



BUFFALO ASTRONOMICAL ASSOCIATION INC.
BUFFALO MUSEUM OF SCIENCE
HUMBOLDT PARKWAY
BUFFALO NEW YORK 14211

the Spectrum

Editor: Ernst E. Both

NOVEMBER - DECEMBER 1973

NOVEMBER MEETING: For our meeting on November 9, 1973 (8:00 p.m., Club Room, Buffalo Museum of Science) we have arranged an illustrated lecture on the TOTAL SOLAR ECLIPSE of June 30, 1973 by Larry Hazel and Vernon Siegel, both members of the B.A.A. Larry journeyed to Kenya, East Africa and obtained some truly beautiful photographs, while Vern was on board the S.S. Canberra, off the coast of West Africa. This promises to be an exciting meeting and we welcome our own LARRY HAZEL AND VERNON SIEGEL!! ON THE SAME PROGRAM: A COOKIE SALE, PROCEEDS TO BENEFIT OUR OBSERVATORY. HOME-BAKED COOKIES *** BE PREPARED FINANCIALLY *** COOKIE SALE ***

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DECEMBER MEETING: On December 14, 1973 (8:00 p.m., same place as above) we present our traditional holiday program, featuring EDITH GEIGER with her annual CANDID VIEWS OF BAA DOINGS, together with an illustrated talk by Ed and Olga LINDBERG (subject to be announced). As always, followed by social hour with refreshments!!!!

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DUES ARE DUE - PLEASE SEE BOB KARTYAS. Our annual dues (\$ 5.00 individual, \$ 8.00 family) cover the period from September 1973 to August 31, 1974. The following members have renewed: Mrs. Octavia Black, Mr.+Mrs. William Chambers, Darwin Christy, Timothy Coons, William Deazley +Family, Thomas Dessert +Family, Marybeth Gauthier, Mrs. Lillian von Gerichten, Mr.+Mrs. Irv Goetz, Robert Hofer, Stephen Jaworski, Robert Kartyas, Bob Kirchgessner, Ed Lindberg, Donald McClure, Robert McGreevy, Robert Mayer, Carl Milazzo, Ernest Okonski, William Parker, Ronald Poling, Dr. Fred Price, John Riggs, Gerald Rote, Kermit Schlitzer, Gretchen Schork, Philip Slaiman, Warren Steinberg, Richard Taibi, Dr. Fred West, Daniel White, Walter Whyman, Mr.+Mrs. Earl Yarnetsky +son. If your name does not appear in this list, see Bob Kartyas.

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OBSERVING AND STUDY SECTION - MEETING November 14, 1973, at Newstead Observatory. A newly formed section of the B.A.A., the "Observing and Study Section", will hold its first meeting at 7:30 p.m., Wednesday, November 14, 1973. An illustrated lecture by Dr. Fred West on "Open Star Clusters" will precede the actual observing session of open clusters (weather permitting). Refreshments will be served. The meeting takes place regardless of the weather - anyone interested is invited to attend. If transportation is needed, call Bob Kartyas at 692-6928.

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* DEEP SKY OBSERVING FOR NOVEMBER/DECEMBER, 1973 * By John Riggs

To the naked eye, the constellations of Cetus and Eridanus appear as vast, lonely expanses of faint stars. In a sense, they seem to match the greyness and barren nature of the months during which they are most favorably placed for observation. If it were not for the rising glitter of Orion and the winter Milky Way further to the east, one might almost think the sky and season were somehow a reflection of each other. However, one should never judge a book by its cover, or a constellation by its lack of bright stars; what matters is the content of each.

Cetus and Eridanus contain one of the largest groups of bright galaxies outside of the Coma-Virgo cluster, and most of these have only rarely been seen by amateur observers.

Near the star delta Ceti lies a galaxy which has become rather famous in the wake of current astronomical research, NGC 1068, or better known among amateurs as M 77. This galaxy is of interest because it is the brightest of the so called Seyfert galaxies. Seyfert galaxies are unusual in that the nucleus contains a small bright region of hot gases. M 77, in particular, also sends out 100 times the radio energy of a normal galaxy. Some astronomers believe that there might be a relationship between Seyfert galaxies and quasi-stellar sources. When all of these facts are taken into account while observing M 77 with a small telescope, one's excitement can only be heightened.

