From: Halifax Centre: R.A.S.C.
Nova Scotia Museum,
1747 Summer St.
Halifax, Nova Scotia.

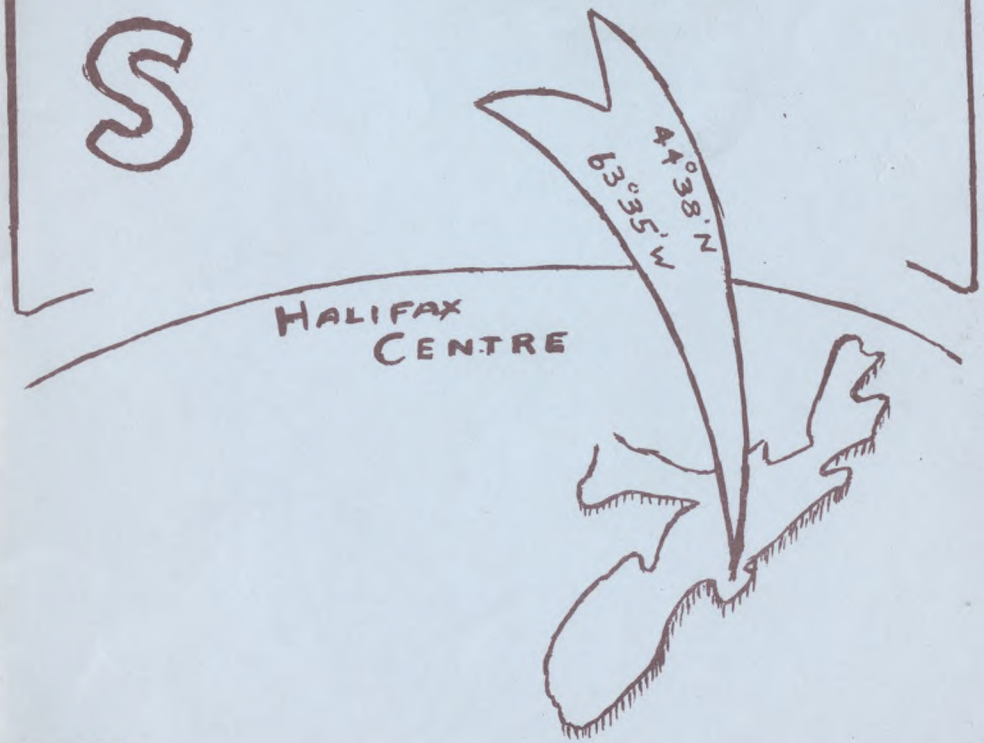
Dec 71

To

Marie Fidler,
Exec. Sec. R.A.S.C.
252 College St.,
Toronto 2B, Ont.

NOVA NOTES

Volume .....
Issue .....



EH70

E D I T O R I A L

Happy New Year! This new year's resolution should be about 1 second of arc, the limit usually imposed on earth bound telescopes. We must try to keep this limit from increasing.

We are probably all familiar now with the words, pollution, environment, biosphere and ecology. We have perhaps seen and heard them so often that we do not pay attention to them anymore, which would be a shame.

Most people are concerned only with living in and breathing air. As astronomers, we are very much concerned with seeing through it. We are already at a great disadvantage living at the bottom of an ocean of air and are dependent on co-operative weather and moderately still air for good viewing. It seems to be an unwritten law that the "goodness of viewing" is perversely proportional to the frequency of, importance of, and interest in a celestial event (witness the cloud cover during the 1970 eclipse and this Christmas morning when the moon, Venus, Jupiter and Mars were all visible in the early morning sky, reminiscent of one of Dr. Roy Bishop's pictures).

When the weather cooperates with good clear skies, it is very disappointing to have one's view ruined by smoke, as happened to Mr. D. Hook, H. Freeland and myself when using the Societies' 3" refractor on the Commons, or convection currents caused by waste heat, or by light as happened on New Years day at 0500 A.S.T. when I climbed to my roof top to try some astrophotography and found a bank of lights over at the container pier was bright enough to cast well defined shadows on my roof, a considerable distance away.

The "big eyes" in the U.S.A. are not immune from light pollution. Recently the large observatories in California have considered asking the cities near them to aim their lights at the ground rather than into the sky. At the Montreal centre, astro-photography at the McGill Observatory is very limited because of revolving search lights which a relative told me were visible in Vermont.

