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North Tropical Current B, (N. edge NEB, NTrZ), System II

No.	Mark	Limiting Dates	Limiting L.	L.	Transits	Drift	Period
1	Dc	Mar.11-Mar.23	155°-142°	-	4	-32°.5	9:54:56
2	Dc	Mar.11-May 17	179 -120	-	9	-26.8	9:55:04
			Mean rotation period:				9:55:00

The above two features were moving in the faster Current B of the North Tropical Current. Both markings were located on the north edge of the NEB. No. 1 is present on Figure 42 of Mr. Mackal's report.

PARTIAL LUNAR ECLIPSE: July 16 - 17, 1981

By: John E. Westfall, A.L.P.O. Lunar Recorder

Circumstances

On the night of July 16-17, 1981, observers in the Americas, the eastern Pacific, and most of Europe and Africa will have the opportunity to see the Earth's umbral shadow cover the southern half of the Moon. At the eclipse's maximum, the umbral magnitude will be 0.554 (i.e., 55.4 percent of the Moon's diameter will be in the umbra). The predicted times of the eclipse events will be:

Event Description	U.T.	EDT	CDT	MDT	PDT
Moon enters penumbra	02:05.2	*22:05.2	*21:05.2	*20:05.2	*19:05.2
Moon enters umbra[a]	03:24.8	*23:24.8	*22:24.8	*21:24.8	*20:24.8
Middle of the eclipse	04:46.8	00:46.8	*23:46.8	*22:46.8	*21:46.8
Moon leaves umbra[b]	06:08.9	02:08.9	01:08.9	00:08.9	*23:08.9
Moon leaves penumbra	07:28.4	03:28.4	02:28.4	01:28.4	00:28.4

[a]At position angle 130°. [b]At position angle 221°.
*July 16, the remaining times are on July 17.

Figure 14 shows the appearance of the Moon and the umbral shadow at mid-eclipse.

Observations

Although this is not always recognized, a partial lunar eclipse can be profitably observed in a number of ways, for the most part with modest telescopic equipment. It is important, though, to time all observations to 0.1-minute accuracy.

General Observations.--In the list of types of observations below, the type of optical aid needed is given in parentheses, where NE = naked eye, B = binoculars, and T = telescope:

1. Visibility, tone, and color of penumbra, including when and where shading is evident. (NE, B, T)
2. Sharpness and possible ellipticity or deformation of edge of umbra. (B, T)
3. Color and tone of umbral edge. (B, T)
4. Zonal and/or time variations of tone and color of umbra. (B, T)
5. Visibility of features within umbra. (B, T)

In addition to written notes on the above, drawings and photographs illustrating the observations will make them all the more valuable.

Umbral Contact Timings.--Timing when the Moon's limb, and selected craters, are on the umbral edge gives us information about the enlargement of the umbra due to the Earth's atmosphere; the degree of enlargement varies between eclipses. Such timings should be accurate to ±0.1 minute and should be made with a telescope of 60 mm aperture or more; the usual magnification range used is 50X - 100X.

The two umbral contacts at this eclipse will occur only approximately at the times and places given in the table above (i.e., 03:24.8 U.T., 130°; 06:08.9 U.T., 221°).

Crater timings, preferably for both umbral immersion and emersion, should be the average of when the umbral edge first and last touches the crater. Because this will be a partial eclipse, only 3 of the 15 "standard" craters (see Figure 14) are expected to enter the umbra. These craters, and their approximate contact times, are:

Crater	Immersion	Emersion
Grimaldi	03:55 U.T.	04:43 U.T.
Tycho	03:44	05:40
Taruntius	04:47	05:37

