★ STAR DUST

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DICK TO REVIEW HISTORY OF COSMIC LIFE SEARCH

DR. DICK

Dr. Steven J. Dick, U.S. Naval Observatory astronomer, will address the January 9 meeting of National Capital Astronomers on the history of the search for extraterrestrial life.

Note that this meeting will be held on the second Saturday of January, not the usual first.

Approaching the subject from the point of view of the history of science, Dr. Dick will concentrate on the 17th Century and analyze why some of the most famous names in science — Galileo, Kepler, Fontenelle, and Huygens — viewed the subject of extraterrestrial life as a topic for serious discussion. This will include a discussion of the roles of science, metaphysics, and theology in their arguments. He will conclude by applying the lessons of science to the modern controversy over extraterrestrial life.

A native of Indiana, Dr. Dick received his B.S. in Astrophysics in 1971, the M.A. in 1974, and the Ph.D. in 1977 in the History of Science from Indiana University.

Before coming to the Transit Circle Division he was a science editor in Princeton, New Jersey for several years. He has authored articles in several periodicals. His book, *Plurality of Worlds*, is being published by Cambridge University Press in January 1982.

JANUARY CALENDAR — *The public is welcome.*

Tuesday, January 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, January 8, 15, 22, 29, 7:30 PM — Telescope-making classes at American University, McKinley Hall basement. Information: Jerry Schnall.

Saturday, January 9, 6:15 PM — Dinner with the speaker at the Thai Room II, 527 13th Street, NW. Reservations unnecessary.

Saturday, January 9, 8:15 PM — NCA monthly meeting at the Department of Commerce Auditorium, 14th and E Streets, NW. Dr. Currie will speak.

Friday, January 1, 15, 22, 29, 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.

DECEMBER LECTURE

Dr. Douglas G. Currie, Professor of Physics at the University of Maryland, spoke at the December 5 meeting of National Capital Astronomers. He discussed the status of development of array detectors, particularly intensified charge-coupled devices (CCD), with which he is currently involved.

Comparatively surveying the field from photographic film to devices still under development, he noted the special capabilities and limitations of each. He gave special attention to the uses to which the various systems are put, and in particular to the problems of data processing — parallel-to-serial conversion and reduction.

Photographic film still offers vastly more resolution elements, a far larger grid of data, than any other medium. Its quantum efficiency (the fraction of incident photons that are recorded) is fairly high; its accuracy and reproducibility are poor.

Photon counting with a single photomultiplier tube gives high sensitivity, high accuracy, and high stability under varying conditions. However, it records only a single channel (resolution element). Its original attraction was sensitivity; its appeal today is its great accuracy, linearity, and stability. Quantum efficiency is about 20 percent.

In contrast, the vidicon is a true array detector. It captures and stores data on a silicon surface which is read serially by a scanning electron beam. Noise and beam wander degrade the data. In particular, image charges tend to displace the beam. There are now intensified tubes which have noiseless electron-image preamplification from a preceding image surface.

Finally, there are arrays of CCD's. Their advantages include 30-fold quieter gain, better stability, and 80 percent quantum efficiency. Background can be removed in real time by photon counting with pulse-height discrimination.

Typically, data are now recorded in circulating memory or tape.

CCD arrays have progressed through 100x100, 90x244, 800x800, and now 1200x1200 elements. While up to 500 preamplifiers can be coupled to an array, multiplexing is still required and the rate of data transfer is limited. These array sizes are still tiny compared with photographic film.

Image detectors such as vidicons can be preceded by noiseless electron-image gain. One such image intensifier consists of a photocathode in the image plane followed by an electron-image accelerator through an evacuated space and the detector surface, e.g., a vidicon.

