Star Dust

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Maurice Shapiro to describe "The Explosive Universe"

By John Graham

National Capital Astronomers will hold their next meeting on Saturday January 4, 7:30 pm at the National Institutes of Health (in the Bunim Room at the Clinical Center, Floor 9, Building 10). At this meeting, we shall be privileged to be addressed by Dr. Maurice M. Shapiro on the subject "The Explosive Universe - as revealed by the new astronomies." He will describe a turbulent universe unsuspected prior to the last few decades. From the discovery of cosmic rays to the birth of neutrino astronomy, this century has witnessed a revolution in our conception of the physical universe. The electromagnetic channels of radio astronomy, X-ray astronomy and gamma-ray astronomy along with startling discoveries in the ultraviolet and infrared regimes, have exposed the violent outbursts and prodigious powers that animate stars and galaxies. We anticipate an exciting lecture about the most recent findings of modern astrophysics.

Dr. Maurice Shapiro is currently Visiting Professor at the University of Maryland and Chief Scientist Emeritus at the Naval Research Laboratory in Washington, D.C. Following service as a group leader at Los Alamos Laboratory, Dr. Shapiro became Director of the Nuclear Physics Division at the Naval Research Laboratory. For his achievements in astrophysics and high-energy physics, he received the U.S. Navy's Distinguished Civilian Service Award. He has since worked at several prestigious research institutions such as the University of Bonn and the Max Planck Institute for Astrophysics in Munich and the Weizmann Institute of Science in Rehovot, Israel. Amongst other activities, Dr. Shapiro served as Associate Editor of Physical Review Letters between 1977 and 1982 and is Director of the International School of Cosmic Ray Physics in the Ettore Majorana Foundation of Italy. We at National Capital Astronomers are proud to have him as one of our members and have elected him as a trustee of our group. It is a pleasure indeed that we welcome him also as a speaker at our January colloquium.

On The Edge:
The Total Solar Eclipse of July 11, 1991 Sayulita, Nayarit, Mexico

by Jeff Guerber

Our site is Sayulita, a tiny fishing-and-beach village on the Pacific coast of Mexico, about 40 km north of Puerto Vallarta and only 4 km inside the southern limit. The designated observing site is a schoolyard in town, but it is so swelteringly hot (probably over

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January Calendar

The Public is Welcome!

Saturday, January 4, 5:30 PM - Dinner with the speaker at Frascati's Restaurant in Bethesda before the monthly meeting. Reservations are for 5:30 Sharp!

January 4, 7:30 PM - NCA monthly colloquium with Maurice Shapiro (University of Maryland), "The Explosive Universe - as revealed by the new astronomies". Meeting will be held in the Bunim Room at the National Institutes of Health. For directions refer to map and description on inside back page.

Tuesday, January 7, 14, 21, 28, 7:30 PM - Telescope making classes at Chevy Chase Community Center, Connecticut Avenue and McKinley Street, NW. Information: Jerry Schnall, 202/362-8872.

Friday, January 10, 24, 31, 8:30 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 (703) 960-9126.

Monday, January 20 and Saturday, January 25, 7:00 PM - "Star Formation," public planetarium program at Montgomery College Planetarium at 7600 Takoma Avenue (Takoma and Fenton Street). Information: Dr. Harold Williams, 301/650-1463 (office), 301/942-1014 (home).

Saturday, January 25, 7:30 PM - "Exploring the Sky" at Rock Creek Park on Glover Road, NW, near the Nature Center. Dress warmly, especially hands, feet and head. Information: John Lohman, 703/820-4194.

Next Month:
February 1, 7:30 PM: Penny Sackett (University of Pittsburgh) "Rings around Galaxies."

Washington Academy of Sciences hosts Panel Discussion on Solar - Terrestrial Interaction

By Nancy Byrd

On the evening of Wednesday, December 4, 1991, at the National Academy of Sciences, the Washington Academy of Sciences, and NCA, and nine other local scientific societies hosted a panel discussion, entitled "Our Sun, Our Earth, Their Constant Interaction: The International Solar - Terrestrial Program of the Inter-Agency Consultative Group for Space Science." The featured panelists included distinguished scientists, Academician, Roald Z. Sagdeev, Distinguished Professor of Physics and Director, East-West Science Center, University of Maryland; formerly Director, Institute for Space Research, Moscow, and advisor to President Gorbachev; Stamatios M. Krimigis, Head, Space Department, Johns Hopkins University Applied Physics Laboratory; Ruedeger Reinhard, Executive Secretary, IACG; Space Science Department, European Space Agency; and moderator, George L. Withbroe, Director, Space Physics Division, Office of Space Science and Applications, NASA.

