AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS

ABSTRACTS

OF

PAPERS

PRESENTED AT PERRY, FLORIDA MEETING

7 MARCH 1970

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187 Concord Avenue, Cambridge, Massachusetts 02138

AAVSO ABSTRACTS

Edited by R. Newton Mayall

The 59th Spring meeting of the AAVSO was held 7 March 1970, at Perry, Florida. Cyrus Fernald was the local organizer for this memorable meeting! The reason for our being there was the eclipse of the sun, which would be visible (?) from Mexico, across the Gulf and the northern part of Florida, thence up the east coast to Nantucket and Newfoundland. Although the majority of AAVSOers went to Florida, a few went to various States along the path of the eclipse from Mexico to Newfoundland.

Friday evening, the 6th, we held our usual lecture in the Auditorium. Ed Halbach was the speaker. Other groups were invited to attend the lecture. Mr. Halbach gave a most interesting talk about his chasing of eclipses in the past. (See below for notes on his talk.)

Saturday, our group was busy setting up their instruments on the grounds of the Perry Elk's Club, notwithstanding the threatening weather. Well! The upshot of it was that the "Sunshine Tree" State did not provide any sunshine. In fact, the sun was not eclipsed as we would like to see it. Two layers of clouds blocked the eclipse, but there were a few interesting moments -- the gradual darkening, the sudden darkness, the changing color, the drop in temperature; the crows went to roost, the frogs began peeping, etc.

Although Perry proved not to be the ideal location for this eclipse, everyone had a good time, and it was particularly interesting to meet some of our foreign colleagues, who seemed to gravitate toward the AAVSO.

The officials at Perry did everything in their power to make our stay a memorable one. Mayor John Livingston and his wife were gracious hosts. Bob Jones, the Executive Director of the Perry-Taylor County Chamber of Commerce and his associates handled all arrangements for the meeting with great skill. Special thanks go to Bill Windsor, Manager of the Perry Elks Club, for his generosity in providing what should have been an excellent eclipse site, with plenty of room for parking and campers and facilities for equipment.

Nearly 200 attended the dinner at the Elks Club on Saturday night. Among those who joined us were the German and Japanese groups.

Our Director went to Florida on Tuesday the 3rd and visited the Gonseths -- old friends who have just moved near Tampa. From there she went to the Fernalds in Longwood where she spent a few days and gave a talk to the Martin Astronomy Club in Orlando.

Miss Hisako Koyama and 20 other Japanese astronomers take the prize for travelling the longest distance -- all the way from Tokyo. Hans Rohr, Robert Naef and a large group from Switzerland, about 40 from Germany and Dr. Klepesta from Czechoslovakia were there. It was good to be able to meet so many of our friends from across the water.

Now, for a note about Nantucket. Friday was a dull cloudy day as it had been for about three days before. But that night the clouds rolled away, the stars came out, and on Saturday morning it was bright and clear. The airport was parked solid with planes of every description -- they were even parked on the golf course and the race track. Several thousand people arrived and probably as many more could not make it to the Island, notwithstanding the extra boat and plane service. Since nothing much was open, people had to sleep, the night before, on the beach or wherever they could find a place to be comfortable.

Dorrit Hoffleit was busy at Loines Observatory doing her "thing" and Don Kimball was there too, with his photographic equipment. Sally Hill of Wellesley and a few students were at Surfside, along with Walter Hampton and two of his children. Shirley Patterson Jones was at Quaise with two of her students.

Standing on the windswept bluff at Surfside, overlooking the ocean, we witnessed a most glorious sight -- totality. We watched the shadow as it progressed across the water, the color of the horizon, and we were told the temperature dropped 20°.

I have seen 5 eclipses, but this was by far the most beautiful one. It was so bright that I could read the f stops on my camera. No flashlight was necessary. The diamond ring was sharp and clear. Others agreed it was the brightest eclipse they had seen.

Due to congested conditions at Perry, it was deemed impractical to hold a session for papers but the following were submitted to the Council for publication.

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ECLIPSE EXPEDITIONS, by Edward A. Halbach
(Notes on public lecture given night before the eclipse)

As Director of the Milwaukee Astronomical Society (MAS) Observatory I have tried to be a continuous observer for the AAVSO. The equipment includes a 12 1/2" reflector in a 14 1/2 ft. diameter dome, a second 12 1/2" reflector in a 14 ft. dome, a sky patrol camera, a cluster of three apogee telescopes for satellite search and a lecture hall seating 70 visitors.

I had the opportunity of going on six solar eclipse expeditions, some to distant lands. To date, only two were viewed under ideal conditions.

The first to Pine River, Manitoba in July 1945 was sponsored by our own society. By devising suitable camera equipment and being blessed by a slit in the cloud cover, we obtained a timed motion picture record of the flash spectrum as part of an endeavor to measure intercontinental distances, using the eclipse events for timing. A two-barrel camera of 24" efl. was used to obtain two polarization photographs. A second 48" efl. camera was used to obtain an ordinary partial phase and a total phase picture. The flash spectrum film was studied and measured by Prof. Lindblad of the Stockholm Observatory and later by the U.S. Army Map Service. This film was the forerunner for subsequent eclipse expeditions.