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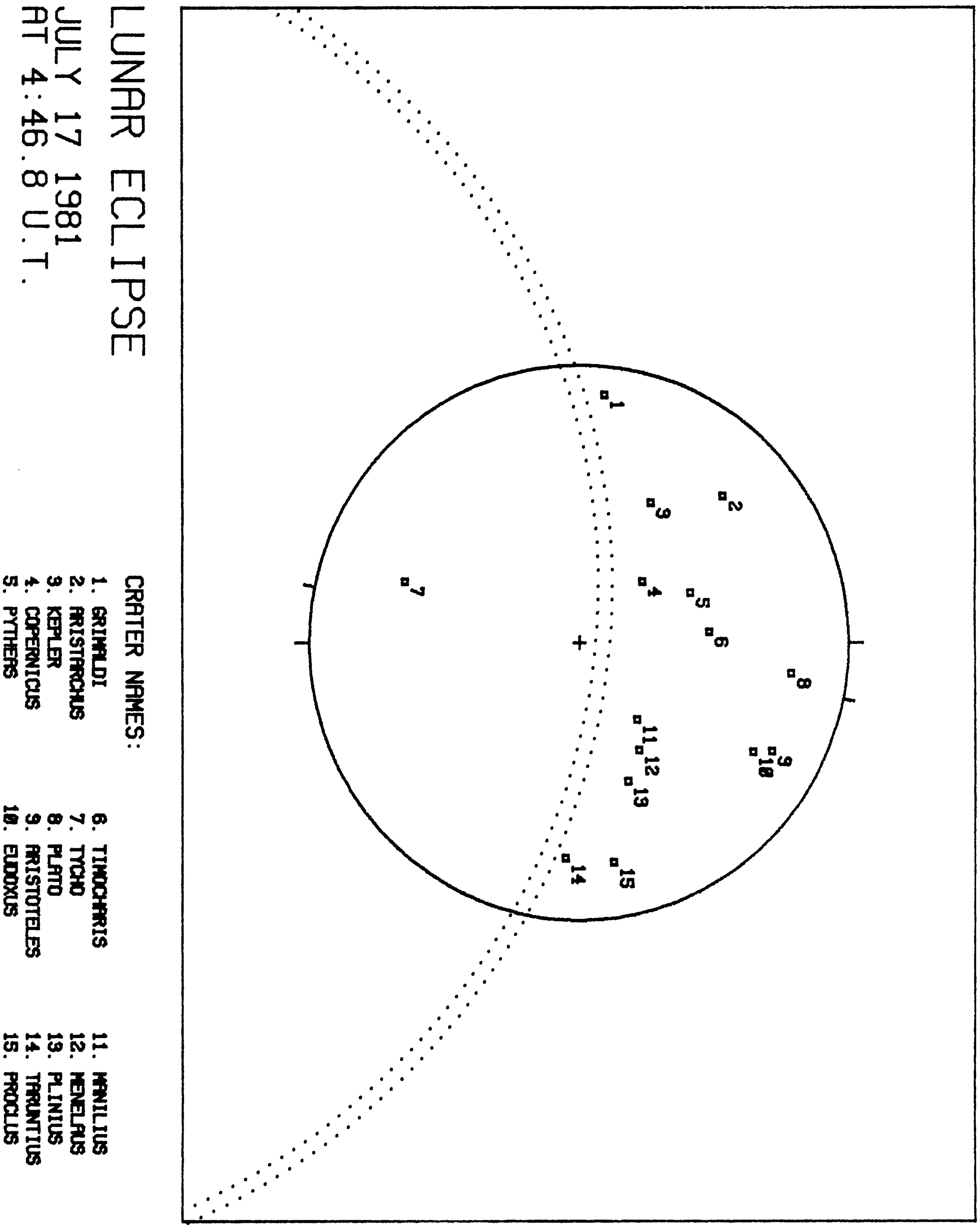

Figure 14. The Moon and the Earth's umbral shadow at mid-eclipse for the partial lunar eclipse of July 16-17, 1981. Celestial north is to the right, with the lunar axis also shown (offset). The chart shows the 15 "standard" craters used for umbral contact timings. The inner dotted curve is the theoretical umbral edge, while the outer dotted curve shows the umbra enlarged by 2 percent due to the Earth's atmosphere. Chart prepared by Dr. John Westfall with the use of a digital plotter on a computer.

Lunar Luminescence.--When in the penumbral shadow, some lunar features are occasionally brighter than expected in green and red light (5700, 5800, 6150, and 6450 Å), although normal in blue. It is believed that this phenomenon is caused by luminescence due to ultraviolet radiation from the Sun's chromosphere and corona.

