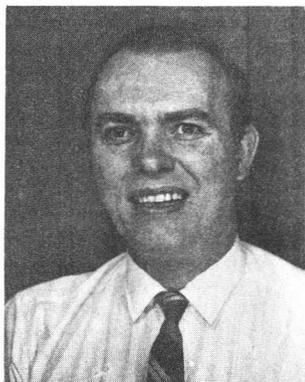




WARREN TO DESCRIBE, DEMONSTRATE SCIENCE DATA BANK



DR. WARREN

Dr. Wayne H. Warren, Jr. will describe, explain, and demonstrate the use of the Astronomical Data Center of the National Space Science Data Center at the October 2 meeting of National Capital Astronomers

Astronomical research presents many problems appropriate to the use of machine-readable data and data bases to store and retrieve information about stars. Catalogs have always been a fundamental product of and an indispensable aid for observational work. The recent flood of interactive computer systems has increased the value of computerized star catalogs immensely, since they can be used for automated telescope operations, fundamental research, and data reduction. The development of a large astronomical data base at Goddard Space Flight Center will be described

and some applications of machine-readable astronomical data will be demonstrated through a terminal which will be linked by telephone line with the Center.

Wayne H. Warren, Jr. received the A.B. in physics from Fairleigh Dickinson University in 1968, and his A.M. (1970) and Ph.D. (1975) in astronomy from Indiana University. He is presently Head of the Analysis Group at the National Space Science Data Center, where he is responsible for the development, improvement, and dissemination of machine-readable astronomical catalogs and data, in addition to the archiving and distribution of all data from the International Ultraviolet Explorer mission.

Dr. Warren is a member of the International Astronomical Union, American Astronomical Society, Astronomical Society of the Pacific, the International Occultation Timing Association, and is a co-editor of the *Astronomical Data Center Bulletin*.

OCTOBER CALENDAR — *The public is welcome.*

Friday, October 1, 8, 15, 22, 29, 7:30 PM — Telescope-making classes at American University, McKinley Hall basement. Information: Jerry Schnall, 362-8872.

Saturday, October 2, 6:15 PM — Dinner with the speaker at the Thai Room II, 527 13th Street, NW. Reservations unnecessary.

Saturday, October 2, 8:15 PM — NCA monthly meeting at the Department of Commerce Auditorium, 14th and E Streets, NW. Dr. Warren will speak.

Tuesday, October 5, 12, 19, 26, 7:30 PM — Telescope-making classes at Chevy Chase Community Center, Connecticut Avenue and McKinley Street, NW. Information: Jerry Schnall, 362-8872.

Friday, October 8, 15, 22, 8:00 PM — NCA 14-inch telescope open nights with Bob Bolster, 6007 Ridgeview Drive, south of Alexandria off Franconia Road between Telegraph Road and Rose Hill Drive. Call Bob at 960-9126.

Saturday, October 16, 4:30 PM — NCA picnic. See Page 7.

Saturday, October 23, 7:30 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.

SEPTEMBER LECTURE

The September meeting of National Capital Astronomers heard Mr. Fred Espenak of Goddard Space Flight Center speak on solar eclipses, methods of their prediction, and eclipse highlights for the remainder of this century. He first described the phenomenon, then reviewed eclipse dynamics.

with variations in the distance of the two bodies, the angular subtense of the Moon varies from 10 percent less to 7 percent greater than that of the Sun. Thus, a central eclipse may be total, annular, or transitional along the path. Because the ecliptic and the lunar orbit do not share the same plane, both bodies must be within 18.5 degrees of the two crossing points, or nodes, for an eclipse to occur. Moving at about 1 degree per day, the Sun requires 37 days to traverse this zone, while the Moon returns to the node every 29.5 days, or synodic month. Thus at least one solar eclipse is necessary during this interval, known as an eclipse season. The annual 19-degree westward drift of the nodes results in an eclipse season every 173.3 days. Two eclipse seasons (346.6 days) constitute an eclipse year. The lunar perigee-to-perigee period, or anomalistic month, determines whether the solar eclipse will be total or annular.