Dr. Withbroe began the discussion by noting that solar magnetic storms have significant geomagnetic effects, such as disruptions of power and communication, and formation of aurorae. He presented a graph showing the remarkable covariation of sunspot cycle length with temperature in the northern hemisphere [See Friis-Christensen and Lassen, *Science*, November 1, 1991, pp. 698-700].

Professor Sagdeev presented a detailed history of the

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Editor's note: The review of the previous month's speaker, normally printed in this space, was not available at time of publication. It will appear in February's issue of Star Dust.

OCCULTATION EXPEDITIONS PLANNED

Dr. David Dunham is organizing observers for the following occultations. For further information call the IOTA information line: (301) 474-4945 (Greenbelt, MD).

Date	Time (EST)	Place	Visible Magnitude	Percent Sunlight	Cusp Angle	Minimum Aperture
Grazing Lunar:						
Jan. 14	21:44	La Plata, MD	4.6	70	5N	6 cm
Jan. 24	03:07	Elkton, MD	6.5	73	12S	10 cm

Date	Time	Place	Star Mag.	Delta Mag.	Name	Aperture
Cometary:*						
Jan. 1	02:41	Maryland	13.2	0.7	P/Schwassmann-Wachmann 1	30 cm

* A finder chart for Comet Schwassmann-Wachmann 1 is on page 72 of January *Sky and Telescope.*

Astronomy and Personal Computers

By Joan Bixby Dunham

Be your own expert? Recently, I read advice by a columnist on computers that we should be our own experts, and not depend on the advice of others when trying to make decisions about computer systems. He was addressing his comments specifically to managers responsible for computer networks, but he clearly thought this advice should apply to all. He had a nice phrase for his advice: "Load your own gun". I have thought about that, and I have decided that he is wrong. This field changes so fast and is so complex that it is not possible to be expert in all of it. This is especially true when trying to make decisions about buying hardware and/or software. Why would someone take the time to become an expert in all of the possibilities when he or she will not use most of them?

His advice is tempting. If you are your own computer expert, you do not have to worry about your consultant quitting, asking for an impossible raise, or not being completely trustworthy. But my experience has been that it takes about a year to learn a computer language well (although perhaps Ada might take longer), several months to learn how to use a word processor with lots of features, and perhaps equally as long to learn the ins and outs of an operating system. If you are trying to decide what is the best system to automate a telescope, you can see that you might easily spend forever learning enough to decide. As you take the time to learn all about the systems and software available, new ones become available. This is, by the way, a significant problem for anyone responsible for making decisions on computer hardware and software. The more thoroughly you research the systems available, the more likely you will never finish the research.

For our personal use, most of us do not need to decide anything more complex than which brand of PC or word processor to purchase. We have many different ones to choose from, and probably most of them would work equally well. Then, we may just spend our time trying to find the best price.

Additional copies of *Observer's Handbook 1992,* published by the Royal Astronomical Society of Canada are still available. Jeff Norman will bring a number of copies to the January meeting. Price is $10.

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Inter-Agency Consultative Group for Space Science (IACG) which consists of the directors of four national space agencies and their assistants. The IACG mission is to improve the return on space expenditures by facilitating cooperation between the agencies and by the sharing of any information obtained. The member agencies are the European Space Agency (ESA), NASA, the Soviet Space Agency and the Japan Institute of Space and Astronautical Sciences (ISAS).

Past cooperative projects include the Global Atmosphere Research Project (GARP) and the international cooperation secured for Halley's comet in which information provided by the U.S. allowed the Soviets to better position their Vega spacecraft, and information provided in turn by the Soviets allowed for the excellent positioning of the European Space Agency's Giotto craft. The current project is the Solar-Terrestrial Program.

