STAR DUST

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Boggess to present Early COBE Observations

DR. BOGGESS

Dr. Nancy W. Boggess, of the Infrared Astrophysics Branch, NASA Goddard Space Flight Center, will bring some very interesting early results of observations by the Cosmic Background Explorer to the March National Capital Astronomers colloquium in the National Air and Space Museum.

There are few directly observable measurements possible of the very early phase of the universe. The Cosmic Background Explorer (COBE), NASA's first space mission devoted to cosmology, is designed to measure the Cosmic Microwave Background (CMB) spectrum and anisotropies on a large angular scale, and to search for the cosmic Infrared Background (CIB). the CIB is expected to result from the cumulative emissions of luminous objects formed since the decoupling of mater and radiation allowed clumping of matter to occur.

COBE, launched in November 1989, is performing an all-sky survey in the spectral range from 1 micron to 1 cm. An overview of the mission, instruments, and results to date will be presented, as well as the cosmological implications.

Dr. Nancy W. Boggess received her B.A. in Mathematics (Cum Laud) in 1947 from Wheaton College, her M.A. is Astronomy from Wellesley in 1949, and her Ph.D. in Astrophysics from the Unibversity of Michigan in 1967. She has served as Program Scientist for all NASA Infrared Space Programs in Astrophysics, the infrared SR&T programs, the Kuiper Airborne Astronomy Program, the IRAS Science Working Group, and at present is COBE Deputy Project Scientist, RTOP Manager for Infrared Submillimeter and Radio Programs in Astrophysics, Executive Secretary for the IR, Sub mm, and Radio M.O.W.G., and Harlow Shapley Visiting Lecturer for the American Astronomical Society. She is a member of the AAS, Sigma Xi, and the IAU, has published widely, and has received several awards.

MARCH CALENDAR — *The public is welcome.*

Friday, March 2, 9, 16, 23, 7:30 pm — Telescope-making classes at American University, McKinley Hall Basement. Information: Jerry Schnall, 362-8872.

Friday, March 2, 9, 16, 23, 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, March 3, 5:45 pm — Dinner with the speaker at the Smithson Restaurant, 6th and C Streets, SW, inside the Holiday Inn. Reservations unnecessary. Use the 7th Street and Maryland Avenue exit of the L'Enfant Plaza Metrorail station.

Saturday, March 3, 7:30 pm — NCA monthly colloquium in the Einstein Planetarium of the National Air and Space Museum, Seventh Street and Independence Avenue, SW. Enter Independence Avenue side. Dr. Boggess will speak.

Tuesday, March 6, 13, 20, 27, 7:30 pm — Telescope-making classes at Chevy Chase Community Center, Connecticut Avenue and McKinley Street, NW. Information: Jerry Schnall, 362-8872.

Thursday, March 29, 8:30 am to 8:oo pm — Washington Area Astronomers Meeting, hosted by National Capital Astronomers at the Universtiy of DC. Registration required. See page 121

The April NCA colloquium will feature Philip Barringer on April 7. See page 119.

For other organizations' events of interest see elsewhere in this issue.

Dr. Thomas R. Watters, Smithsonian Center for Earth and Planetary Studies, addressed the February National Capital Astronomers colloquium in the Einstein Planetarium of the National Air and Space Museum. He presented a comparative study of the terrestrial planets' tectonic characteristics.

Tectonics is the activity of building. In planets it refers to development of the surface structure through crustal deformation. The forces required to generate the deforming stresses derive primarily from heat-loss mechanisms, conduction, convection, and advection. In the smaller planets, convection is the dominant mechanism. In the Earth, the main drivers are convection from the inner mantle and conduction through the lithosphere, or crustal plate. The thermal action in the Jovian satellite Io is an example of advective, hot-spot activity, with volcanoes, but apparently no convective plate activity.