A remarkable coincidence leads to an important periodicity in eclipses: 19 eclipse years almost exactly equals 223 synodic months; 239 anomalistic months also almost exactly equals 223 synodic months. This period, 6,585.3 days, is the saros interval. Solar eclipses separated by one saros interval occur under almost identical geometry, therefore have very similar characteristics. Because the saros is not an integral number of days, successive eclipses at saros intervals are displaced by one-third day in longitude. Because the saros interval is 11 hours shorter than 19 eclipse years, each successive eclipse of such a series occurs about one-half degree farther eastward along the ecliptic. Such a series produces 70 to 80 eclipses, all very similar. The entire saros series lasts about 13 centuries.

Many saros series progress simultaneously; at this time there are 39 individual saros series, 25 of them producing total eclipses.

In 1824 Bessel introduced a simplified procedure for predicting solar eclipses. In his coordinate system the X-Y plane with geocentric origin is perpendicular to the axis of the lunar shadow. The Z axis is parallel to the shadow axis. The umbral and penumbral radii expressed in X-Y coordinates, the central and penumbral shadow angles with the Z axis, and the hour angle and declination characterize an eclipse. Bessel's method is still the most powerful for eclipse prediction.

Espenak described some of the more interesting eclipses to occur in the next few decades and compared them to previous eclipses of the same saros.

The unusually long eclipse of 11 June 1983 will begin in the Indian Ocean, sweep across Indonesia and New Guinea, and end in the Coral Sea. The maximum duration, 5 minutes 54 seconds, near Java, and the estimated probability of clear sky make Java the preferred site. Espenak will serve as a tour guide with a New York expedition for this eclipse.

On 30 May 1984 an 11-second annular eclipse crosses Mexico, enters the United States, and passes south of Richmond, Virginia.

A 1-minute 58 second total eclipse will skirt the coast of Antarctica on 12 November 1985.

Near Iceland an annular-total eclipse on 3 October 1986 will reach totality for one-third second near midpath.

On 29 March 1987 an annular-total eclipse will begin in Argentina, become total for 7 seconds in mid Atlantic, and cross Africa as annular.

A total eclipse on 18 March 1988 will begin in the Indian Ocean, cross Sumatra, Borneo, the Philippines, reach a maximum of 3 minutes 46 seconds south of Japan, and end in the Gulf of Alaska.

Beginning in Finland, a 22 July 1990 total eclipse will reach a maximum of 2 minutes 32 seconds in Siberia and end 2,100 km south of Los Angeles.

North America's only remaining total eclipse of this century will occur in 1991. Starting in the Pacific Ocean, it will cross Hawaii, Mexico, Central America, and end in Brazil. Totality will reach 6 minutes 53 seconds near the west coast of Mexico.

The maximum possible totality is 7 minutes 31 seconds. Only three have exceeded 7 minutes this century.

Espenak concluded with an impressive series of slides from an expedition to Kenya in 1980.

OCCULTATION EXPEDITIONS PLANNED

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

UT Date	Time	Place	Vis Mag	Pcnt Sunlit	Cusp Angle	Min Aper
10-09-82	09:44	Lime Kiln, MD	8.8	56	8N	15 cm
10-15-82	10:12	Nags Head, NC	5.1	3	15N	5 cm
10-20-82	23:42	Rockville, MD	8.6	15	1S	15 cm
10-23-82	01:21	Waverly, VA	6.4	32	5S	8 cm
10-26-82	01:30	Donegal, PA	6.2	60	6S	5 cm
ASTEROIDAL:			Star Mag	Delta Mag	Name of Asteroid	
10-07-82	05:18	ne USA ?	9.2	2.7	(481) Erita	10 cm

NCA PICNIC AT MANASSAS BATTLEFIELD PARK 16 OCTOBER

Bring your picnic dinner, telescopes, and guests, and enjoy another NCA outing at Manassas Battlefield Park at 4:30 PM on Saturday, 16 October.