To find M 77, place delta in the field of view of a low powered eyepiece, and then sweep about one degree to the southeast. The galaxy should be easily visible with telescopes as small as a three or four inch. Even city dwellers can pick it out through the haze and lights. With both my six and ten inch reflectors it appears as a small fuzzy patch with a fairly bright, very small nucleus. It is a pretty little galaxy and should not be missed.

Well into the Eridanus border there lies another object which is also a show-piece, the planetary nebula NGC 1535. It is situated about three degrees due south of the star 39 Eridani. A slightly better guide star might be gamma Eridani since it is brighter than 39, but it is farther away, $4\frac{1}{2}$ degrees to the west of NGC 1535. Though there are no other bright stars around, the nebula is of sufficient magnitude to be visible with a large finder telescope under a good sky. At 50 X, the planetary appears as a bluish 9th magnitude star slightly out of focus. To really see it well however, more magnification should be applied. With the ten inch at 200 X, the nebula looks like a large, bright sphere of gas and is quite a sight. Urban observers can see NGC 1535 very well also, since it is a concentrated object with a distinct edge. Next time you are out observing and waiting for Orion to rise higher, take a look at some of the objects in Cetus and Eridanus begging for attention.

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** B.A.A. INSTRUMENT SECTION REPORT ** By Warren Steinberg

On Friday evening, September 28, 1973, the members of the B.A.A. Instrument Section met at Gerry Rote's house to view and talk over his high-rise observatory being constructed by him. It will eventually house a $12\frac{1}{2}$ -inch reflector.

The work which has already been completed by Mr. Rote is quite remarkable. But the problems that we all noticed on this observatory outweigh attempts at an early completion date. Some of these problems were pointed out by Tom Dessert: the need for thrust rollers to prevent the dome from shifting and the need for a minimum number of hard rubber wheels for the dome to run on. Tom also made suggestions for a pulley assembly for the lateral motion of the double shutter. Building this type of a shutter does present problems - the moving of long and often heavy shutters equally at all points to override any stress and strain caused by the warpage of the wood frame must be taken into account.

Taking a look at the $12\frac{1}{2}$ -inch, f/8 telescope, Ed Lindberg observed that this would be a practical f.l. limit for a scope of this size, since a longer tube would require a higher observing ladder. Tom Dessert discovered that the worm gear on the R.A. drive was too small for fine photographic work. I personally cannot understand

why people invest hundreds of dollars in buying ready-made telescopes only to have to rip it apart to install new gears and electrical equipment upon finding something desparately wrong with the original equipment. A person can build his own scope for less money and still have enough finances left over to make a mount which in many instances will be better. The meeting took a turn for the worse when several man-eating hornets decided to practice their in-flight maneuvers; we in turn did our own "flying" (or "fleeing"?) maneuvers with only one known casualty.

Other subjects discussed: Bill Parker presented some new ideas on photography with a 35 mm camera and he illustrated them with his beautiful montage of the Milky Way; comet enthusiasts Bob Kartyas and Carl Milazzo talked about comet Kohoutek and the prospects of a brilliant display in the morning skies. After the meeting Bob Kartyas and myself drove out to Newstead and surveyed the nice maintenance work which has been carried out by a number of our members during this year. We also placed a sign near the MainStreet entrance (along the south side of Main Street) which is visible day and night, indicating the position of the entrance. The sign is another service of the instrument section - so why not come out and see it, together with the observatory? (How about November 14 for the Observing Section???)

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* A.A.V.S.O. MEETING HIGHLIGHTS * By Dr. Fred West

The latest annual meeting of the American Association of Variable Star Observers (AAVSO), a group comprised predominately of amateur astronomers, took place in Lenox, Massachusetts on October 19-21, 1973. The Buffalo Astronomical Association was represented by Larry Hazel and Fred West. The most important business transacted there was the selection of a new director, Dr. Janet Akyüz-Mattei, to succeed Dr. Margaret W. Mayall as director effective November 1, 1973. Dr. Akyüz-Mattei came from Turkey, has worked at Maria Mitchell Observatory, and did her graduate work at Harvard College Observatory.