Watters emphasizes that while these processes are dominant at this time, there is to some extent a complex interaction of mechanisms involved. Their relative importance probably varies during the evolution of all the planets.

Many of the concepts about tectonics in the Earth are based on models which, although they work very well, are not thoroughly proven. As the models and concepts are refined, a basis is developed for comparative planetary studies. In order to understand the effects of the various processes in the complex, it is necessary to start with the Earth.

The "great unifying theory" in geology that pools all or most of the observational evidence into one uniform picture is plate tectonics. In the first-order sense, tectonic activity is localized at the plate margins. Watters pointed to examples of divergence in the mid-Atlantic ridge, and convergence in South America. The driving forces are analyzed in terms of principal stresses. Where the maximum stress is horizontal and the least is vertical, the tendency is to form compressional features, either buckling and folding, or cracking and subduction. Where the maximum stress is vertical and the minimum horizontal, extension, or pulling apart results in a normal fault. Where both principal stresses are horizontal, a strike-slip fault results, where the two crustal edges slip past each other. The San Andreas fault in California is an example.

One region Watters has been studying is the Columbia Plateau, a continental flood basalt province in the Pacific northwest. It is at the region of shear between the eastern margin of the Pacific plate and the western margin of the North American plate, east of the volcanoes of the Cascade Range in Washington and Oregon. Those volcanoes are a product of subduction of the Juan de Fuca plate and the Pacific plate. As a plate is driven down, heat developed by the subduction melts the plate and develops volcanoes.

Flood basalts erupt at fissures, are extremely hot, fluid, and voluminous. These eruptions typically are extremely energetic events. Some flow several hundred kilometers down very shallow gradients. Watters showed a section of the Plateau in the region of the Columbia River where flood basalts were emplaced during the Miocene period about 20 million years ago. There, a section of 3.5 kilometers was emplaced in less than two million years. Subsequent compressional stresses buckled the basalt, resulting in long, sinuous ridges of three- to four-hundred meter heights. The ridges are laced with very narrow strike-slip faults at acute angles, about 30 degrees from the principal stress direction, determined by the coefficient of friction. Very narrow, and separated by broad, flat valleys, the ridges can now be seen along the Columbia River.

Models have been developed to explain and relate the mechanisms which produce often observed periodic spacing, buckling, and other deformation patterns. Factors to consider include the thickness and strength of the basalt layer, the weaker, underlying sedimentary layer upon which the basalt was deposited, and the thin layers, or interbeds, of material deposited during the intervals between events of a series of basalt flows, and the total thickness above the rigid, supporting continental plate.

It is important that analysis shows that a coherent system of structures forms within a predictable set of stress conditions.

There are counterparts of basaltic

flood plains on the terrestrial planets. The Tharsis region of Mars is one of the most tectonically interesting places in the solar system. An enormous chasm, Vals Marenaris, is 8Km deep, several thousand km long, appears to be a tectonic feature, a rift of both crust and lithosphere. There are huge volcanoes, a radial system of extensional fractures in the crust, covering almost a quarter of the planet's surface. Many compressional ridges are periodically distributed on smooth plains that appear to be volcanic flood plains very similar to those on the Columbia Plateau. There are even what appear to be strike-slip faults cutting across the ridges as on the Columbia Plateau.

These periodic compressional features were earlier observed on the lunar mare, which are flood-volcanic material. They are also seen on Mercury. Those dimensional details of morphology that are available (most are not) fit the models reasonably,, using estimates of the unavailable parameters, to explain the observed periodicities.

There is, however, a problem with plate tectonics on Mars: The isostatic support of the huge volcanoes would require a thickness of one or two hundred km — two to four times that of the terrestrial lithosphere. This in a planet one-half the size of the Earth! Subduction of such plates seems about impossible. Watters suggests that these massive structures may have resulted in an unuaual way from an unsuccessful subduction event. Mars may be a one-plate planet.

