CALENDAR FOR MARCH - continued from page 1

7 JUNIOR DIVISION * SPECIAL MEETING at 7:00 P.M. in Room 2062 of the Department of Commerce.

10 ASTRONOMY REVIEW CLASS 8:15 P.M. in Building 59, U. S. Naval Observatory, The Milky Way Galaxy and Extra Galactic Phenomena, Ellen Stolarik

13 VIRGINIA JUNIORS meeting at the Westover Baptist Church, 1125 N. Patrick Henry Drive, Arlington, Va. at 7:30 P.M.

14 MD-DC JUNIORS meeting at 2:00 P.M. at the Cleveland Park Branch Library, Conn. Ave. at Macomb St., N.W. Dr. Armand Spitz speaking on "The Universe through Other Eyes"

17 ASTRONOMY REVIEW CLASS 8:15 P.M. in Bldg. 59, U.S. Naval Observatory, 34th and Mass. Ave., N.W. The Celestial Sphere and Astronomical Reference Systems, Leith Holloway

20 PRINCE GEORGES JUNIORS meeting at 7:30 P.M. at the District Heights Elementary School, 801 County Line Road, District Heights, Maryland

21 DISCUSSION GROUP at 8:15 P.M., Dept. of Commerce, Room 2062, Mythology and the Stars, Betty Lipscomb

27 VIRGINIA JUNIORS meeting at 7:30 P.M. in the Westover Baptist Church, 1125 N. Patrick Henry Drive, Arlington, Virginia

6,13,20,27 MAKSUTOV CLUB AND TELESCOPE MAKING CLASS at the Chevy Chase Community Center with Hoy Walls, 7:00 to 10:00 P.M.

4,11,18,25 TELESCOPE MAKING CLASS in Bladensburg with William Isherwood from 7:00 to 9:30 P.M.

5,19 TELESCOPE MAKING CLASS at McLean High School in McLean, Va., with Grady Whitney from 8:00 to 10:00 P.M.

* STAR DUST

Published monthly except August by and for members of the NATIONAL CAPITAL ASTRONOMERS, INCORPORATED, a non-profit, public-service organization promoting interest and education in astronomy and the related sciences. President, Mrs. John Stolarik, Re 6-4321; Vice President, Mrs. Margaret Noble; Secretary, Theodore Noble; Treasurer, Arthur Etienne. Trustees: Sam C. Feild, Jr., G. Robert Wright, James Krebs, and Robert McCracken. Editor, Mrs. John Stolarik. Assistant Editor, Isabel Fine. Publicity Distribution, Norton Schiff. Photography and Production, Sam C. Feild, Jr. Deadline: Tenth of each month.

WASHINGTON D.C. MAR-4'64 U.S. POSTAGE 05 PB METER 376071

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★ STAR DUST

MARCH 1964 Vol.XXI No. 7

COMETS AS PROBES OF SPACE AND TIME

Dr. Bertram Donn

NCA presents Dr. Bertram Donn of the Goddard Space Flight Center, Greenbelt, Maryland, as guest lecturer for March. Dr. Donn completed his undergraduate study at Brooklyn College, Brooklyn, N.Y. and received a Ph.D. in Astrophysics and Interstellar Matter from the Harvard College Observatory.

The most prominent features of comets are the shape, dimensions, luminosity, and temporal variations of the coma and tails. In some way, they are the result of the interaction of matter ejected from the nucleus with solar radiation and with the local space environment. Consequently cometary phenomena is a measure of conditions in interplanetary space. A proper interpretation requires a better understanding of the composition and structure of cometary nuclei and of its interaction with the space environment than we now possess. Cometary spectra are in the main due to devising theories of the nature of comets and also furnish more details of the interaction mechanisms.

Current ideas of the origin and nature of the nucleus indicate that comets probably developed during the formative stage of the solar system. Because of their small mass and low temperatures, relatively little change has occurred since that time. Consequently comets indicate also the type of material out of which the bodies in the solar system developed. In addition, they provide data on chemical processes in space. Continued page 2

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CALENDAR FOR MARCH

3 ASTRONOMY REVIEW CLASS 8:15 P.M. in Bldg. 59, U. S. Naval Observatory, 34th and Mass. Ave., N. W. Cosmology, Ellen Stolarik

6 PRINCE GEORGES JUNIORS meeting at 7:30 P.M. at the District Heights Elementary School, 801 County Line Road, District Heights, Maryland

7 COMETS AS PROBES OF SPACE AND TIME by Dr. Bertram Donn, Dept. of Commerce Auditorium, 8:15 P.M.
Business meeting follows.
DINNER WITH THE SPEAKER at 6:30 P.M. at the Occidental Restaurant. All members invited. For reservations, call -- Mrs. Noble - Lu 2-6721. Continued page 4

Comets - continued from page 1

Dr. Donn was a Research Associate at the Columbia Radiation Laboratory; Associate Professor in Physics and Astronomy at Wayne State University, Detroit, Michigan; Research Associate at the Enrico Fermi Institute for Nuclear Studies-University of Chicago, Research in Cosmic Chemistry in Dr. Harold Ureys' Laboratories; and is presently Associate Head of the Astrochemistry Section, Goddard Space Flight Center,NASA,carrying on theoretical, experimental, and space research on problems of cosmic chemistry.