Detecting this phenomenon is one of the more challenging lunar eclipse observations, and requires either photographic or photoelectric photometry with a telescope 6 inches (15 cm.) in aperture or greater. If photography is used, the penumbral portions of the Moon should be photographed with black-and-white panchromatic film using either or both green and red filters, while nearly-simultaneous "control" photographs are taken with a blue filter. Also, sets of control photographs should be taken shortly before, or shortly

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after, the eclipse. Later, the brightnesses (densities) of selected lunar features in the photographs should be measured with a densitometer in order to establish color differences and, particularly, any changes in these over time. Areas which have shown luminescence in past eclipses include Aristarchus, Copernicus, and Kepler.

If photoelectric photometry is used, "V" and/or "R" readings can be used with "B" readings as control. Comparison readings on a nearby bright star should also be taken and timed in order to correct later for differential atmospheric extinction. Four suitable nearby stars, with magnitudes from the Arizona-Tonanzintla Catalogue, are:

	Magnitudes			
Star	V	B	R	Spectrum
52 Sgr	+4.59	+4.53	+4.61	B9
ω Sgr	4.70	5.45	4.11	G5
60 Sgr	4.82	5.71	4.17	G5
ρ_1 Sgr	3.93	4.15	3.74	F0

Conclusion

Observers wishing more detailed information about observing lunar eclipses may obtain a copy of the A.L.P.O. Lunar Eclipse Handbook from the writer for $1.00 (address on inside back cover). An A.L.P.O. "Lunar Eclipse Observation Form" will be included with the Handbook, or may be obtained separately by sending a stamped self-addressed envelope to the writer.

Observational reports should be sent to the A.L.P.O. Director, Prof. Walter H. Haas (address on inside back cover). Photographs and drawings are welcome, but please include all relevant data with them.

PLANETARY SOCIETY FORMED

By: Charles F. Capen

If you are intrigued by the unknown, fascinated by the explorations of other worlds and by the prospect of finding extraterrestrial life, or excited by the limitless possibilities out there in our Universe beyond our Earth...Come Join Us For The Ultimate Adventure! You are invited to become a Member of the Planetary Society, to make a real contribution toward the search for where we are, who we are, and why we are; and to enjoy a number of worthwhile membership benefits and privileges.

The formation of The Planetary Society, a national organization to focus the growing public interest in planetary exploration and the search for extraterrestrial life has been announced by Carl Sagan, Cornell University astronomer, and Bruce Murray, Director of the Jet Propulsion Laboratory-Cal. Tech. Formed by a group of scientists and interested laymen, The Planetary Society is devoted to encouraging, supporting, and participating in the greatest adventure that Mankind may ever experience - solar sailing, comet rendezvous, returning planetary soil samples, radar mapping, robot rovers on planets and their moons, probes beyond our Solar System, and the search for galactic civilizations. Membership in the Society is open to all. Members will receive a subscription to "The Planetary Report", as well as pictures and invitations to lectures and exhibits on planetary exploration, member discounts, and membership credentials. The Society is incorporated as a non-profit, tax-exempt organization. Send $15 for membership to, or ask for further information from: The Planetary Society, P. O. Box 3599, Pasadena, CA 91103.

COMA DIAMETER OF COMETS - II

By: Charles S. Morris, A.L.P.O. Comets Section

Abstract

An analysis of A.L.P.O. coma diameter observations of Comet Bennett 1970 II (1969i) is presented. The analysis indicates that the actual physical size of the coma was almost three times greater after perihelion than before perihelion. Maximum coma diameter was at least 750,000 kilometers.

Introduction

This is the second in a series of papers dealing with the coma diameter of several major comets. In the first paper (Morris, C.S., J.A.L.P.O., Vol. 25, Nos. 5-6, pp. 94-101) the selection and reduction of observations were discussed. The methods which were outlined were applied to the coma diameter estimates of Comet Tago-Sato-Kosaka 1969 IX (1969g). In the present paper the coma diameter of Comet Bennett 1970 II (1969i) is examined.

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