The stress sources and mechanisms on Mars are not yet known. The Mars Observer is planned to be launched in 1992. If sucessful, it will yield very high-resolution Martian topography with which the models can be refined.

Although Venus cannot be observed optically, radar altimetry from Pioneer Venus shows the topogtaphy to be bimodal, as on the Earth. There are high, contenental areas and lowlands, which on the Earth are ocean basins. Earth-based radar from Arecibo has yielded higher resolution than that from Pioneer Venus. The Soviet Venera 15 and 16 produced radar images of higher resolution, about 1 km. Venus has ridge belts of periodic compressional ridges on high, smooth plateaus, features that in size and form resemble those on the Columbia Plateau and the wrinkle ridges on Mars. Again, there seem to be fine linear cuts at angles, apparently strike-slip faults.

As with Mars, although the obsera tions seem convincing, there is still not a sufficient knowledge of the driving stresses in Venus to conclude that plate tectonics is the mechanism of surface deformation. The surface temperature of Venus is about 475°, and the atmospheric pressure about 100 bars. Under these conditions, the lithosphere may be much thinner than that of the Earth. For these reasons, Venus may be the most challenging planet to model. There may be some different mechanism, perhaps intermediate between those of Mars and of the Earth.

Watters is looking forward to studying the results from Magellan within the next year. Magellan should yield resolution of 100 meters, far better than the 1 km resolution now available.

The satellites of the outer planets pose even greater challenges; strange features are seen which bear no resemblance to current models.

Watters concluded with a computer simulated video production of a spacecraft flight over and around Mars, entitled "Mars the Planet." Robert H. McCracken

COMING NEXT MONTH

At the April 7 National Capital Astronomers coloquium, Mr. Philip Barringer will discuss the famous Arizona Barringer Meteor Crater.

Mr. Barringer (as in "bell-ringer," not "passenger," he says), owner, is a member of National Capital Astronomers, and son of the geologist and engineer for which the crater is named. He will discuss the crater's history, early studies and controversies regarding its origin, geology, purchase, attemps at recovery, and development as a geological atraction.

The elder Mr. Barringer is perhaps uniquely distinguished by having craters named for him on both the Earth and the Moon.

OCCULTATION EXPEDITIONS PLANNED

Dr. David Dunham is organizing observers for the following occultations. There is one asteroidal, but no lunar graze expeditions planned in February. For further information call the NCA-IOTA Information Line: (301) 474-4945 (Greenbelt, MD).

UT Date	Time	Place	Vis Mag	Pcnt Sunlit	Cusp Angle	Min Aper
Grazing Lunar:						
03-03-90	04:08	Salem, MA	5.6	39	11N	6 cm
03-03-90	04:18	Dulles & Alex., VA	8.8	39	11N	20 cm
03-03-90	04:24	Newark, DE	4.0	39	-10S	6 cm
03-03-90	23:47	n. Harrisburg, PA	6.5*	49	2N	6 cm
03-17-90	10:44	Georgetown, SC	3.0	70	3N	6 cm
13-19-90	11:05	Atlanta, GA	4.4	51	3N	6 cm
03-30-90	23:42	Seaville, NJ	8.0	23	10N	10 cm
04-06-90	01:30	South Hill, VA	4.6	85	19N	6 cm

Asteroidal:		Star Mag	Delta Mag	Name	
03-13-90	00:04	DC & MD	8.5	4.4	(584) Semiramis	6 cm
03-19-90	06:24	Oregon & Idaho	10	2.1	(747) Winchester	10 cm
03-18-90	09:41	DC Area?†	9.2	0.5	Titan	20 cm
03-29-90	09:24	NY & New England	8.9	5.3	(619)Pax	6 cm
04-02-90	08:28	DC & VA	12.0	2.7	(86) Semele	20 cm

* Double, mags 7.1 & 7.3, separation 4.1 arcsec in Position Angle 192°
† Location very uncertain; nominal: Chile.

