



BOHLIN TO DISCUSS NEW XUV SOLAR PHENOMENA

Opening the 1975-76 NCA lecture series on September 6, Dr. J. David Bohlin, solar astrophysicist of the Space Science Division of Naval Research Laboratory, will discuss those surprising and complex extreme-ultraviolet (XUV) solar phenomena discovered by Skylab.

During the manned Skylab mission (May 1973 through January 1974) the Sun was intensively observed by the six instruments of the Apollo-Telescope-Mount cluster. The 171-630-Å XUV spectrograph images revealed a completely unexpected and complex array of phenomena in the Sun's polar caps. Among the features observed are solar plumes, a broader and elevated limb-brightened ring of certain transition-zone emission lines, and the completely new macroscopic phenomenon, similar to the chromospheric H_{α} spicules, but of sizes and dynamics many times larger.

All of these features are now understood to be manifestations of the more-general phenomenon of coronal holes — regions of abnormally low electron density and temperature in the solar corona, recognized only in the last five years through a combination of XUV and visible-light observations. The boundaries of the coronal holes are rather accurately outlined by decreased emission and loss of definition of the supergranulation network in the XUV images of singly ionized helium (He II) at 304 Å. These He II images have been used to measure the boundaries of coronal holes for the entire manned portions of the Skylab mission. These boundary data have been computer-plotted in both the synoptic (equatorial) and polar projections in order to study their long-term evolution.

Born in Indiana, J. David Bohlin received his A. B. in physics and mathematics from Wabash College, Crawfordsville, Indiana, and his Ph. D. in solar physics from the University of Colorado in 1968. He did post-doctoral work in solar astronomy at the California Institute of Technology at Pasadena as project manager for the installation of Big Bear Solar Observatory.

SEPTEMBER CALENDAR

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

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

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

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

Saturday, September 13, 8:00 PM — Exploring the Sky, presented jointly by NCA and the National Park Service. Glover Road south of Military Road, NW, near Rock Creek Nature Center. Information: Bob McCracken, 229-8321.

Sunday, September 14, 2:00 PM — Solar observations with the NCA 5-inch Clark refractor at the U. S. Naval Observatory, and discussion of current problems in solar phenomena. Meet William Winkler in the lobby of the Administration Building. Your NCA membership card will admit you to the Observatory grounds; go *directly* from the gate to the guard desk in the lobby. Information: William Winkler, 937-6927.

Saturday, September 20 — Observation, discussion, photography, at the home of Benson and Mary Ellen Simon. Call Benson, 301-776-6721.

VAN FLANDERN CORROBORATES PRE-ASTEROID PLANET HYPOTHESIS

Dr. Thomas Van Flandern, research astronomer of the U. S. Naval Observatory and NCA member, has developed an impressive analytical support for Ovenden's theorem, advanced in 1971 to explain Bode's law.

Bode's law, empirically derived from observation, specifies the relative distances of the planet orbits from the Sun. In 1971, Michael Ovenden of Canada proposed a dynamical explanation of Bode's law. Confirmed by test on other orbiting systems, Ovenden's theorem insists on a planet of about Saturn's mass being in what is now the asteroid belt. Furthermore, it requires that the planet must have existed until 16 million years ago.

Since 1971, Ovenden has pointed out that of all meteorites, only carbonaceous chondrites, as a class, show ages not exceeding 22 million years. All others are older than 10^8 years. The present total mass of the asteroids is only about 10^{-3} that of Saturn.

Dr. Van Flandern reasoned that since these suggestions of a planet fragmentation indicate that most of the mass was ejected from the Solar System, the disintegration must have been violent, leading to a wide distribution of velocities among the fragments. Those few having relative velocities near zero would remain to populate the orbit as asteroids; those having low relative velocities would be promptly ejected from the Solar System by planetary perturbations. Among those having very high velocities must be an interesting group injected into long elliptical orbits having periods of the order of 16 million years, so as to just now be returning for the first time. Could these be the extremely long-period comets? Many meteoroid orbits have been found to have such periods. The orbits of these first-returners have not yet suffered the inevitable perturbations upon encounter with the planetary system; they can be calculated back to the point of origin, where they must necessarily converge if they have a common source. Dr. Van Flandern found 60 comets with appropriate periods whose orbits are well enough known to make the test. Of these 60, he found that 52 converged to within a few degrees of a common point! Six converged to within 0.05 degree. The orbits extend far into regions where the gravitational field of the galaxy is a few percent of that of the Sun. This one perturbation that is common to all easily accounts for the observed scatter.

Dr. Van Flandern is presenting his findings to the American Astronomical Society meeting in San Diego on August 18.

COMET KOBAYASHI-BERGER-MILON (1975h) APPROACHING PERIHELION

Discovered July 2, Comet 1975h has since transited the sky from Aquarius northward through Ursa Major, and is now approaching southeastern Leo Minor, where on September 5 it will reach perihelion at about magnitude 4.1. At that time it will rise before the Sun and set after the Sun, appearing in both the morning and evening sky.

At the August 9 "Exploring the Sky" program the comet was a popular feature.

Having recently completed a 12-inch Wright-Schmidt, Bob Bolster made this one-hour exposure at Hopewell Observatory, ending at 0328 August 9 UT. The Tri-X negative was Diafine-processed to ASA 2400. This reproduction, about 1.2 times the original size, is about 2° high. North is to the right.

