



LOWMAN ON PLANETOLOGY, ELECTION IN MAY

Dr. Paul D. Lowman, Jr., of the Geophysics Branch, Earth Survey Applications Division, Goddard Space Flight Center, will address the May 5 meeting of National Capital Astronomers on recent discoveries in planetary evolution resulting from the Apollo, Mariner, and Voyager missions.

The annual election of NCA officers will be the only business preceding the lecture.

New understanding of terrestrial evolution is beginning to emerge from the exploration of the planets. The geological record of the early Precambrian period, when most of the Earth's continental development took place, is poor. The corresponding record on the terrestrial planets and the Moon is well preserved. Evidently, parallel evolution of the terrestrial planets differed mainly in how far their development continued; the less massive terminated at earlier stages. The largest, the Earth, is still active. Lowman has proposed that the Earth's continents are the greatly altered remnants of an originally global primitive crust.

Paul D. Lowman, Jr., originally from Rahway, New Jersey, received his B.S. in geology from Rutgers University in 1953. After serving two years in the U.S. Army, he attended the University of Colorado, where he received the Ph.D. in geology in 1963.

Dr. Lowman joined Goddard Space Flight Center in 1959, and initially worked on the origin of tektites and lunar geology. During 1963-64 he served at NASA Headquarters on the Apollo and Mercury programs. Since then, he has been a principal investigator on Mercury, Gemini, and Apollo missions, and has been associated with the Skylab, Mariner, Voyager, and ERTS programs. He has taught lunar geology at the Air Force Institute of Technology, the University of California at Santa Barbara, and the Catholic University of America, and has published widely in several fields.

Dr. Lowman is a member of the Geological Society of America, the American Geophysical Union, the American Society of Photogrammetry, the Air Force Association, and the American Association for the Advancement of Science.

MAY CALENDAR — *The public is welcome.*

Friday, May 4, 11, 18, 25, 7:30 PM — Telescope-making classes at American University, McKinley Hall basement. Information: Jerry Schnall, 362-8872.

Saturday, May 5, 6:15 PM — Dinner with the speaker at the Thai Room II, 527 13th Street, NW. Reservations unnecessary.

Saturday, May 5, 8:15 PM — NCA election meeting at the Department of Commerce Auditorium, 14th and E streets, NW. Dr. Paul Lowman will speak.

Monday, May 7, 14, 21, 7:30 PM — Telescope-making classes at the Chevy Chase Community Center, Connecticut Avenue and McKinley Street, NW. Information: Jerry Schnall, 362-8872.

Saturday, May 19, 9:00 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. Planetarium if cloudy. Information: Bob McCracken, 229-8321.

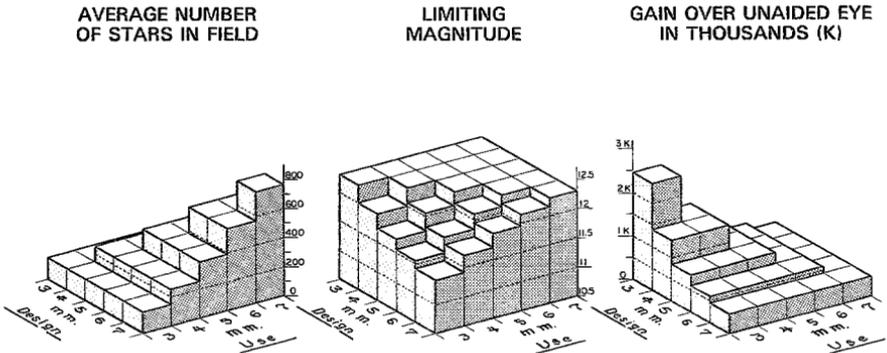
APRIL LECTURE

The April 7 meeting of National Capital Astronomers heard President James Trexler present the results of his work on the optimization of telescope optical parameters to those of the individual observer, with emphasis on rich-field (finder) optical systems.

Trexler's early interest in photography led to his being prevailed upon at Southern Methodist University to build cameras for the observatory, primarily for planetary use. While there, he spent much time building and working with such cameras, gaining experience which he was later to apply at Naval Research Laboratory, where he became Head of the Space Technology Branch.

While working with an 18-inch NRL satellite-tracking telescope a few years ago, Trexler encountered the problem of locating certain low-altitude satellites whose orbits vary with atmospheric drag. For this purpose a finder having a wide field and high light efficiency is required. Dr. John Eisele (a past president of NCA) was asked to assemble an optimum finder from available components. The resulting scope was a 6-inch refractor having a 30-inch focal length and a 1.25-inch Erfle ocular. Based upon the usual rich-field criterion, the design produced a 0.25-inch exit pupil closely matching the standard pupil of the dark-adapted eye. Its 3-degree field thus contained an average of 578 stars visible to such an eye. The finder not only proved to be quite satisfactory for its intended purpose, but also yielded spectacular star fields and nebulae.

