★ STAR DUST

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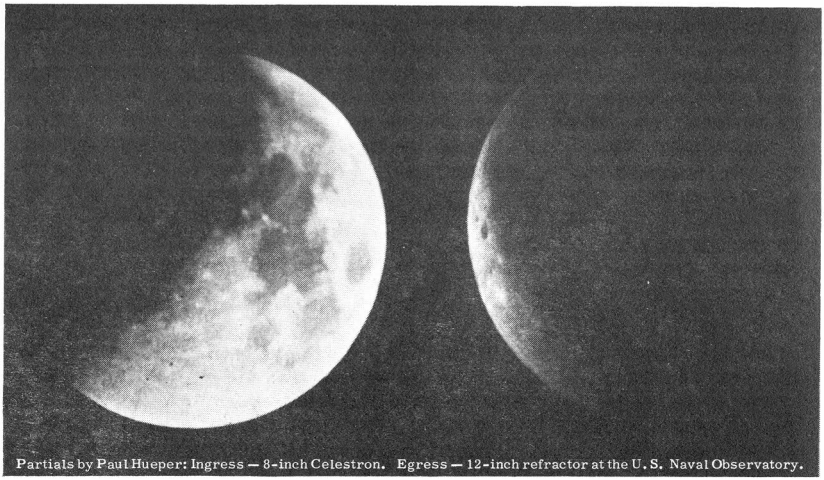

Partials by Paul Hueper: Ingress — 8-inch Celestron. Egress — 12-inch refractor at the U. S. Naval Observatory.

'IMPOSSIBLE' ECLIPSE UNEVENLY ILLUMINATED - AS PREDICTED

A total lunar eclipse is impossible!

The uneven illumination of the Moon during the nearly central eclipse on 6 July was just as predicted by Dr. David Dunham of NCA.

Just as the image of the Sun is lifted above the horizon by atmospheric refraction at sunrise and sunset, the refraction also lifts the Sun's image above the Earth's horizon — all the way around — as seen from the Moon during an eclipse. Dr. Thomas Van Flandern, of the U.S. Naval Observatory and NCA, points out that even when the Moon is deepest in the geometric cone of the Earth's shadow, the real umbra, because of refraction, never reaches the Moon. The limb of the Sun is always visible from the Moon.

The April eruption of a Mexican volcano ejected ten times as much material as did Mount St. Helens. Noting that this cloud of ejecta has diffused throughout the northern, but not the southern, atmosphere, Dunham predicted the observed uneven illumination by the refracted light

A simple experiment will illustrate the effect. Place a dime on a table. Lay a larger coin, say a quarter, on the center of a reading glass. Holding the glass above the dime and looking straight down at the dime through the glass, note that the quarter can no longer entirely hide the enlarged image of the dime. The Earth's atmosphere similarly magnifies the solar image, which illuminates the eclipsed Moon. Thus, a total lunar eclipse is not possible.

AUGUST CALENDAR — *The public is welcome.*

Tuesday, August 3, 10, 17, 24, 31, 7:30 PM — Telescope-making classes at Chevy Chase Community Center, Connecticut Avenue and McKinley Street, NW. Information: Jerry Schnall, 362-8872.

Friday, August 6, 13, 20, 27, 7:30 PM — Telescope-making classes at American University, McKinley Hall basement. Information: Jerry Schnall.

Friday, August 13, 20, 27, 9:00 PM — NCA 14-inch telescope open nights with Jim Trexler, 5609 Ottawa Street, Oxon Hill, MD. Call Jim at 839-3490.

Saturday, August 14, 9:00 PM — *Exploring the Sky*, presented jointly by NCA and National Park Service. Glover Road south of Military Road, NW, near Rock Creek Nature Center. Planetarium if cloudy. Bob McCracken, 229-8321.

JUNE LECTURE

Dr. Peter M. Perry and Dr. Barry E. Turnrose of the Astronomy Department of Computer Sciences Corporation spoke at the June meeting of National Capital Astronomers.

The Astronomy Department of about 50 people is involved in various space-science projects. Our speakers focused on two of these — Perry on the Space Telescope (ST), Turnrose on the International Ultraviolet Explorer (IUE).