NCA WELCOMES NEW MEMBERS

Gary L. Marshall
3152 Cedar Grove Drive
Fairfax, VA 22031

Jay Patrick &
Debra Ryan
7222 Flower Avenue
Takoma Park, MD 20912

St. Stephen's School
c/o Dr. Stan Smith
1000 St. Stephens Road
Alexandria, VA 22304

NASA GODDARD COLLOQUIA SCHEDULED

The following colloquium will be held at 15:30 in Building 3 Auditorium at Goddard Space Flight Center, Greenbelt, MD. Coffee and tea will be served from 15:00. Enter the main gate and obtain a visitor's pass from the guard. Call Tracy Parlate, 286-8543, for further information.

Friday, March 30 — **"Particle Physics, Astrophysics, and Cosmology,"** Dr. Arnon Dar, GSFC and Isreal.

UNIVERSITY OF MARYLAND OPEN HOUSE SCHEDULED

The Astronomy Program, University of Maryland, holds open house on the 5th and 20th of each month at the University's observatory on Metzerott Road in College Park. Talks and slide shows are presented at 8:00 pm, followed by telescopic sky viewing, weather permitting. The public is invited; there is no charge.

Monday, March 5, — "Globular Clusters," Mike Briley, University of Maryland.

Tuesday, March 20, — "The Search for Extraterrestrial Intelligence," Dr. G.L. Verschure, University of Maryland.

No reservations are necessary for individuals. Groups larger than ten should call (301) 454-3001 at least 5 days prior to the program.

UNIVERSITY OF MARYLAND ASTRONOMY PROGRAM COLLOQUIUM SCHEDULED

The University of Maryland Astronomy Program Colloquia are held each Wednesday at 16:00 at the UMD Computer and Space Sciences Building (CSS), Room 1113. For more information, call Dr. Roger Bell, Astronomy Program, (301) 454-3005.

7 March — "Star Counts and the Distance to the Virgo Cluster," Dr. John Tonry, Massachusetts Institute of Technology.

14 March — "The Cosmic Microwave Background — Is there Anything Left to Do after COBE?," Dr. Bruce Partridge, Haverford College.

28 March — "Women in Astronomy — 1840 to the Present," Dr. Vera Rubin, Carnegie Institute of Washington.

The colloquia are preceded by tea at 15:30 in CCS 0254, and followed by refreshments. Park at meters in the garage at the corner of Regents Drive and Stadium Drive, across the street from the CSS Building.

U.S. NAVAL OBSERVATORY TOURS IN MARCH

The next Monday night public tours of the Naval Observatory are scheduled to begin at 7:30 pm EST on March 5, 12, 19, and 26.

Passes will be issued to the first 100 persons in line at the gate across from the British Embassy, at Massachusetts Avenue and the southeast side of Observatory Circle, at the end of the circular road. Some form of photoidentification will be required. Parking for the tours is not allowed on the grounds except for the handicapped; ample parking is available near the gate. Information: 653-1541.

WASHINGTON AREA ASTRONOMERS MEETING TO BE HOSTED BY NCA IN MARCH

On Thursday, March 29, National Capital Astronomers will host a Washington Area Astronomers meeting at the University of The District of Columbia, Connecticut Avenue and Van Ness Street, NW, Building 42, in the Second Floor Lounge. Registration and the later reception will be in the First Floor Lounge.

Approximately 19 papers are expected from leading astronomers, primarily in the Washington-Baltimore area.

The University is conveniently accessible either by automobile or by the Van Ness - UDC Red Line Metrorail Station.

By Metrorail, as you emerge from the escalator (Van Ness Street is behind you), enter between the columns at your left, and either ascend the stairs toward the back to the elevated crosswalk to Building 42, or, through the rear exit, cross the bus drive, and enter the end of Building 42 diagonally toward the left.