Trexler and Eisele followed with a more detailed review of the relationships among the parameters of the optical system and the eye. Trexler discussed their considerations and presented the results that emerged, using three-dimensional graphic models.



PARAMETERS
DESIGN EXIT PUPIL OF
"OPTIMIZED" TELESCOPE
ENTRANCE PUPIL OF USER'S EYE

Textbooks state that the diameter of the dark-adapted pupil starts in youth at about 8 mm and decreases with age to about 1 mm at age 100. Thus, the age of the observer must be considered if a design match is to be achieved. With G. R. Wright's cooperation, Trexler arranged to measure eyes of various ages to determine the distribution, as well as averages, for working numbers. He also developed and maintained current a list of available wide-field oculars with their optical characteristics. Of interest, aside from desirable aberration corrections, are apparent field, focal length, field-stop diameter, number of glass-air interfaces, coatings, eye relief, and F number, as derived from the focal length and field-stop diameter. In some cases, glass absorption becomes

ELECTION IN MAY

NCA officers for fiscal 1980 terms will be elected at the May 5 meeting. Candidates nominated by committee were published last month. Additional nominations may be made by written petition of ten full members in good standing, submitted to the trustees prior to the May election.

GRAZING OCCULTATION EXPEDITIONS PLANNED

Dr. David Dunham is organizing observers for the following grazing lunar occultations. For further information, call Dave at (301) 585-0989.

UT Date	Time	Place	Vis Mag	Pcnt Sunlit	Cusp Angle	Min Aper
05-01-79	01:46	Scaggsville, MD	6.5	21	-1S	5 cm
05-16-79	04:08	Kitty Hawk, NC	5.0	80	11S	10 cm
06-01-79	02:51	Fairland, MD	8.8	33	1N	20 cm

SUMMER PROGRAMS SCHEDULED

The public park program series, *Exploring the Sky*, presented jointly by National Capital Astronomers and the National Park Service, is scheduled for 1979 as follows:

May 19, 9:00 PM	August 18, 9:00 PM
June 16, 9:00 PM	September 15, 8:00 PM
July 7, 9:00 PM	October 13, 7:30 PM

All of the programs are held on Glover Road south of Military Road, NW, near Rock Creek Nature Center. In case of weather, the Nature Center Planetarium is used. All are invited to bring telescopes to share with the public.

important. The list is dominated by the large-field military-surplus Erfle types, some of which are no longer available.

As an optimization example, he started with an ocular of 1.25-inch focal length, a 1.75-inch field stop, and an apparent field of 80 degrees. Assuming an observer's pupil of 0.25 inch, he showed that for this ocular the optimum objective of about 4 inches aperture would show an average of about 1,000 stars in its 5-degree field.

Trexler discussed some of the occasionally heard terms of rather limited meaning, such as twilight factor — numerically, $(AM)^{0.5}$, where A is aperture and M is magnification. With A in millimeters, the factor for 7 x 50 binoculars is about 19; for the previously described finder, about 60. Relative brightness is the square of exit-pupil diameter in millimeters. Of course, there is no further gain in brightness when the diameter of the exit pupil exceeds that of the observer's pupil.

Trexler showed plots of twilight factor, relative brightness, magnification, objective diameter, and diameter of field, all as functions of design pupil diameter. Using the solid models, he showed the effects of mismatching of the design pupil and observer pupil, in efficiency, gain over the unaided eye, and limiting stellar magnitude. The accompanying Naval Research Laboratory figures are similar to, but of lesser range than the solid models, which better show the effects of extreme mismatches.

Trexler offers to those interested an individual optimization computation using his computer program developed for the purpose, if they will provide the parameters.

STAR DUST may be reproduced with proper credit to National Capital Astronomers.

EXCERPTS FROM THE IAU CIRCULARS

1. 1976 March — A.N. Bunner, University of Wisconsin, reported the detection of soft X-rays from V843 Oph (the Kepler 1604 supernova remnant) with the Wisconsin soft-X-ray experiment on OSO-8.

2. March 23 — O. Hull, New Zealand, observed an outburst of the recurrent nova U Sco. The visible magnitude on March 24 was 12.5.

3. April — B. Margon and colleagues, UCLA, reported highly varying Doppler shifts in H and He emission lines from variable X-ray star SS 433 in Aquilla. Changes in wavelength of $1,000 \text{ \AA}$ in 50 days and simultaneous large redshifts and blueshifts of $+50,000$ and $-30,000$ km per sec in addition to a stationary system, have been observed. A 160-day period is apparent, with the minimum velocities expected in May and June.

FOR SALE

Tasco 60-mm refractor, needs some work. Repairable, or useful for parts. Wooden tripod, but no mount. Easy deal — make offer. Ted Silvey, 363-0501.

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