



ASTRONOMICAL PERSPECTIVES - 1973



DR. RICHARD BERENDZEN

Dr. Richard Berendzen will address the National Capital Astronomers on September 8, 1973, on the unique contributions astronomy makes to philosophy, culture, and technology. The worth of astronomy is based on more than its collection of facts, and includes the formation of world views which shape our lives. In connection with these large ideas, Dr. Berendzen will discuss topics ranging from a proposed 1,000-meter optical telescope, and satellite synchronization of national power nets, to extraterrestrial life and our place in the cosmic scheme of things.

Professor Richard Berendzen received a Ph. D. in astronomy from Harvard University in 1968. He has been a member of the Department of Astronomy at Boston University since 1965. He has published two books and more than 50 articles and reviews. He speaks frequently to both professional and amateur societies on a broad range of topics, including the possibilities of extraterrestrial life and communication schemes, recent developments in astronomy, the teaching of astronomy, the history of astronomy, and careers in science.

SEPTEMBER CALENDAR

- Friday, September 7, 14, 21, 28, 7:30 PM — Telescope-making classes at American University, McKinley Hall basement. Information: Jerry Schnall, 362-8872.
- Saturday, September 8, 6:15 PM — Dinner with the speaker at Bassin's Restaurant, 14th Street and Pennsylvania Avenue, NW. Reservations not required.
- Saturday, September 8, 8:15 PM — NCA monthly meeting at the Department of Commerce Auditorium, 14th Street and Constitution Avenue, NW.
- Monday, September 10, 17, 24, 7:30 PM — Telescope-making classes at the Chevy Chase Community Center, Connecticut Avenue and McKinley Street, NW. Information: Jerry Schnall, 362-8872.
- Saturday, September 15, 8:00 PM — Discussion group at the Department of Commerce Building, room 2062. Members who viewed the 1973 total solar eclipse will present photographs, slides, and movies of their experiences.
- Saturday, September 22, 8:00 PM — Exploring the Sky, presented jointly by NCA and National Park Service. Glover Road south of Military Road, NW, near the Rock Creek Nature Center. Information: Bob McCracken, 229-8321.

JUNE LECTURE

In his NCA lecture, "Our Cosmic Destiny," Dr. Ernst J. Öpik delivered a public admonition regarding hazards to the potential longevity of life such as ours in the universe. To make his point, the eminent and versatile 80-year-old astronomer first discussed estimates of the probabilities of extra-terrestrial life and technical civilizations. He next considered the time scales required for evolution, estimated from the geological record, and then evaluated the dangers

Continued on page 2

JUNE LECTURE — *continued*

of summary extinction. Since the inbuilt properties of atoms which led to organic evolution appear to be everywhere the same, and, if so, must ultimately produce similar (not necessarily identical) results, he takes humanity and terrestrial life to represent a fair sample.

Although estimates of the number of life sites in the universe vary widely, Dr. Öpik points out that even a large error would not alter the impression of the extreme rarity of such occurrences. For example, among the 100,000 million stars in our galaxy there may at this time be only 8 million with earthlike planets, 40,000 in a stage similar to that of stone-age man, and only one in the technological state of present humanity. Even so, there are about 100,000 million other galaxies in the observable universe, and the total number of inhabited worlds must be enormous despite their rarity.

The dangers of extinction, Dr. Öpik said, are 1) genetic — perhaps through unknown biological limitations, or through hereditary poisoning by drugs; 2) violent — through external catastrophes such as meteorite impact, nova- or supernovalike outbursts of their suns, or by self destruction through nuclear, chemical, or germ warfare; 3) environmental changes affecting the climate and atmospheric composition.

For technological civilizations having acquired the means of self destruction, Dr. Öpik gave two extreme outlooks toward further evolution: 1) they blow themselves up in a matter of 100 years or so, so that (because of the short time) there can be expected to exist at present only one of this perishable type of society per galaxy, or 2) they learn to cope with the danger of self destruction and manage to achieve a long life of continuous moral, intellectual, and technical evolution for some 100 million years (approximately the age of the oldest animal species). There could then be one million, or one among 100,000 stellar systems of our galaxy carrying inhabitants with advanced *cooperative* intelligence, philosophical, and moral wisdom.

Dr. Öpik sees the next 100 years, then, as the most critical for our humanity. He warns, however, that the greatest danger is not the atom bomb, but the *credulity of humans* which helps to place the instruments of destruction in the wrong hands. As an extreme example of credulity, Dr. Öpik cites the sensational popularity enjoyed by Velikhovski's *Worlds in Collision*, although, he says, "In this case the harm done is minimal — perhaps only in wrongly undermining the authority of science and scientists."

1973 MID-EAST REGION CONVENTION

The Astronomical League regional convention was held in Towson, Maryland on Saturday, June 9. Sixteen NCA members attended. In addition to the varied papers dealing with observing, telescope-making, club-planetarium relationships (by Norman Sperling, formerly of NCA), and motion picture applications, an astrophotograph judging was held. In both the prints and slides divisions, color photographs of solar eclipses won.