The ST project is administered by Marshall Space Flight Center. The ground system and optical experiments are managed by Goddard Space Flight Center. The ST is to be orbited by the Space Shuttle in 1985 and operated in real time from the Science Institute at Johns Hopkins University in Baltimore under contract with Associated Universities for Research in Astronomy (AURA), which also operates the National Observatory at Kitt Peak. CSC is subcontracted by AURA to provide data and image processing software and later to provide resident-astronomer operators.

The ST is expected to extend the distance reached by ground-based instruments by about 7 times -- from 2 billion to 14 billion light years -- multiplying the volume of the observable universe by about 350 times! Attainable resolution will be increased by 10 times, and objects 0.02 as bright (about 4 magnitudes) will be observable. The spectrum will be covered from ultraviolet to infrared.

The 20,000-pound ST is a 2.4-meter F/24 Ritchey-Chretien with five instruments sharing the focal plane: A high-resolution spectrograph, a high-speed photometer, faint-object spectrograph, faint-object camera, and wide-field and planetary camera, the latter two with charge-coupled devices.

In the future, these could be changed by the Shuttle, or the entire ST could be returned for maintenance or alteration.

CSC is developing universal software for the Space Institute, which ultimately will be used by all guest investigators. The data-reduction system will remove the instrument signatures and provide raw data essentially free of such artifacts. It will also provide for selective extraction of desired information and offer a variety of processing options.

One of the first problems to be addressed probably will be suspected black holes, Perry said.

The International Ultraviolet Explorer is a joint venture of NASA, the European Spage Agency, and the Science and Engineering Research Council of the U.K. In geosynchronous orbit, it is a guest-observer facility operated in real time from two stations, one at Goddard Space Flight Center, the other at Madrid, Spain. Observing time is shared two-thirds and one-third by NASA and the European groups. More than 153 programs are scheduled for this observing year by NASA alone.

Now in its fifth operational year, IUE has overcome the observational limitations of short rocket flights, high-altitude balloons, and low-orbit satellites. Its 45-cm F/15 Ritchey-Cretien objective is coupled to two eschelle spectroscopes with SEC-vidicon detectors to cover the spectrum from 120 to 3000 nm. A 3-arcsec acquisition field is provided by an image-dissector tube. Objective spatial resolution is 3 arcsec. Spectrograph fields are 3 and 10x24 arcsec.

Turnrose discussed CSC's involvement in the program and described as an example one research project.

CSC's software, operational system, and data-acquisition and processing system are to relieve the observer of these details.

Although the IUE is a non-imaging spectroscopic system, Turnrose illustrated the flexibility of data manipulation by citing a project in which he and Perry were involved: spectral mapping of the Orion Nebula in the lines of C-I, C-II, and O-I, and combining these distributions with pressure and density data to determine the abundances of these elements in the vicinity of the condensations in the H-II regions. By using the wide (10 x 25 sec) spectroscopic field

OCCULTATION EXPEDITIONS PLANNED

Dr. David Dunham is organizing observers for the following grazing lunar occultations and asteroidal apoulses. Information: Call Dave at 585-0989.

UT Date	Time	Place	Vis Mag	Pcnt Sunlit	Cusp Angle	Min Aper
LUNAR:						
08-13-82	10:17	Koppel, PA	6.2	12.9	12N	10 cm
08-15-82	08:53	Saltillo, PA	8.1	18	12N	8 cm
08-15-82	09:54	Strongsville, OH	6.0	18	12N	5 cm
08-15-82	12:34	Ashland, VA	3.2	17	9N	10 cm

ASTEROIDAL APPULSES:	Star Mag	Angular Miss Distance	Name of Asteroid	
08-11-82 02:59	8.4	1s.8S	(334) Chicago	15 cm
08-29-82 07:57	8.8	0s.95S	(57) Mnemosyne	5 cm

Asteroidal appulses are observed for secondary occultations indicative of possible satellites.

Paul Hueper of NCA reported definite indication of duality of SAO 98018 by 3 April occultation. Time separation approximately 0s.2, primary leading.