Professor Krimigis discussed the scientific plans and goals of the IACG. He showed that atmospheric convection patterns on Earth are greatly altered during auroral events. Some goals of the Solar-Terrestrial Program include studying areas of the Earth's magnetic field from different positions in space, study of the area about 50 km. above the Earth's surface. Other plans are for a solar probe which would spend ten days within 0.3 AU of the Sun, and for an inter-stellar probe which couldarrive at its destination faster than Voyager 1 by a factor of at least 5. The existence of IACG, says Krimigis, may make such a program possible.

Dr. Ruedeger, formerly Giotto project scientist, described the organization and function of the IACG. He observed that the member agencies combined have forty different spacecraft in all parts of geospace, making for some complexity in determining which instrument is best suited for a given task. Other functions of the organization are to maintain the flow of information between the participants while preserving the informality that has heretofore characterized it.

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100° F) that many of us set up on the beach a block away — a very pleasant spot with palm trees and a flock of brown pelicans that put on quite a show as they fold their wings and dive into the water.

The sun is coming straight up out of the east, out from behind a palm tree from where I sit; the beach here runs northeast to southwest. Everyone has been very concerned about the weather, which in Puerto Vallarta was mostly cloudy with periods of rain until yesterday, and we can see thunderstorms building over the mountains to the west. Before we left, Dave Dunham had been on the phone to the weather service in Washington to get the latest predictions and GOES satellite images; they indicate that the weather system is moving northward, and is cloudier closer to the centerline. As eclipse time nears, it becomes apparent that the thunderstorms and their cirrus debris will not affect our view.

As totality approaches, the illumination level drops — not like sunset, where the shadows lengthen and the colors change, but rather as if your sunglasses keep getting darker. All the shadows remain distinct and the colors stay the same.

About two minutes before totality we spot the shadow bands on sheets borrowed (surreptitiously) from the hotel and laid out on the beach. They are not so much bands as a faint, varying mottling, more like the pattern on a pond or swimming pool. The scale is, as I recall, about 2-4 inches, and I don't see any apparent direction to their motion. To the west-southwest, over Punta de Mita, some low clouds have turned bright orange; the sky to the northwest — most of the sky, actually — is fairly dark but I don't have the impression of the shadow rushing up on me as others report.

Then, suddenly, the corona becomes visible, with a patch of photosphere on the southeast side forming a "diamond ring" — it really does look like one, too. At this point, I start taking pictures. The diamond disappears and the we are left with a luminous, pearlescent, ring of light, very sharp on the inner

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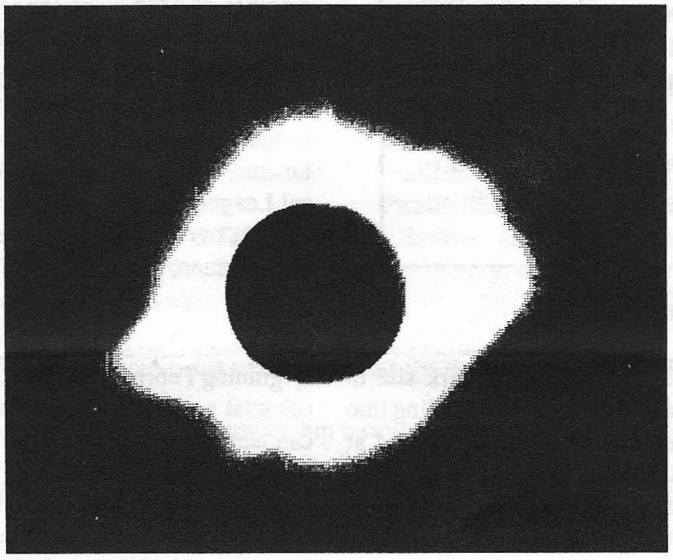
edge and fading off toward the outside, with two major streamers extending north to south and many smaller ones in other directions; I am surprised at the east-west symmetry of the corona. There is an intense red fringe along the inner edge of the corona, covering about 30 degrees on the southern side — the chromosphere. Near the centerline it is visible only briefly, so that its emission spectrum is known as the "flash spectrum", but since we are so close to the edge it remains visible throughout totality. On the east and west are two prominences, the same color as the chromosphere; the one on the west is a loop, the one on the east forms a double "C".