An aircraft also recorded its approach to Dulles Airport, 16 miles northeast.



VENUS AND THE SCHRÖTER EFFECT

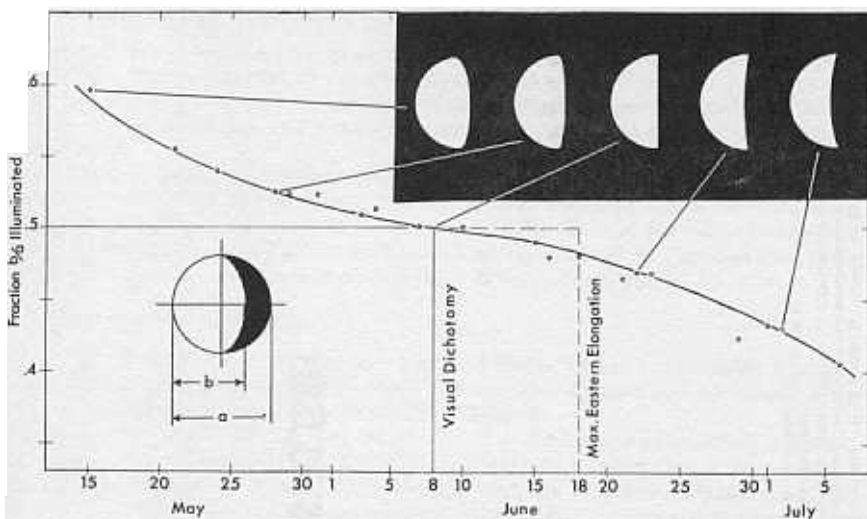
NCA member Daniel Costanzo, who is also a member of the Association of Lunar and Planetary Observers (ALPO), writes of some of his recent observations of Venus:

"The planet Venus regularly displays an interesting discrepancy in its observed phase from that predicted from the geometry alone. This phenomenon, the Schröter effect, is not thoroughly understood, but is believed to be caused by the atmosphere of Venus.

"The Schröter effect is most easily detected by measuring the moment of dichotomy, or half phase, of Venus. The time of dichotomy does not coincide with the geometric prediction; a discrepancy of as much as 10 days is always observed. Dichotomy occurs early during evening apparitions."

If the orbits of the Earth and Venus were circular and coplaner, and if Venus were airless, dichotomy should coincide with maximum elongation. Corrected for inclination and ellipticity, the geometric basis of the published prediction does not include atmospheric effects. Costanzo describes his observations:

"This spring Venus was well placed in the evening sky and provided an ideal opportunity to detect the Schröter effect. Using a 6-inch, $f/8$ reflector at 100x to 200x, I made 57 drawings of the planet around the time of eastern elongation. All observations were made while the Sun was a few degrees above or below the horizon in order to facilitate finding Venus, to minimize atmospheric turbulence, and because at this time Venus' image displays optimum contrast. The disks thus drawn were later analyzed in the following manner:



"My observations indicate that Venus reached dichotomy on June 8, 10 days before the date of maximum eastern elongation, June 18, predicted in the *American Ephemeris*. Results from my filter measurements show little if any difference in phase when different filters are employed. The accompanying graph summarizes my observations. The points plotted are average values from several observations made on each date. The curve is a freehand attempt to find continuity among the data."

Costanzo says ALPO desires more observations of Venus, especially of transient "surface" features and times of dichotomy. For information, contact either Costanzo, 841-0051, or the ALPO Venus Recorder, Julius Benton, Jr., Piedmont Station, PO Box 839, Clinton, SC 29325.

EXCERPTS FROM THE IAU CIRCULARS

1. July 5 — E. J. Reese, New Mexico State University, observed a major disturbance in Jupiter's South Equatorial Belt. The dark feature was photographed near longitude (II) 68°, latitude 15° south.

2. July 13 — Y. Kuwano, Hita, Oita, Japan, discovered an 8th-magnitude nova in Sagittarius.

3. July 27 — Barker, Drake, Jenkins, and Upton, Princeton, observed the ultraviolet spectrum of comet 1975h with the Copernicus orbiting observatory. The intensity of the Lyman-alpha line was comparable to that of comet 1973 XII (Kohoutek) on January 29, 1974.

4. July 31 — Devinney and McCracken, Goddard Space Flight Center, observed comet 1975h with a 91-cm reflector and detected spectral lines of CN, C₃, C₂, NH₂, CH, NH, and OH.

5. August 3 — Gomez, Agrupacion Astronomica, Sabadell, Spain, observed a second disturbance in the South Equatorial Belt of Jupiter. At the same latitude, this disturbance was at longitude (II) 208°.

This listing furnished courtesy R. N. Bolster.

NOTE

President Benson Simon's telephone number must be prefixed with the 301 area code when dialed from Metropolitan Washington exchanges: 301-776-6721.

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STAR DUST
Published 11 times yearly by NATIONAL CAPITAL
ASTRONOMERS, INC., a non-profit, public-service
organization promoting interest and education in
astronomy and related sciences. President, Benson J. Simon, 8704 Royal Hedge
Road, Laurel, Maryland 20811. Star Dust deadline: 15th of each month.