Driving, park under Building 44, the second building west of Connecticut Avenue on the north side of Van Ness Street. Walk out the rear garage door a few feet to Building 42. Bring your parking receipt (if charged) to the meeting registration desk (First floor Lounge, Building 42) for reimbursement. Later in the day parking may be difficult.

Registration (for those not pre-registered) will begin at 8:30 am. Pre-registrants may pick up their badges at the same time and place.

The welcoming address will be given at 9:00 am by Dr. Philip L. Brach, Dean of the College of Physical Sciences, Engineering, and Technology. Presentation of papers will follow, with coffee and lunch breaks, and the reception and poster session at 3:00 pm. Pre-registration will be $5.00, registration at the meeting, $8.00. Free to students with identification card. These fees include coffee breaks and the reception. Lunch will be available at the UDC cafeteria or at nearby restaurants.

For further information, call NCA: (301) 320-3621.

OPTICAL SOCIETY SCHEDULES JOINT MEETING WITH IEEE

The monthly lecture meeting of the National Capital Section of the Optical Society of America will be held on March 20, jointly with the Ultrasonics Society of the Institute of Electrical and Electronics Engineers. The topic will be "Acousto-optic Signal Processing," by Irwin Abramovitz, of Westinghouse Electric Company. The social hour will be at 6:pm, dinner at 7:00, and the talk at 8:00. For information on place, registration and cost, call call Dick Bulova at (703) 323-1283 (H), or (703) 664-6771 (W).

CCD SEMINAR IN CHARLESTON SCHEDULED

The Citadel, the College of Charleston, and the Institute for Space Observations will hold a seminar, "New Methods and Applications of CCD Technology," March 15 to 17, at the Science Center of the College of Charleston. Topics covered will include:

* Data reducton techniques
* High-speed and ultra-deep photometry
* Astrometric applications
* Wide-area surveys (drift-scan, CCD's with Schmidt telescopes)
* High signal-to-noise spectroscopy of fint sources.

For further informtion, call NCA: (301) 320-3621. For complete information, call Dr. Saul Adelman, Physics, Department, the Citadel, Charleston, SC, (803) 792-6943.

AIR AND SPACE MUSEUM OFFERS PROGRAMS IN MARCH

The following free public programs will be offered during March in the National Air and Space Museum:

Saturday, March 10, 9:30 am, Albert Einstein Planetarium* — Monthly Sky Lecture: "The Wide Field Planetary Camera," Dr. Kenneth Seidelmann, Astronomer, U.S. Naval Observatory, a member of the team that developed the high definition, wwide field camera for images of the planets, one of the five instruments to fly on the Hubble Space Telescope.

Wednesday, March 14, 8:00 pm, Albert Einstein Planetarium — Exploring Space Lecture Series: "Black Holes," Dr. Minas Kafatos, Acting Chairman, Physics Department, George Mason University, will shed some light on black holes.

*Possibly in another room: the Planetarium may be undergoing renovation at this time.

ASTRONOMY AND PERSONAL COMPUTERS

Joan B. Dunham

Consumables — This is the term used for items that are "used up," such as paper, printer ribbons, floppy disks, batteries, mailing labels, envelopes, floppy disk mailers, and so forth. Consumables are the not-so-glamorous side of computing. We need these to use our computers, yet we often do not consider them when determining the costs of a computer, or when deciding which among many pieces of hardware or software to buy. I am always surprised when I total the costs of these items in early April, to see how much can be spent on consumables without even realizing it. I now buy disks in bulk and look for savings in computer paper, but still the incidentals can mount up. For example, one evening last week we noticed we were out of prointer ribbons and had to make a quick trip to the MightyBig office supply senter to finish our plots by the next morning. We paid for our forgetfulness. One ribbon from MightyBig cost more than the last ribbon sixpack we had gotten by mailorder. Neuther ribbon was a namebrand, although the mail order was the more generic (packaged in a plastic bag with no manufacturing information). Both brands of ribbons, by the way, are of quite satisfactory quality. In fact, the only ribbon we have had fail in the last year failed two nights ago. It was a carbon ribbon for a daisy wheel printer, made by the printer manufacturer. The ribbon takeup mechanism inside the cartridge failed immediately after insertion into the printer.