Scientific results reported at the meeting included the discovery within the last year at Maria Mitchell Observatory of two new flare stars in the nearby Coma Berenices open cluster. The valuable service provided to Astronomy by AAVSO observations was emphasized by requests for estimated magnitudes of the semi-explosive variable SS Cygni from a group of M.I.T. physicists who are making X-ray observations of the sky. SS Cygni recently has been identified as a source of soft X-rays when at maximum brightness. Also reported were improved periods for four Mira-type variables in Cygnus. Captain Marvin Baldwin, USAF, reported on timings of minimum light for some of the 69 eclipsing binary stars now on the AAVSO observing program. Mr. Michael Daniel Overbeek of Johannesburg, South Africa, discussed his observations of two red variables near the South Celestial Pole, one of which, R Volantis, is among the reddest stars known.

In all, the past year has enabled 120,000 reported observations to be made by 373 AAVSO observers, 70,000 of which were made in the United States and 50,000 abroad. Possible future projects include a photographic atlas of galaxies with plate-filter combinations now being tested on the 12-inch Zeiss refractor at Griffith Observatory in Los Angeles, California. The atlas is intended for use in screening out foreground stars in the AAVSO supernova patrol of external galaxies. Also eclipsing binary timing methods may be used in observations of eclipses of Jupiter's satellites.

Entertainment was provided Friday evening by Dr. Peter Millman's slide show "Astronomical Fun with A Camera," and Saturday evening by slides of the total eclipse

of June 30, 1973 from several sites. For the final event, the cloudy skies over Lenox cleared early Saturday morning, October 21, and allowed Larry Hazel and 8 other observers to scan variable star fields with a 6-inch reflector and several pairs of binoculars.

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** COMET 1973f: KOHOUTEK ** By Ernst E. Both

Comet 1973f/Kohoutek was discovered on March 7, 1973 by Czech-born Dr. Lubos Kohoutek, working at the west German observatory of Hamburg-Bergedorf, with the 80/120 cm (f.= 240 cm) Schmidt telescope. This telescope has a field of 5°5 X 5°5 and was put into operation in 1955. It is scheduled to be transferred to the new German-Spanish Astronomical Center in the Sierra de los Filabres (altitude 2170 m, 60 km from Almeria, Spain). Eight nights before Dr. Kohoutek had discovered another comet, 1973e.

The comet will reach perihelion (point in its orbit closest to Sun) on 28 December 1973 (distance: 13,237,000 miles) and will be closest to Earth on 15 January 1974 (distance: 74,000,000 miles). Earlier predictions concerning its expected brightness, length of tail, etc. were somewhat exaggerated. In all likelihood it will be brighter than comet 1970 II/Bennett, but not as spectacular as comet 1965 VIII/Ikeya-Seki.

Ephemeris:

Date:	Right Ascension:	Declination:	Elongation:	Length of Tail:	Apparent Mag.
Nov 14	12 h 14.28 m	-12° 18.0	43.8	0.4	6.2
19	12 33.79	-14 17.7			
24	12 56.53	-16 28.0	42.7	0.6	5.1
29	13 23.44	-18 47.1			
Dec 4	13 55.74	-21 10.1	37.9	1.	3.7
9	14 34.80	-23 26.0			
14	15 21.95	-25 14.4	27.6	2.	1.7
19	16 18.15	-26 03.5			
24	17 24.73	-25 09.1	9.9	3.	-1.9
29	18 45.86	-21 34.3			
Jan 3	19 56.27	-17 25.6	16.1	15.	-1.7
8	20 56.21	-13 22.2			

Distance and Tail length (actual, predicted)

Date:	Distance from Earth:	Distance from Sun:	Length of Tail:
Nov 24	141.6 Million Miles	96.8 Million Miles	3.0 Million Miles
Dec 4	122.1	75.2	4.5
14	108.8	50.7	6.0
24	105.5	22.2	6.5
Jan 3	89.7	25.4	25.5
13	75.5	53.5	30.0

Guide to Naked Eye + Binocular Observation:

November 24: Located in the constellation Virgo, about 19 degrees south of the bright star Spica, the comet is barely visible to the naked eye. One hour before sunrise it is due southeast, about 20 degrees above the horizon. Short tail.