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BUS TRIP TO NEW YORK????

Plans are being made for an NCA trip to New York City on Saturday,April 11, 1964, to visit the American Museum of Natural History, the Optical Shop of the Amateur Astronomical Association of New York, and the Hayden Planetarium. The schedule will be: Leave Washington 7:30 A.M.; arrive New York 12:00, Leave N.Y. 6:00 P.M. and arrive Washington 11:30 P.M. Cost of transportation and admission to Planetarium will be $10.00(museum free).

If you want to go,hand Bob Wright a check for $10.00(payable NCA) at the March meeting. We need 41 passengers to fill a bus, unless 25 persons agree to go at the March meeting, the trip will be dropped.

******* Robert Wright, Ev 4-6748

FEBRUARY LECTURE--SOME RECENT DEVELOPMENTS IN RADIO ASTRONOMY

Although radio astronomy only really got started in 1947, it has advanced spectacularly in the 17 intervening years according to our February speaker Dr. Gart Westerhout of the University of Maryland. Whereas optical astronomers can use only a narrow window around 5,000 Angstrom units in the electromagnetic spectrum, radio astronomers observe a number of octaves of radio frequencies. However, radio telescopes can only look at one point in the sky at a time. Thus a radio frequency photograph is not yet possible although maps of radio intensity distributions can be compiled from a number of point radio observations. Furthermore, the longer radio wavelengths permit only very poor resolution even with the largest radio telescopes. For example, a 250-foot parabolic dish has a resolving power of only 0.2 degree at 25-cm. wavelengths. Fortunately much greater resolution can be obtained while studying single objects by linking two radio telescopes miles apart by microwave radio.

Astronomers obtain their best overall view of our own galaxy by radio since light cannot penetrate very far through the dust clouds in the galactic plane. With radio observations,astronomers have been able to trace the spiral arms of our galaxy and study the peculiar structure of its center containing several expanding rings of hydrogen gas. Perhaps the center of our galaxy is actually exploding!

The source of radio emission in space puzzles astronomers. The best explanation is that the synchrotron effect produces the radiation. However, this mechanism requires a magnetic

field and relativistic electrons (ones moving at nearly the speed of light). Where the necessary large supply of such rapid electrons comes from is still a mystery. Moreover, synchrotron radio emission is linearly polarized, but in 1960 such polarized radio noise was indeed discovered. In fact, ionized hydrogen rotates the plane of polarization of these waves, and so observations of the direction of the electric vector provide important data on the distribution of ions in introgalactic space.

Astronomers no longer consider colliding galaxies as a common source of radio emission. Many radio sources are extended objects such as the Crab nebula. Lunar occultation observations of these sources furnishes information about their structure.

At least 14% of all radio sources are double. Point radio sources are currently the most interesting phenomena observed. One of the "brightest" (in radio output) is 3C-273 which has been identified with a 12th magnitude star in Virgo. This star has a red shift corresponding to one-sixth of the speed of light or a distance of 1.6 billion light years. If one of the brightest radio "stars" is that far away, and that energetic, what could the dimmer sources be like?

Dr. Westerhout concluded by saying that astronomers are coming to the stage where they think sudden and spontaneous evolution may be just as important as slow evolution in the universe.

******* Leith Holloway

MD--DC JUNIORS

The ever-popular Mr. Hoy J. Walls gave the sixth lecture of the current series to the Maryland-D.C. juniors in the Cleveland Park Library on February 8. The 18 juniors attending were presented a comprehensive talk on all types of telescopes, historically and qualitatively, from the first Dutch refractor to the latest Maksutov. In addition to informing and entertaining his audience, Mr. Walls gained one or two students for his telescope-making classes.

Our March speaker will be the well-known Dr. Armand N. Spitz. His topic, "The Universe Through New Eyes", will be a discussion of astronomical observation at other than visual wavelengths. All juniors, from all regions, should make it a point to not miss this lecture.

Project World Day, with a circulation last issue of 75, will issue its second edition in April. A comprehensive study of juniors' observations of the December 30 lunar eclipse, Project World Night is investigating new methods of reproducing the numerous photographs included in the reports submitted. An outstanding series, exhibited by Bill Pala of McLean at the February 1 meeting is among those to be printed.

The Md-DC Juniors' library now contains booklets on many phases of astronomy, recent issues of NOVA, Star Dust, and Project World Day, most issues of Space Science for the past six or seven years, the individual tapes of our five Cleveland Park Library lectures, and space for any donations you care to make, of anything related to astronomy. Please contact Mr. Holloway to contribute or check out any materials.

Currently investigating packaging and shipping costs,our Film Committee plans to make a definite proposal to the Trustees and to Eastman Kodak for small quantity retailing of the 103a series of spectral films, some time in March. If all goes well, NCA'ers should be able to purchase for the first time small rolls of these special astrophotographic films in May or June.

Norman Sperling

******* MD-DC Junior Editor