Eclipse 1991 *Photo by Jeff Guerber*

I have been taking pictures, running through the exposure settings on my camera, but it's going more slowly than I expect — changing the setting, cocking the shutter, and taking the picture with the cable release turns out to be a three-handed job (Oh for an autowinder!). I am using a 35-mm camera (Pentax K-1000) with a 400 mm f/5.6 telephoto lens and Kodachrome 64 film; 400-500 mm turns out to be the perfect focal length, as the corona extends most of the way across the vertical field-of-view. I had planned to run through the entire range of exposures twice, but the eclipse is going faster than I expected and the photography slower, so I stop after making it through once. I grab my binoculars and lay back in the sand to just watch the rest of totality.

Officially, we have 103 seconds of totality, though it seems much less. (Fred Espenak, a veteran eclipse chaser from Goddard who was in Cabo San Lucas, says that, no matter what the predictions say, totality always lasts 6 seconds.) Just as quickly as it disappeared at second contact, a diamond forms on the south-west side, and I sit up to take a few more pictures. Everything now happens in reverse: we see the shadow bands again briefly, and the illumination level begins to rise. However, everyone is even more excited now than they were with anticipation three minutes earlier: Wow! That was incredible!

I did not see any planets during totality, but a few minutes after I saw Venus, which had been behind a palm tree. (On the other hand, during totality I wasn't very interested in looking at planets!) I also did not see any unusual behavior in the local wildlife; a rooster in town crowed shortly after totality but he had been doing that all day anyway (people more familiar with chickens than I say that's entirely typical), and pelicans are not known for their vocalizations. The humans, however, were doing quite a lot of vocalizing!

Within a half hour after third contact, the sun is covered by thickening cirrus clouds. The clouds did not interfere with the totality, though my long-exposure photos at third contact show clouds in the area, which were not noticeable until illuminated by the full-strength sunlight of the diamond ring. My bus is late leaving after fourth contact, and by the time we get back to Puerto Vallarta it is raining.

No picture I have ever seen, no description I have ever read (including this one), not even the video tapes that many people made (though they do relatively well), even begins to capture the incredible beauty and excitement of a total solar eclipse. It was well worth every penny, every hour of vacation time, every bit of frustration making the preparations. By the closing banquet that night, Tom van Flandern, our expedition's organizer,

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From the Local Group

Member to Member Communications

Telescope For Sale

Coulter Odyssey 2 - 17 1/2" diameter, f4.5 Dobsonian. Bought about 1986 after Halley's apparition, very good mirror, excellent views (no filters, no eyepieces) - $950. Call Carl Adams - home: 703/391-8838, work: 202/586-9142.

NCA Members provide data for determining Size and Shape of Kleopatra

On January 19, 1991, four NCA members, Dave Dunham, Wayne Warren, Jeff Guerber and Bob Bolster, observed and recorded the occultation of a 9th magnitude star by 216 Kleopatra. These observations provided the information necessary for determination that Kleopatra is an unusually elongate object with a pronounced projection from its side.

Quadrantids Meteor Shower

Dan Costanzo is organizing a small, informal group to observe the annual Quadrantid meteor shower from a dark site in Culpeper, VA, beginning January 3, 1992, and extending into January 4. The shower is expected to peak on January 4 at approximately 10 hours UT. Call Dan at 703/841-4765 for more information. Also, see January *Sky & Telescope*, page 80, for information on the shower itself.

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was already talking about Eclipse Edge '94 to the eclipse of November 3, 1994, that crosses South America from the Peru/Chile border to the coast of Brazil. (Sorry, it'll miss Rio de Janeiro by about 500 miles; Tom's looking at Florianopolis, Brazil.) In 1999, one will cross Europe, the Middle East, and India, from the south edge of England to the Indian Ocean. It is an unforgettable experience and one that I highly recommend.

Astronomical League Membership

This past summer, NCA trustees and officers voted to cancel NCA's membership in the Astronomical League. Thus a member of NCA is no longer automatically a member of the Astronomical League. Subscription to the *Reflector*, the quarterly newsletter of the League is $4.00 for one year. You should have already received communication from the Astronomical League to that effect, with contact information within the League. If you think that NCA's dropping out of the Astronomical League was a mistake, or if you feel strongly in any way about it, or need the League contact information, please contact Jeff Norman, phone number: 202/966-0739.