One way to control the costs of consumables is to make them a factor considered when purchasing equipment. If the printer is a new design does it use ribbons, ink cartridges, or paper of a special design only available from the manufacturer? Can these items be purchased from a second source, or is the manufacturer the only supplier? Is there a chance that the ribons, paper, or batteries are so different that they will be hard to find at any price? For example, I once was considering purchasing an ink jet printer noted for its small size. When I was discussing this printer with a salesman, another customer rushed in and identified himself as someone who had called for the ink jet cartridges this printer used. It was soon obvious that the store had very few cartridges, and this customer had called many stores trying to find them. No only was she paying a premium price for the few cartridges they could sell her, she also had spent several hours trying to find them for any price.

A more recent example is a special printer made for printing mailing labels. The special labels for this printer are several times the cost of the more ordinary labels. Several vendors were selling this new printer at a computer show I attended in January, but neither they nor any other vendors at that show had the labels. The selling point of this special label printer is that the printer is alwys there, ready to print labels when needed. I think that is an attractive idea. I frequently want to print a few labels, and find switching paper and labels a nuisance. Instead of buying the label printer, though, I purchased a very good printer. One inexpensive older printer — still working and purchased at a cost much less than the label printer — will be dedicated to labels only.

Online Astronomy — Tom Van Flandern is teaching a course in Astronomy with CompuServe for eight weeks starting February 19. The course will be taught through files uploaded every week to the Astronomy Forum, and augmented by optional online conferences once a week. No specialized training or prior experience in astronomy will be needed to understand the material. Participating in the course requires registration, but the files are available to anyone on CompuServe. The course prospectus promises controversial topics and lively discussions.d

The Astronomy Forum also has ongoing discussions of such diverse topics as cosmology, the Texas Star Party, and messages to, about, and from visiting Soviet astronomers. The files in the Astronomy Forum Library included instructions on wide-field astrophotography, elements for artificial satellite orbits, a graphics file with a Comet Austin CCD image, software for Focault tests, software to help determine if one's recent discovery is a returning periodic comet or a new discovery, and files from *Sky and Telescope*. The graphics images look particularly interesting. They are stored in a GIF format with software available to display them on different brands of computers.

National Capital Astronomers, Inc.

is a non-profit, public-service corporation for advancement of the astronomical sciences. NCA is the astronomy affiliate of the Washington Academy of Sciences. For information, call NCA: (301) 320-3621.

SERVICES AND ACTIVITIES

A Forum for dissemination of the status and results of current work by scientists at the horizons of their fields is provided through the monthly NCA colloquia held at the National Air and Space Museum of the Smithsonian Institution. All interested persons are welcome; there is no charge.

Expeditions frequently go to many parts of the world to acquire observational data from occultations and eclipses which contribute significantly to refinement of orbital parameters, the coordinate system, navigation tables, and timekeeping. Other results of this work under continuing study include the discovery of apparent satellites of some asteroids, discovery of apparent small variations in the solar radius, and profiles of asteroids.

Discussion Groups provide opportunities for participants to exchange information, ideas, and questions on preselected topics, moderated by a member or guest expert.

Publications received by members include *Sky & Telescope* magazine and the NCA newsletter, *Star Dust*.

The NCA Public Information Service answers many astronomy-related questions, provides predictions of the paths and times of eclipses and occultations, schedules of expeditions and resulting data, assistance in developing programs, and locating references.

The Telescope Selection, Use, and Care Seminar, held annually in November, offers the public guidance for those contemplating the acquisition of a first telescope, and dispells the many common misconceptions which often lead to disappointment.