Observational proof that galaxies are actually composed of stars was obtained by Walter Baade (Mt. Wilson-Palomar) from long time exposure photographs taken during blackouts of Los Angeles and Pasedena during World War II. (Ref. Wm. H. Brittingham - The Review of Popular Astronomy, Vol. LVIII, No. 527 Pg. 5.) We hope that war blackouts never happen again, but if light pollution is not curbed, the length of exposures possible with the world's largest telescopes will be severely limited.

We ask you to help keep the New Year's resolution and support clean air campaigns. An interesting picture depicting the consequences of pollution can be seen at the Red Cross building, blood donors's clinic on Gottingen Street. Best of luck in the New Year.

JLS.

N O T I C E O F M E E T I N G

Date: January 15, 1971.

Place: Theatre of the Nova Scotia Museum
1747 Summer Street, Halifax, Nova Scotia.

Time: 8:00 p.m. sharp

Speaker: Dr. G. F. Mitchell
St. Mary's University

Subject: The Structure of the Universe:
Theoretical Models and Observational Tests.

Discussion will cover Geology and Spacetime. Connection between geometry and matter with reference to Einstein's Theory of Gravity. Information will also be included regarding observations on galaxy red shift, radio source counts and microwave background.

The film entitled: "Fields in Space" will be shown.

All members and guests are most welcome.

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Members are urged to bring along to the Meeting, observational charts, or photographs which they have taken.

Newsletter is printed, thanks to the goodwill of the:
Nova Scotia Museum:

The regular meeting of the Royal Astronomical Society was held on Friday, December 18, 1970 at 8:00 p.m. The President, Mr. John Shaw conducted the meeting. Mr. Ian McKenna was appointed Librarian of the Halifax Centre.

An informative and at times amusing lecture was then presented by Mr. David Levy. Mr. Levy dealt with the subject of Comets, and Comet Hunting. We sincerely hope David that one day your patience will be rewarded, and you will find a new comet appearing as you search with your telescope. Mr. Zukauskas thanked Mr. Levy on behalf of the Halifax Centre.

Winner of "design a cover for our newsletter" - Eileen Humphrey - she was fortunate she submitted the only entry!

The film on the Apollo 12 mission was shown also at this meeting.

Members were urged to view the Venus, Jupiter, Mars configuration on the mornings of the 29th and 30th December.

Meeting closed at 10:30. Coffee was served.

1970 Executive:

President:	Mr. John Shaw 1094 Wellington St. Apt. 402 Halifax, N.S.	423-4717
Treasurer:	Mr. Peter McGuigan 1039 Bellevue Ave. Halifax, N.S.	422-3259
Vice President and Co-ordinator:	Mr. Walter Zukauskas Seabright P.O. Halifax Co. N.S.	1-823-2263
Secretary:	Mrs. Eileen Humphrey 17 Tobermory Road Dartmouth, Nova Scotia.	466-0875
Librarian:	Mr. Ian McKenna 39 Spikenard Street, Dartmouth, Nova Scotia.	466-9256

Results of Questionnaire:

There were 13 questionnaires filled out by members attending the December meeting. Here are the results.

(a) Telescopes owned by members:

Refractors	Reflectors
1, 2½"	1, 2½"
1, 4½"	1, 3"
1, 5	3, 6"
	1, 8"

1, "Nondescript"?

(b) Reflecting telescopes made by members, and a source of technical information and help for members about to start construction:

1,	4¼"	
5,	6"	(1 under construction)
1,	8"	
1,	12"	(not mounted yet)

(c) Binoculars

1,	7 x 35	1, 10 x 50
2,	7 x 50	1, 12 x 60 (in England).
1,	8 x 30	
1,	8 x 50	

(d) Special Interests.