Go west on I-66 approximately 17 miles from the Beltway to Route 234, right on 234 1.7 miles to the site on the left. Follow the dirt road to the picnic tables. Picnic will be held regardless of weather short of rain at the time.

ANNUAL NEIGHBORHOOD ASTRONOMERS' MEETING SCHEDULED

The 1982 Neighborhood Astronomers' meeting will be held at Goddard Space Flight Center on 14 October.

Registration (\$3.00) at 8:30 AM will be followed at 9:00 by papers by many prominent astronomers and a reception at 5:30 PM. There will be breaks for lunch and for morning and afternoon refreshments.

Foreign Nationals must pre-register. For further information call Dr. M.R. Kundu, 454-3001.

U.S. NAVAL OBSERVATORY COLLOQUIUM SCHEDULED

Professor S.K. Runcorn, University of Newcastle-on-Tyne, will speak on "Lunar Paleomagnetism, Pole-Wandering, and Possible Existence of Early Moons in the Earth-Moon System."

The colloquium will be held on Thursday, 7 October, at 2:00 PM in room 300, Building 52. Coffee and tea will be served following the talk.

NCA members are welcome. Enter the Observatory at the Massachusetts Avenue and 34th Street gate, where the guard will require identification and provide directions. Parking is available behind Building 52.

SMITHSONIAN RESIDENT ASSOCIATES OFFERS 8-WEEK COURSE

The Smithsonian Resident Associates Program is offering a series of eight evening astronomical lectures beginning 18 October. Coordinated by Drs. Carl Fichtel and Jacob Trombka, Goddard Space Flight Center, and featuring leading astronomers, the series will provide a broad overview of the major branches of modern astronomy. Smithsonian Resident Associates members, \$63.00. Non members, \$89.00. For information call 357-3030.

CUMBERLAND OPTICAL TOUR WELL ATTENDED, ENLIGHTENING.

Two dozen members who enjoyed Mr. J.R. Cumberland's gracious hospitality on 22 September were fascinated by the many special optical pieces and clever processes for producing them. Tiny 1-mm prisms gleamed like little jewels. Precision Questar and Quantum optics, lenses, flats, and mirrors of various sizes and focal lengths were figured individually to exacting specifications. Mr. Cumberland demonstrated several of the processes, showed some special techniques, and answered questions. He then unwrapped a foot-high obelisk of sparkling lead glass which he hand made purely as a work of art.

Among the things that became clear were that Mr. Cumberland is a gifted artist as well as artisan, a sophisticated optician, and a genial host.

EXCERPTS FROM THE IAU CIRCULARS

1. August 18 — M. Oda and the Hakucho Team, Institute of Space and Astronomical science, discovered a new X-ray burster, probably associated with Serpens X-2. The peak intensity in 2-9 keV was four times that of the Crab Nebula.

2. August 19 — C. W. McCracken and L. W. Brown, Goddard Space Flight Center, obtained spectra of Comet Austin showing emission by CN, CH, C₃, and (O I). On August 26 additional emission features from OH, NH, and CO⁺ were detected. The spectra were obtained with the 91-cm telescope with a cassegrain spectrograph equipped with an image intensifier.

3. August 19 — M. Lovas, Konkoly Observatory, discovered a supernova of 15th magnitude in NGC 521. R.N. Bolster

FOR SALE

Mirror — Edmund 4, 25-inch, F/10, homemade cell, and secondary mirror. Used but excellent condition. \$18.00. Can deliver to NCA meeting. Pete Rutledge, (703) 590-2468.

Mirrors — a number of 8-inch F/6 Pyrex aluminized and overcoated, fully corrected parabolic mirrors, excess contract production. \$100.00. Mr. J.R. Cumberland, 423-8857.

★ S T A R D U S T

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