The U.S. Air Force and National Geographic Society sponsored about 10 expeditions to cover the eclipse of April 1948. I was asked to be the expedition leader to Merqui, Burma, the first site along the path. The U.S. Army was to provide personnel and material support. The support failed to materialize in time so the six man team hired native help to cut a jungle road to the observing site, to erect a thatched shelter and otherwise give aid. The team constructed the concrete footings and erected the heliostat and camera with objective prism to record and time the events of the flash spectrum. Because April is the start of the monsoon season, we tried to view totality through a thick cloud cover- a failure.

Seeing an annular eclipse was to be part of the activity of an Astronomical League Convention at Chapel Hill, N.C. A large group went to Knob Hill, N.C., which is an ancient volcanic cave projecting from the otherwise level terrain. The vertical (not slanted) sides had to be negotiated by ladder in the darkness of night to reach the table top, less than a city block in area, where the eclipsed sun could be observed at sunrise. Naturally, the morning mist at the horizon allowed a none too desirable view. No scientific studies were attempted here.

Ohio State University and the U.S. Air Force combined efforts to outfit about 10 expeditions from Labrador to Iran to obtain information during the July 1954 eclipse. I was asked to be in charge of a 12 man party near Okak on the northeast Labrador coastline. Special cameras were obtained through a contract with a Finnish laboratory which had prior experience in the flash spectrum program. The expedition party was flown to a radar (Dew Line) station by plane and then returned 80 miles to the observing site by helicopter. Roughing for two weeks at the site and a multitude of equipment problems found everything in readiness for an early morning eclipse. At eclipse time the cloud cover was so dense that the moving hand could not be seen in front of one's face during totality. Result, a complete failure.

Georgetown University and the U.S. Air Force collaborated for the next eclipse in December 1955. I was again asked to head an expedition, this time to British Somaliland in Africa. I agreed only on the condition that I choose my own party members, some of whom are present here tonight in Perry, Florida. The emphasis was in timing the eclipse from photoelectric records. This was a three week expedition and an eventful trip for all concerned. Enough 16mm color pictures were obtained for this trip to make a 50 minute documentary. The 6-man party was in complete readiness but heavy clouds allowed only fleeting glimpses of the partial phases. Again a failure.

The next eclipse expedition was to be only a viewing session on July 20, 1963 at Pleasant Pond, Maine. I assisted Mr. E. Drumm of Dayton, Ohio to obtain a series of partial and total phase pictures and to obtain a photoelectric light curve. Although some clouds interfered, seeing was good during totality and I had a fine opportunity to watch the entire event.

Having a 50-50 success record, if one can include an annular eclipse at sunrise, we are preparing for the March 7, 1970 eclipse. The Astronomical League proposed a number of interesting and scientifically valuable programs for amateurs. The MAS observatory chose to outfit up to 12 stations with duplicate cameras to photograph the solar streamers during totality with hopes of determining the motion or lack of motion in the solar streamers during the 1 1/2 hours of totality from Mexico to Labrador. A picture was shown of the camera equipment which went to one station in Mexico, eight from Perry, Florida to Norfolk, Virginia, one each on Nantucket Island, Nova Scotia and Labrador. I will man the camera at Perry.

I hope that my poor success record will not be repeated tomorrow.

A MAGNETIC TELESCOPE, by Michael Cunningham

During every solar eclipse, Einstein's proven theory on magnetic forces disturbing and bending starlight can be seen. Is it not conceivable that in the future man will not use mirrors and lenses to bend starlight but instead use powerful magnetic forces? Anyone who has a working knowledge of telescopes knows of chromatic aberration, lens distortion, imperfect mirrors and lens absorption. Would it not be desirable to have a telescope free of these problems? A magnetic telescope would be free of these problems. The power expenditure for the magnets would have to be very great to even come close to that of the sun but man has the capability to do it with nuclear power. I would be very pleased to hear on some other ideas, theories or views. Please write to Michael Cunningham, Route #1, Box 230, High Ridge, Missouri 63049.