Celestial Navigation Course

Beginning February 3, 1992, a ten week course (12 classes) in celestial navigation fundamentals, including use of the hand calculator will be offered in Bethesda, MD. The instructor, NCA member, George Lear, is a USCG licensed master with offshore sailing experience as coach with the USNA Sailing Squadron, a professional engineer, and former college math instructor. Call George for details: 301/986-0314.

EXCERPTS FROM THE IAU CIRCULARS

By R.N. Bolster

1. November - Further observations of the split nucleus of Comet Chernykh (1991o) show that the splitting occurred on April 14 and that the separation velocity is 15 m/s, the highest known for any such event. The smaller fragment is expected to disappear before the comet reaches perihelion.

2. November 1 - E. Helin and K. Lawrence discovered a fast-moving asteroidal object of 15th magnitude with the 46-cm Palomar Schmidt. The orbital elements by Marsden show it to have a period of 2.48 years, and indicate that its closest approach to the Earth will be at 0.074 AU about January 3.

3. November 13 - C.S. and E.M. Shoemaker and D.H. Levy discovered another comet (1991d1) of 16th magnitude in Perseus with the 46-cm Palomar Schmidt. The elements by Marsden show that it has a period of 6.72 years and passed perihelion on October 27th.

National Capital Astronomers, Inc.

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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 Meeting. (See monthly *Stardust* for time and location.) 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 monthly publication of NCA, *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 dispels the many common misconceptions which often leads 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

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Note: If you already subscribe to ***Sky & Telescope***, please attach a recent mail label, or indicate the expiration date: _____. A prorated adjustment will be made. Make check payable to National Capital Astronomers, Inc., and send with this form to:

Leith Holloway 10500 Rockville Pike Apartment. M-10, Rockville, MD 20852.

The following information is optional. Please indicate briefly any special interests, skills, vocation, education, experience, or other qualifications which you might contribute to NCA

Thank you, and welcome!

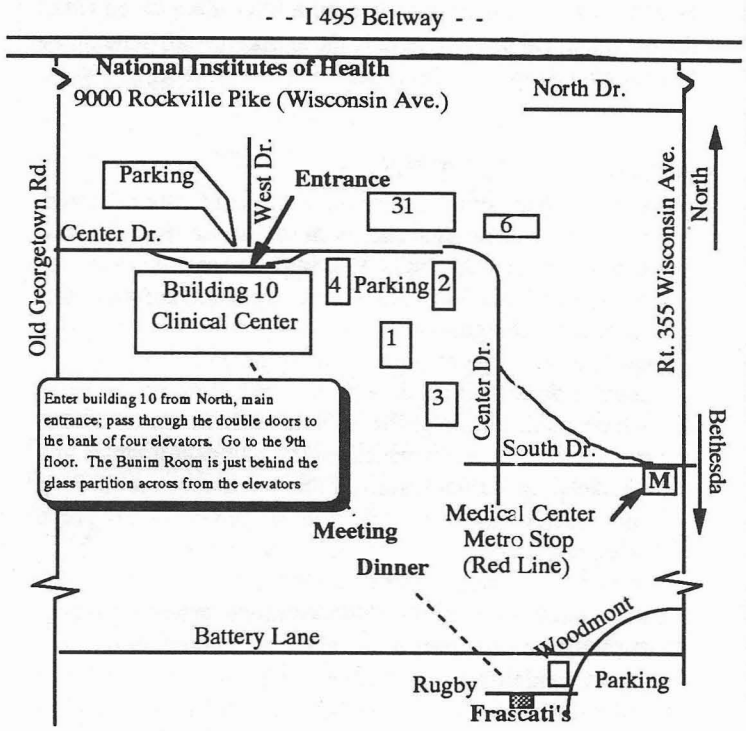
_____

_____

Getting to the NCA Monthly Meeting

•Subway Riders - From Medical Center Metro Stop: Walk down the hill, pass the bus stops and turn right at the anchor (onto Center Drive). Continue uphill to building 10, the largest building on campus.

•To Frascati's: Proceed down Wisconsin Avenue toward Bethesda. Bear right onto Woodmont (or the next right onto Battery Lane), follow Woodmont across Battery, take a right onto Rugby and park. The restaurant will not guarantee seats after 5:30.



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