of the scene will be perceived stereoscopically.

This knack is useful in many ways. Having practiced it for years, I have made much practical use of it to detect subtle differences in nominally identical material, often as effectively as a blink comparator. An even more generally useful technique may be practiced for widely spaced or very large material. If there is stereo information, reverse the pictures and converge the lines of sight in front of them instead of at a great distance. If there is no stereo information, left or right position is immaterial. Thus, two typed pages may be checked for very minor changes in a matter of seconds; differences will seem to stand out and attract attention. Complex electronic diagrams having even very slight differences may be compared quickly.

Once experienced, free-vision stereo rapidly becomes easier; with practice, the two images may be perceived stereoscopically almost immediately. rm

EXCERPTS FROM THE IAU CIRCULARS

1. August 23 — Ferland, Tomkin, and Woodman, University of Texas, made narrow-band photometric observations of V1500 Cygni with the 270-cm telescope at McDonald Observatory showing that the continuum rather than emission lines was the source of the nova's recent variability.

2. September 23 — Y. Kuwano, Hita, Japan, discovered a nova-like object of magnitude 8.8 in Ophiuchus at $18^{\text{h}}00^{\text{m}}09^{\text{s}}, +11^{\circ}48^{\text{m}}$.

3. October — Tapia, Stockman, and Angel, University of Arizona, reported that AM Herculis showed strong circular polarization varying with the same $185^{\text{m}}5$ period as the brightness, radial velocity, and X-ray emission. The cause is postulated to be cyclotron resonance in a magnetic field of about 2×10^8 Gauss.

4. October 9-13 — Oda and Canizares, MIT, detected rapid flaring by factors of 2 to 4 of Cygnus X-1 in X-radiation with the SAS-3 spacecraft.

5. October 21 — G. E. D. Alcock, Peterborough, U. K., discovered a 6.5-magnitude nova in Vulpecula at $19^{\text{h}}27^{\text{m}}11^{\text{s}}, +20^{\circ}21^{\text{m}}$. Lick Observatory spectrogram on October 22 indicated nova near maximum.

This listing furnished by R. N. Bolster

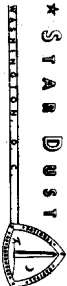
Note, Item 5: October 27.0 UT, Bolster reported 6.6 magnitude, Costanzo, 6.7.

FOR SALE

Three-inch Unitron refractor, 2-inch finder, equatorial mount, wooden tripod, sunscreen, star diagonal, wooden case. Asking \$300.00. Mr. J. Weinfield, (301) 428-3426. (Metropolitan Washington exchange)

DUST may be reproduced with proper credit to National Capital Astronomers

FIRST CLASS MAIL



★ **NATIONAL CAPITAL ASTRONOMERS, INCORPORATED**, published eleven times yearly for related sciences. President, Benson J. Simon. *STAR DUST*; Robert H. McCracken, 5120 Newport Avenue, Washington, DC 20016. Deadline: 15th of preceding month.