TREASURER'S REPORT

Income		Expenses	
Dues	$4,441.00	Sky & Tscope subscrs	$1,950.00
Publications sales	142.50	Star Dust production	452.47
Tscope-mkg classes	137.00	Star Dust postage	712.63
Donation	25.00	Other publications	126.36
Interest (new acct)	14.67	Adminis & Miscel	203.83
Total Income	$4,761.17	Total Expenses	$4,414.14

Excess of Income over Expenses	$347.03
Balance on hand 15 July 1981	2,521.57
Balance on hand 30 Jun 1982	2,868.60

Ruth S. Freitag
Treasurer

NCA WELCOMES NEW MEMBERS

Barrett, Mrs. Jane B. & Family
5205 Easton Drive
Springfield, VA 22151

Gilfillan, James
9922 Edwards Avenue
Bethesda, MD 20014

Moubrey, Ron and Kathryn
2709 Livingstone Lane, #103
Vienna, VA 22180

Thornton, Will
PO Box 165
Nokesville, VA 22123

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and successively re-aiming the instrument, they prepared a mosaic image of the regions of interest in the wavelength of each line. A similar mosaic made several angstroms off line provided a continuum image for background subtraction to improve spectral purity. They smoothed the pixel boundaries by interpolation and color-coded the intensity distributions of the three ions. With the resulting image, subjective, qualitative estimates can easily be made, while the recorded quantitative data are available for any indicated further processing.

In both the ST and IUE programs, CSC's function is to provide the guest observer with full operational and processing support culminating in standardized output format: graphic hard copy, data, magnetic storage and photographs. Thus freed from these operational details, the observer can apply more effectively his specific expertise. rhm

EXCERPTS FROM THE IAU CIRCULARS

1. June — N. Sanduleak and P. Pesch, Warner and Swasey Observatory, reported the discovery of a binary system containing nearly identical white dwarfs in Hercules. The astrophysically interesting pair has a separation of 6 sec, and both stars are of magnitude 15.5.

2. June — McCulloch and Hamilton, University of Tasmania, and Ables and Hunt, C.S.I.R.O. Division of Radiophysics, reported the discovery of a pulsar in the Large Magellanic Cloud with 680-MHz radio observations. The period of the pulsar is 0s.9957, and it appears to be extragalactic, probably in the LMC.

3. June 18 — Rodney R.D. Austin, New Plymouth, New Zealand, discovered a comet (1982g) of 10th magnitude in Horologium. It is expected to reach a maximum brightness of 4.1 in early August. (Comet Austin will be visible in the Washington, DC area in the southwest evening sky beginning in mid August.)

4. July — Gehrz, Hackwell, and Grasdalen, University of Wyoming, reported the discovery of a feature due to silicon carbide grains in the spectrum of Nova Aquilae 1982.

5. July 11 — Malcolm Hartley, U.K. Schmidt Telescope Unit, discovered a comet (1982h) of 15th magnitude in Ophiuchus with the 1.2-m Schmidt telescope at Siding Spring. Excerpts furnished by Robert N. Bolster.

COMET AUSTIN EPHEMERIS

These times and positions were calculated for the Washington, DC area by Walter Nissen, National Capital Astronomers. The times are for the end of nautical twilight (Sun altitude = -12°). Note that for the convenience of the casual viewer times are EDT, not UT. New moon is on the 18th; on succeeding dates increasing interference can be expected. Binoculars are recommended.

EDT	RA		Dec		Alt	Az	Mag
Date Time	hrs	min	deg	min	deg	deg	
08-15 21:05	09	38	35	54	04	315	4.2
08-17 21:02	10	11	39	41	10	313	4.4
08-19 20:59	10	39	42	09	15	312	4.6
08-21 20:56	11	04	43	39	19	311	4.7
08-23 20:52	11	24	44	28	22	310	5.0
08-25 20:49	11	40	44	49	24	309	5.2
08-30 20:41	12	08	44	36	26	307	5.7
09-04 20:33	12	25	43	38	27	306	6.3
09-09 20:24	12	35	42	24	26	305	6.8

FOR SALE

Four-inch refractor with Jaegers objective and components, numerous eyepieces and accessories. Unitron altazimuth mount with wooden tripod and cabinet. $275.00. John Hoshor, Laurel, MD (301) 725-4117.

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