The following number of "votes" were received for each of these activities:

1. Solar	3	2. Deep sky	5
3. Lunar	4	4. Meteors	1
5. Radio	2	6. Photo	5
7. Variables	1	8. Planetary	7
9. Satellites	1		

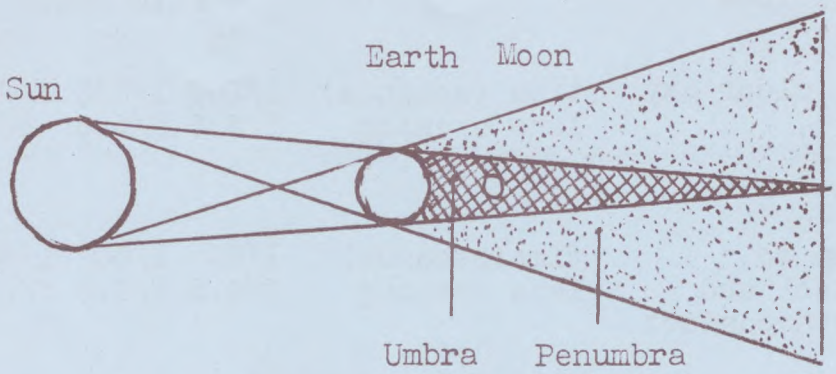
(e) Recommendations on content and format of meetings

- involve our members (Let's hope so)
- Nature of the Universe speaker
  (You get your wish Ralph at the next meeting)
- A planetary film
- Fields in Space - film (Walter gets his wish on Jan. 15th)
- Father Burke Gaffney, speaker
- Dr. Roy Bishop to speak on Sky photography (we're working on him).

With the equipment available and the interest expressed by members in various aspects of astronomy, we can expect a lot of activity in the New Year.

JLS

LUNAR ECLIPSE PHOTOGRAPHY



A lunar eclipse occurs when the moon passes through the shadow of the earth. When the moon is within the umbra part of the earth's shadow (see illustration above), it changes color. Its color usually varies from red to brown, although many other tints may appear. Totality (the length of time the moon is totally within the umbra) may last as long as 1 hour and 40 minutes.

It's easy to photograph a lunar eclipse. However, because the moon is so dim during totality, you should use a high speed film. During totality, use the largest lens opening possible. This allows you to use shorter exposure times to stop the moon's motion.

The moon may appear large to you, but when photographed through a lens of normal focal length, it will look like a very small spot on the film. You can estimate the diameter (in inches) of the moon's image that will be recorded on your film by dividing the focal length (in inches) of your camera lens by 115. Use the lens with the longest focal length available for your camera, and put the camera on a tripod. If you want to study detail in the moon's surface, take your pictures through a telescope, spotting scope, or binoculars. (To learn how to do this, read Astrophotography with your Camera, Kodak Publication No. AC-20. You can get a copy from your photo retailer, or write to Eastman Kodak Co. Department 841, 343 State Street, Rochester, New York 14650.

Suggested Exposures for Lunar Eclipse Photography.

These exposures are only suggestions. Lunar eclipses vary widely. Variations in atmospheric conditions and in the distance of the moon above the horizon also affect the moon's apparent brightness, making exact recommendations impossible. If the sky is hazy or if the moon is low in the sky, try doubling the recommended exposure time.

Stage of Eclipse		Film Speed (ASA)					
		25	32	64	125	160	400
Full moon, clear sky	time (seconds)	1/250	1/250	1/250	1/250	1/250	1/250
	lens opening	f/5.6	f/5.6	f/8	f/11	between f/11 - f/16	f/22
Moon deep in penumbra up to first contact and after fourth contact	time(seconds)	1/60	1/60	1/60	1/60	1/60	1/60
	lens opening	f/4.5	f/5.6	f/8	f/11	between f/11 - f/16	f/22
At second and third contacts	time (seconds)	3	2	1	1	1	½
	lens opening	f/2	f/2	f/2	f/3.5	f/4	f/5.6
Mid-totality	time (seconds)	12	8	4	4	4	2
	lens opening	f/2	f/2	f/2	f/3.5	f/4	f/5.6

When the moon is partially in the umbra, select the exposure for either the umbra portion or the penumbra portion. The film cannot properly record both areas at the same time.
Gradually increase the exposure from the second contact to the midpoint; decrease the exposure from the midpoint to the third contact (see exposure table).

You can calculate exposure times for f-numbers other than those given in the table. Suppose the largest lens opening a lens has is f/4 and the table suggests f/2. Divide 4 by 2 and square the answer ($4 \div 2 = 2$ and $2^2 = 4$). Thus the f/4 lens opening will require an exposure 4 times as long as that required with a lens opening of f/2. For example, if the table suggests 2 seconds at f/2, you can use 8 seconds at f/4. (If the exposure time is longer than 10 seconds, the moon's motion is likely to be evident in the photograph.)