Working Groups support areas such as computer science and software, photographic materials and techniques, instrumentation, and others.

Telescope-Making Classes teach the student to grind and polish, by hand, the precise optical surface that becomes the heart of a fine astronomical telescope.

NCA Travel offers occasional tours, local and world-wide, to observatories, laboratories, and other points of interest. NCA sponsored tours for comet Halley to many parts of the southern hemisphere.

Discounts are available to members on many publications and other astronomical items.

Public programs are offered jointly with the National Park Service, the Smithsonian Institution, the U. S. Naval Observatory, and others.

PLEASE ENROLL ME IN NATIONAL CAPITAL ASTRONOMERS MEMBERSHIP

[ ] Regular ($32 per year) Each regular member receives *Sky & Telescope* and *Star Dust*.

[ ] Junior (Only open to those under age 18.) Date of birth_____

Junior members pay a reduced rate and may elect not to receive *Sky & Telescope*.

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If family membership, list names of additional participating immediate family members in same household, with birthdates of all those under 18 years old:

NOTE: If you already subscribe to *Sky & Telescope*, please attach a recent mail label, or indicate expiration date:_____. A prorata adjustment will be made.

Make check payable to National Capital Astronomers, Inc., and send with this form to: Patricia B. Trueblood, Secretary, 10912 Broad Green Terrace, Potomac, MD 20854.

The following information is optional. If you would like to participate actively in NCA affairs, please indicate briefly any special interest, skills, vocation, education, experience, or other qualifications which you might contribute. Thank you, and welcome!

EXCERPTS FROM THE IAU CIRCULARS Robert N. Bolster

1. December 24 - M.E. Ressler and M. Shure, University of Hawaii, reported the first groundbased resolved infrared images of Io. Obtained with a 58 x 62 InSb array camera at the NASA Infrared Telescope Facility, the images show the volcano Loki as a point source against Io's disk.

2. January 16 - Gordon Garradd, Tamworth, Australia, discovered a nova of magnitude 11.5 in the Large Magellanic Cloud on exposures with a 30-cm lens.

3. January 21 - Paul Wild, Berne University, Switzerland, discovered a comet (1990a) of 14th magnitude in Leo. The elements by Marsden indicate that comet Wild has a period of 6.25 years.

4. January 23 - R.M. West, European Southern Observatory, reported the detection of a jet of gas emitted by the sunward side of the nucleus of comet Austin.

NCA SEEKS TO SHARE

There is much gratification to be derived from service in the useful, interesting functions of National Capital Astronomers. We are considering some significant expansions of NCA operations which will entail some fundamental changes. Opportunities are open for a number of persons to share the pleasures of working with interesting, dedicated people in fascinating and valuable services.

Elections are approaching; the nominating committee is seeking candidates for fiscal 1991 officers. There are also opportunities in special functions involving research, publications, educational activities and institutions, development of educational programs, classes, and materials, promotional items, demonstrations, and displays, chapter activities, public affairs, conference planning, tours and travel, other special events, press, advance planning, legal counsel, and others. Leith Holloway is reactivating the Junior Division. In our busy pursuit of science, we must not neglect tomorrow's leadership. If you would like to serve as a mentor for one or more youth, call Leith Holloway at (301) 564-6061. Let's discuss your talents, experience, and special avilities. Call NCA: (301) 320-3621.

PHYSICS IS PHUN

The Physics Department of the University of Maryland offers this instructive and entertaining demonstration program series free to the public. Scheduled approximately bimonthly, each program is presented on a Thursday and repeated on the consecutive Friday:

Thursday, 15 March, repeated Friday, 16 March, 1990, 7:30 pm, displays open from 7:00 pm — "Seeing the Light," demonstrates light phenomena, including the eye mechanism and color, hosted by Dr. Richard E. Berg, the staff of the Physics Lecture-Demonstration Facility, and physics students. For further information, call (301) 454-3520.

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FIRST CLASS

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