TRANSIT OF MERCURY, 9 MAY 1970, by Lewis J. Boss

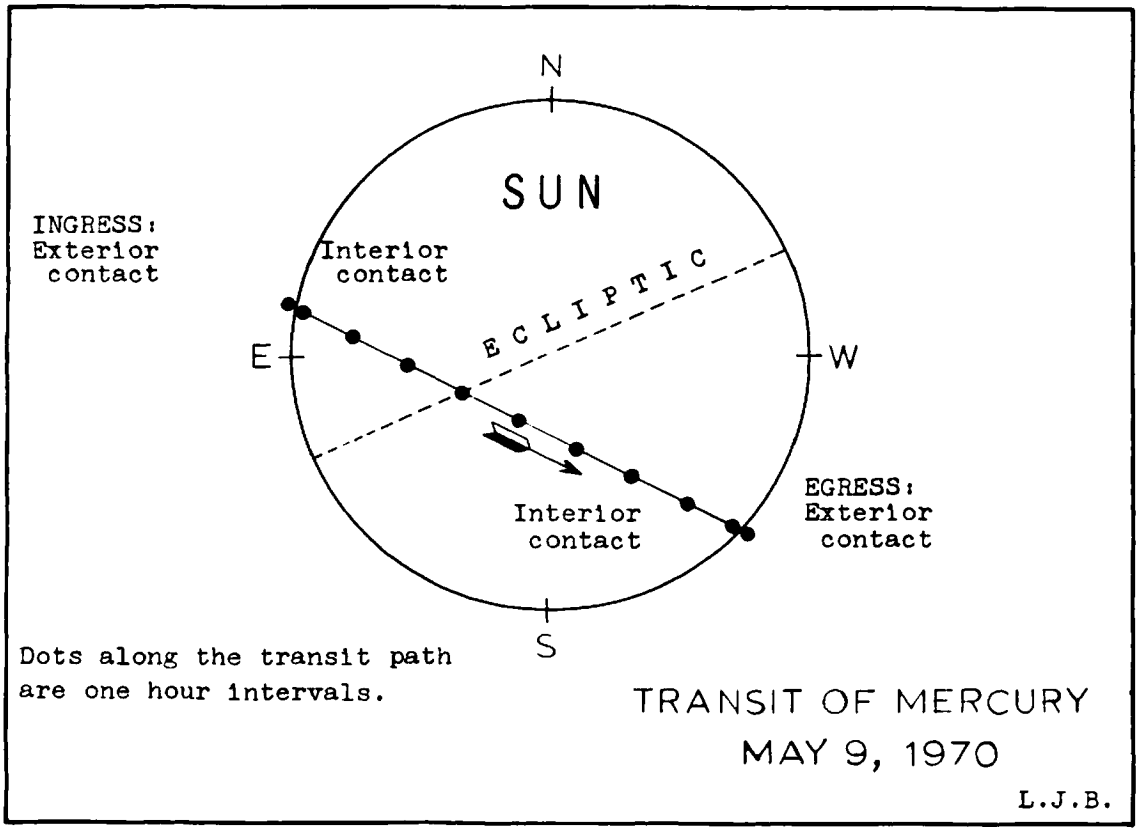
Another astronomcial event involving the sun, less spectacular than the total solar eclipse which has just occurred, but of considerably greater rarity, is the transit of Mercury scheduled for Saturday, 9 May this year.

Usually at the time of inferior conjunction, Mercury will pass either north or south of the sun due to the 7^{o} inclination of its orbit to the ecliptic. However, about 13 times during each century, if the conjunction occurs when the planet is very near its node, it will pass directly across the face of the sun and be visible upon it as a small black spot -- not, however, large enough to be observed without optical aid. It should be added that suitable protection for the eyes, from the intense light of the sun, should be used.

Due to the planet's nodes being located in longitudes 227^{o} and 47^{o} they are passed by the earth on 8 May and 10 November which means that transits can occur only within 3 days of 8 May and 5 days of 10 November and as a result the November transits are nearly twice as numerous as those occurring in May.

The synodic period of Mercury is 115.88 days and 22 of these are almost 7 years; 41 periods are nearly equal to 13 years and 145 synodic periods are almost exactly 46 years. Following a May transit a repetition is not possible in 7 years and sometimes fails to materialize after 13 years. On the other hand, after a November transit a second one is possible after 7 years, probable after 13 years and almost certain after 46 years.

The first transit of Mercury was observed by Gassendi on 7 November 1631. The last May transit took place on 11 May 1937, while the last November transit occurred on 7 November 1960. After the May 9th



transit the next one will take place on 10 November 1973.

The path taken by Mercury across the sun next May will be very nearly central and will, therefore, be of almost the longest duration possible but only a part of this will be visible in the United States. Mercury enters the eastern edge of the sun's disc at $04^h\ 20^m$ U.T. or about 11:23 P.M. May 8, Eastern Standard Time. Sunrise at Boston on 9 May will be at 4:29 A.M. Eastern Standard Time with the planet more than half-way across its disc. The transit will end at 7:14 Eastern Standard Time. The extreme western states will not see the transit as it will have ended before sunrise at those locations. In Hawaii it may be possible to see the first few minutes of the transit just before sunset on 8 May.

If you are wondering about the next transit of Venus the next one will occur on 8 June 2004, followed by a second one eight years later on 6 June 2012. The last one took place on 6 December 1882, and there will be no transit of Venus in this century.

ECLIPSE PHOTOGRAPHS, by Erich U. Petersen

Erich Petersen joined a group of Harvard University scientists at a somewhat unusual eclipse site. A group of about 100 chartered a boat from Onset, Massachusetts and sailed around Nantucket to view the eclipse. The sky was perfect and the sea smooth before totality. With darkening skies, the wind picked up and the sea became rougher. The partial phases shown below were taken with a Zeiss Ikon camera held against 7x50 binoculars, using Tri-X Pan film.