Kodak Customer Service Pamphlet No. AM-18

HIGHLIGHTS OF THE YEAR.

On the night of February 9-10 the first total eclipse of the moon since October 1968, will be visible from beginning to end throughout North America and much of South America. Umbral eclipse starts late on Tuesday evening for viewers in the middle and western United States but on Wednesday morning for those on the Atlantic seaboard.

	EST
Moon enters umbra	12:52 a.m.
Totality begins	2:03
Middle of eclipse	2:45
Totality ends	3:26
Moon leaves umbra	4:37

Remember we are on AST:

Mercury and Venus: Favourable elongations of Mercury occur in January (morning sky), March-April (evening sky), September (morning sky) and at year's end (morning sky). Venus the brightest planet, will be easily visible in the morning sky until the end of July, but will not become conspicuous in the evening until November and December.

Mars: Every 15 or 17 years this neighbor planet makes a close approach to the earth, permitting unusually favorable observing of its surface features. On August 12 this year, the minimum distance will be 34.9 million miles, slightly less than in 1956 and the nearest since 1924. Mars will be well above the horizon sometime during every night this year, In mid-August, with opposition occurring on the 10th, Mars will have a visual magnitude of -2.6 and will outshine all the other planets except Venus.

Jupiter and Saturn:
A predawn object at year's beginning, Jupiter will soon attain prominence in the midnight sky, well place for observing until October. These two planets are playing hide and seek, for Saturn begins the year in the evening sky and sets before Jupiter rises. During May and June, Saturn will be too close to the sun, but then becomes observable to the end of the year, rising shortly after Jupiter sets.

Condensed from Sky and Telescope, January, 1971.

Lunar Eclipse Observations

B.L. Matthews

(Excerpts from Lunar Observer's Manual 1969)

No two eclipses are alike, and amature can contribute a great deal of valuable information. There is no limit to the type or size of equipment ranging from naked eye to the largest scope available.

Descriptions - Using naked eye, binoculars or whatever equipment you have you can survey the moon throughout the whole time of the eclipse. Even written impressions of the eclipse can and do provide a great deal of information. As a guide, some items that you can pay particular attention to are listed below:

a) color, and tone of penumbra
b) definition and ellipticity of the umbra
c) color and tone of umbra
d) sharpness or visibility of features in the umbra
e) luminosity (at totality) as shown on the 5-value "Danjon" scale on the attached form.

Lunar Photometry - Is the estimation of the apparent magnitude of the moon during the course of an eclipse-in particular, during totality. Of all the methods of carrying out Lunar Photometry there are three that have particular appeal.

I. If you wear glasses remove them and compare the out of focus image of the moon with stars or planets having publicized magnitudes.

II. View the moon through reversed binoculars-compare this with naked eye viewed stars during partial phases, and with the reversed binos' viewed stars during totality. (Refer to the brightness reduction, in magnitudes caused as K.)

III. Use a ball bearing or a plain christmas tree ornament to reduce the size and brightness of the moon image. The eye-reflector distance R, the moon's magnitude will be diminished by an amount, M as shown in the following formula:

$$M = K + 5 \log R$$

K may be found by calibrating either just before or just after an eclipse when the apparent magnitude will be -12.7. This report may also be recorded on the attached forms.

Crater Timing - Last but not least. Valuable information concerning the earth's atmosphere may be found by timing selected craters as they enter or leave the umbra. The 15 craters shown on the attached form have been designated as prime targets. Using the accepted timing procedures that have been practiced during occulations report on the bottom of the form the U.T.'s the umbra touches the pre-designated craters, and when it reaches the other side to the nearest

...../2

.1 sec. and turn these times over to the lunar coordinator.

Forthcoming Lunar Eclipses (1 is = to TOTAL)

FEB	21, 1970	(.05)
AUG	17, 1970	(.4)
FEB	10, 1971	(1.0)
JAN	30, 1972	(1.0)
JUL	26, 1972	(.6)
DEC	10, 1973	(.1)
MAY	25, 1975	(1.0)
NOV	18, 1975	(1.0)

ROYAL ASTRONOMICAL SOCIETY OF CANADA-LUNAR ECLIPSE REPORT FORM

OBSERVER _____

ADDRESS _____

SITE _____

DATE _____ 19

TIME _____ U.T. TO _____ U.T.