In the elections, Dale Fuller of Cumberland, Maryland, and Bill Winkler of NCA were re-elected president and vice president. Norm Sperling of Princeton is the new secretary. He also represented our region at the national convention in August.

an excellent banquet was followed by a speaker to match — Dr. Stanley Sobiski of the Goddard Space Flight Center. He discussed the proposed 120-inch reflector to be orbited in the 1980's. Maintained by round-trip space-shuttle flights, the space telescope will have more than 25 times the resolution of the 200-inch Hale instrument and will detect 29th-magnitude stars using 10-hour exposures. The Ritchey-Cretien design will weigh 8.5 tons. Because of fogging by Van Allen Belt electrons, image-tube systems rather than direct photography will generally be used. The mirror optical surface should be accurate to 1/60 wavelength.



EXPERIMENTAL PLANETARY PHOTOGRAPHY

It is probably safe to say that black-and-white photographs of planets (or other celestial objects) should very seldom be made without some filtration appropriate to the purpose. Many excellent photographs have been made; there is little point in adding more poor ones.

The longer wavelengths (red) penetrate planetary atmospheres deeper than the shorter (violet) ones, and thus show more surface detail than the latter, which show the extent of the atmosphere better. Visual observations benefit in the same ways. Even from full-color photographs subtle details can often be extracted with proper filtration after processing.

It is the nature of planetary photography to require fast film, contrasty processing, and great enlargement, all of which cooperate to emphasize film grain. This problem can be tackled by a useful technique which also helps to alleviate some of the effects of poor seeing. Several (nominally) identical negatives are made and the best few are selected. These are carefully superimposed in making the print. While the desired details are recorded on each negative, the grain structures of the individual negatives differ; the details are reinforced while the grain and other flaws are weakened.

Those seriously interested in planetary photography might profitably study the accompanying exemplary photographs of Mars made by John Korintus using these techniques. In comparing these selected examples, bear in mind that more than one parameter were varied at a time. For all of the pictures, John used his 10-inch f/8 Cave Newtonian with 8-mm eyepiece projection, system approximately $f/80$, Plus-X film, D-76 1:1. Of course, there is the inevitable loss in the half-tone negatives, printing plates, and lithography, try as we do. Top row, August 14, 1971, approx 1:30 AM, central meridian (cm) 96.1. Left to right, 1) Three 2-second exposures, violet filter; 2) Three 1-sec, blue; 3) Two $\frac{1}{2}$ -sec yellow; 4) Two $\frac{1}{2}$ -sec orange; 5) Cm 107, one $\frac{1}{2}$ -sec orange-red filter plus one 1-sec red. Second row, August 29, 1971, apx. 11:30 PM, cm 293.5. Left to right, 1) Two 1-sec, two $\frac{1}{2}$ -sec, no filter; 2) Two 2-sec, two 3-sec, light blue; 3) Two 1-sec, one $\frac{1}{2}$ -sec, yellow; 4) Two $\frac{1}{2}$ -sec, two 1-sec, orange; 5) Two 1-sec, two 2-sec, orange-red.

NCA'S WALTER FARRAR WINS AT STELLAFANE

An elaborate, complete, and beautifully executed transportable observatory, Walt Farrar's entry in the judging for mechanical excellence took first place honors at Stellafane on August 4. Walt, an active variable star observer and AAVSO member, designed and built the system as a visual variable star observatory. The instrumentation cluster includes a 12 $\frac{1}{2}$ -inch f/5 Newtonian, a 6-inch f/4 reflector, and a 3-inch refractor, folded to match the field orientation of the reflectors. All are simultaneously driven on a massive English half-yoke mount with all the appropriate automatic controls and accouterments. Normally resting on a masonry foundation, the base assembly has wheels for trailing.

ABSTRACTS FROM THE IAU CIRCULARS

1. May 28-June 3 — Faint Comet Tuttle-Giacobini-Kresak (1973b) suddenly brightened, reaching 4th magnitude. The outburst was first reported by amateur John Bortle of Stormville, N. Y.

2. June 10 — M. Clark, Mount John University Observatory, New Zealand, discovered a comet (1973i) on a photograph taken with a 10-cm astrograph.

3. July 4 — E. Helin of Caltech discovered a fast-moving asteroid with the Palomar 46-cm Schmidt.

4. July 4 — A. Sandage, Hale Observatories, discovered a 15th-magnitude comet (1973k) on a photograph taken with the Palomar 122-cm Schmidt.

5. July 7-10 — Comet 1973b again brightened from 14th to 4th magnitude, producing jets and a tail a few minutes of arc long.

Some of these items are treated in further detail in *Sky and Telescope*, September 1973. See pages 144 and 158. This listing courtesy Bob Bolster.

FOR SALE

Telescope — 4 1/4-inch Edmund reflector with clock drive; parts to make a 3-inch Edmund reflector; Smithsonian Astrophysical Star Atlas. All for \$50. Gene O'Bryan, 920-4498.

Telescope — 10-inch f/8 Newtonian reflector by Cave. Electric slow motions in both axes, 2.4-inch guide telescope; 4 oculars, choice of portable or permanent pier. \$850; original cost was \$1100. See pictures in this issue. John Korintus, 946-6807.

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