- December 4: One hour before sunrise, the comet (still in Virgo) is 15 degrees above the horizon in the south-east. Fainter than the stars in the Big Dipper, binoculars may show a one-degree tail.
- December 9: In the constellation Libra, the comet is nearly as bright as the stars in the Big Dipper, but only 10 degrees above the horizon in the south-east one hour before sunrise. The full moon may interfere.
- December 14: Now brighter than the Dipper stars, the comet (in Libra) is only five degrees above the horizon in the south-east, one hour before sunrise. Moon two days before last quarter, may interfere somewhat. Tail ca. 2 degr.
- December 19: In Scorpius, the comet is very close to the red star Antares and almost equally bright. In the south-east, just above the horizon one hour before sunrise. Moon three days past last quarter.
- December 24: Although brighter than the star Sirius, the comet is barely visible half an hour before sunrise, in the south-east.
- December 25 to 31: The comet is beyond the Sun and invisible. Throughout January and into the early part of February the comet should be easily visible to the naked eye in the south-west, as soon as it gets dark.
- January 3, 1974: Of magnitude minus 2, the comet is about 4 degrees above the horizon in the south-west, one hour after sunset. It is to the right and below Venus, its tail stretching upward for about 15 degrees. The comet sets about 6 p.m.
- January 8: Just above Venus and to the right of Jupiter, the comet is about 12 degr. above the horizon in the south-west one hour after sunset. The comet sets around 7 p.m., but the tail, now nearly 20 degrees long, will be visible above the horizon until about 8 p.m.
- January 13: In the south-west, the comet is 22 degrees above the horizon one hour after sunset and sets around 8 p.m. The tail sets around 9 p.m.
- January 18: In the south-west one hour after sunset, the comet is 30 degrees above the horizon and sets around 9 p.m. nearly due west. The comet is almost as bright as the Dipper stars.
- January 23: Now fainter than the Dipper stars, the comet is nearly 40 degrees above the horizon in the south-west, one hour after sunset. It sets before 10 p.m. nearly due west. The tail may still be 15 degrees long.
- January 28: Considerably fainter than the Dipper stars, the comet is 45 degrees above the horizon, nearly due south-west one hour after sunset. It sets after 10 p.m. in the west.

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PARTIAL ECLIPSE OF THE MOON: December 9, 1973.

A partial eclipse of the Moon will be visible from this area on the night of December 9, 1973. The Moon enters the umbra at 8:09 p.m. (EST) and leaves it at 9:12 p.m. (EST). The Museum's Kellogg Observatory will be open to the public that night from 8 p.m. until 9:30 p.m. Any members interested in helping out or bringing

their telescopes, please contact Ernst Both at 896-5200 (daily, Mon-Fri).

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TRANSIT OF MERCURY, November 10, 1973: A transit of Mercury across the Sun's disk will take place in the early hours of November 10, 1973. The transit will already be in progress when the Sun rises in this area. The end of the transit occurs at 8:06. It is planned to open the Museum's solar observatory for members of the B.A.A. from 7:00 a.m. to 8:30 a.m.

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SPY AND TELL Orrin Christy is the first BAA member to report seeing comet Kohoutek. Orrin observed it on October 25, around 6:10 a.m. (EDT) with 20 X 50 binoculars. It appeared as a faint, slightly out-of-focus star, estimated apparent magnitude 7.5 -***- According to calculations by Dr. Fred West, Pluto will be closer to the Sun than Neptune from 1979 until 2000. Some books cite erroneous values. ***-*** Congratulations to Dr. & Mrs. West who have become the proud parents of a baby girl! ***-*** Dick Zygmunt looks very slim this autumn. Climbing all those stairs in the Museum? ***** The planet Earth reaches its perihelion on January 4, 1974. At that time the orbital velocity is 18.83 miles/sec - at aphelion (July 5, 1974) the orbital velocity is 18.21 miles/sec. ***** There will be 2 full moons in October 1974: October 1 and October 31. Transylvanians should like that! ***** CONTRARY TO WHAT HAS BEEN ANNOUNCED PREVIOUSLY, THERE WILL BE AN ASTROPHOTO EXHIBIT BY B.A.A. MEMBERS AT THE MUSEUM SOMETIME DURING THE SPRING OF 1974. SO TO ALL OUR ASTROPHOTOGRAPHERS - START EARLY!! ***-*** Since we intend to improve the BAA's observatory, we intend to raise some funds at each meeting by way of cookie sales, raffles, etc. This seems to be a painless way of doing things and we hope that all members and friends come prepared with sufficient funds. * HAPPY HOLIDAYS *****

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