S(0-10) _____ T(rev.) _____

INSTRUMENT(S) & MAGNIFS.

_____

_____

ECLIPSE LUMINOSITY
(Check One Value)

( ) 0: Very dark eclipse, moon almost invisible, especially at mid-totality.

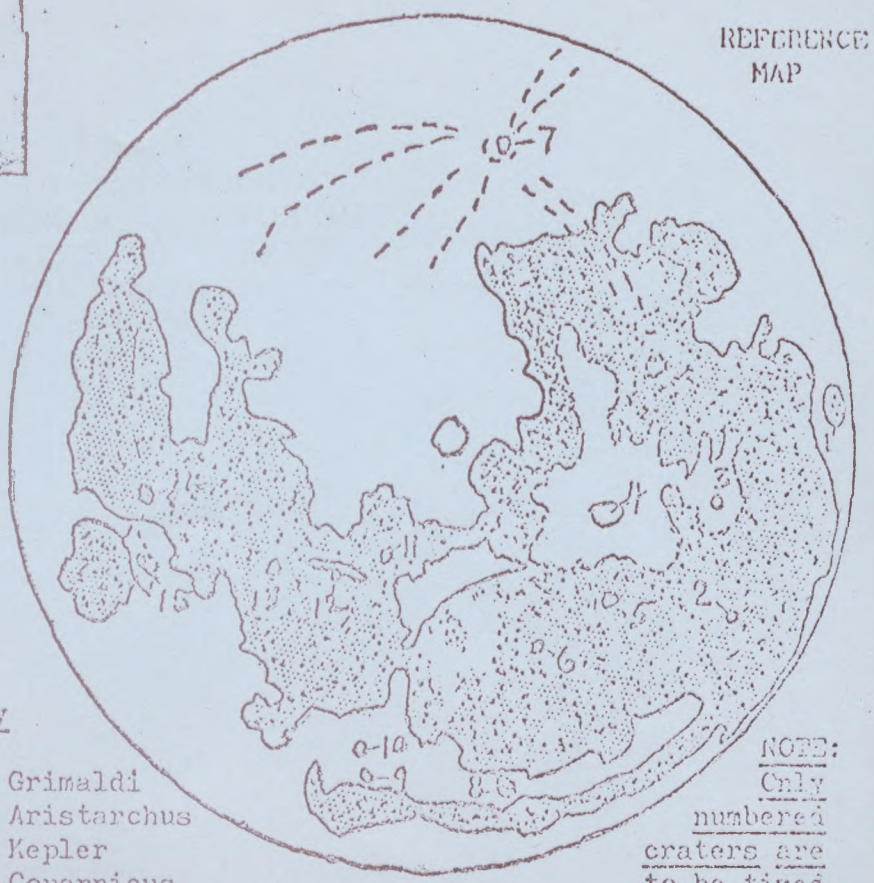
( ) 1: Dark eclipse, gray or brownish coloration, details distinguishable only with difficulty.

( ) 2: Deep red or rust-colored eclipse, with a very dark dentral part in the shadow, and the outer edge of the umbra relatively bright.

( ) 3: Brick-red eclipse, usually with a bright or yellow rim to the shadow.

( ) 4: Very bright copper-red or orange eclipse, with a bluish very bright shadow rim.

REFERENCE MAP



Key

1. Grimaldi
2. Aristarchus
3. Kepler
4. Copernicus
5. Pytheas
6. Timocharis
7. Tycho
8. Plato
9. Aristoteles
10. Eudoxus
11. Manilius
12. Menelaus
13. Plinius
14. Taruntius
15. Proclus

NOTE: Only numbered craters are to be timed.

LUNAR MAGNITUDE ESTIMATES
Method used _____

U.T.	MAG.	U.T.	MAG.

WRITTEN DESCRIPTION OF ECLIPSE

(Please continue on top of ba

CRATER TIMINGS

CRATER	U.T. (-+.1	CRATER	U.T. (+-.1	CRATER	U.T. (+-.1	CRATER	U.T. (+.