A recent development, the microchannel plate is an array detector with gain. In typical form a ceramic plate is penetrated by perhaps a million closely spaced microscopic holes, each internally coated with a photoemissive material. Photons entering one side of the plate release electrons which are accelerated along the tubes, frequently colliding with the walls. Each collision dislodges an avalanche of secondary electrons, each continuing the multiplication process until a highly energetic electron image emerges from the plate. Each channel is thus a photomultiplier with an indefinite number of stages.

Both types of image intensifiers are in use with a variety of array detectors.

Dr. Currie described the development and application of intensified array detectors by his group at the University of Maryland: the use of amplitude interferometry to obtain high resolution through atmospheric turbulence. In one technique two small apertures are used in an interferometer. Point sources give sharp phase delays, which become fuzzy for extended sources. They are working at Mount Wilson, where the atmosphere is exquisite for this purpose. Measurements on Alpha Orionis are accurate to 1 arcmillisecond, and star diameters can be measured to magnitude 6. If images can be tracked the results can be excellent. The use of arrays promises far greater gain. A CCD array should be in use for this purpose in about 6 months.

Another application with which Dr. Currie is involved uses an astrolabe on

OCCULTATION EXPEDITIONS PLANNED

Dr. David Dunham is organizing observers for the following grazing lunar occultations in January. For further information call Dave at 585-0989.

UT Date	UT Time	Place	Vis Mag	Pcnt Sunlit	Cusp Angle	Min Aper
01-02-82	03:19	Beaver Creek, MD	6.8	38	4S	5 cm
01-18-82	10:16	Doswell, VA	8.3	36	12S	10 cm
01-20-82	09:07	Everglades, FL	4.8	19	11S	2 cm
01-21-82	11:51	Talahassee, FL	4.5	12	13S	2 cm
02-04-82	07:24	Richmond, VA	6.2	79	5N	5 cm

NCA WELCOMES NEW MEMBERS

Jeffery A. Beaudry
10919 Howland Drive
Reston, VA 22091

Sam K Brown, Jr.
3132 North Monroe Street
Arlington, VA 22207

FIFTH ANNUAL WERNHER VON BRAUN MEMORIAL LECTURE

The annual Wernher von Braun Memorial Lecture is an annual presentation of the National Air and Space Museum in honor of the late rocket engineer and scientist.

On Wecnesday, February 3 at 8:00 PM John F. Yardley will deliver the 1982 lecture. His topic will be "Space Shuttle: From Earth to Orbit." There is no charge.

As former Associate Administrator for Space Transportation Systems, Yardley directed the design, development, production, and launch of the space shuttle. He is currently president of the McDonnell Douglas Astronautics Corporation.

EXCERPTS FROM THE IAU CIRCULARS

1. August 7 — D. Herald, Woden, Australia, observed an occultation of SAO 145972 by (18) Melpomene with the 76-cm reflector at Mt. Stromlo. The occultation lasted 19.3 seconds and no secondary events were detected.

2. November — Z. Sekanina, Jet Propulsion Laboratory, reported that Comet Howard-Koomen-Michels (1979 XI) was very likely a member of the Kreutz sun-grazing group, and probably did collide with the Sun. His orbital elements give a perihelion distance of 0.35 solar radii.

3. December — B. Margon and S. Anderson, University of Washington, and S. Grandi, University of California, Los Angeles, reported that the 164-day precessional period of SS 433 (V1343 Aquilae) is no longer decreasing, but has been increasing over the last 16 months.

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a star catalog. This technique promises very good internal accuracy. The FK-4 stars are to be observed in the red.

The transit circle's precision is far better than its accuracy. (Observation of tight groups like the Pleiades permits this comparison.) The astrolabe promises higher accuracy because it measures altitudes rather than angles; it can also measure time. The technique is to measure an altitude crossing. This also lessens gravity-reference problems. Refraction errors, if strictly vertical, are correctable. There are unproven techniques for measuring dispersion.

Dr. Currie is a member of the Wide-Field Planetary Camera Team developing a CCD camera for NASA's Space Telescope. jbl

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