FROM

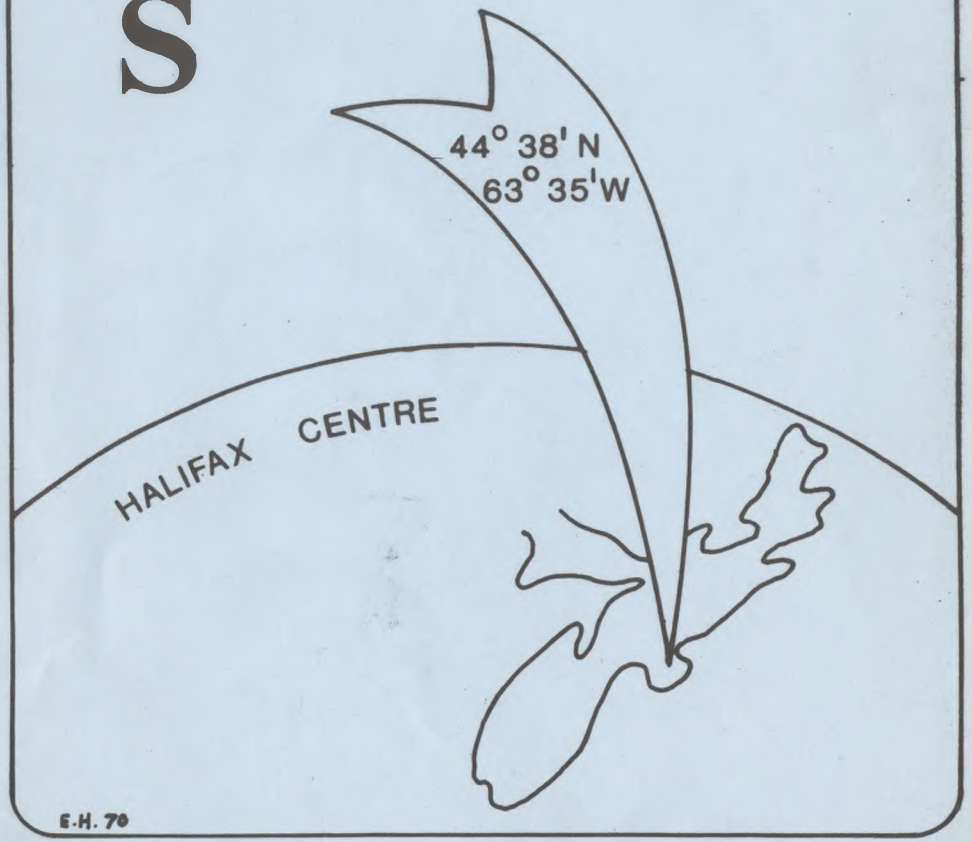
HALIFAX CENTRE R.A.S.C.
1747 SUMMER ST.
HALIFAX, N.S.

June 72

TO

ROYAL ASTRONOMICAL SOCIETY,
252 COLLEGE ST.,
TORONTO, ONTARIO.

NOVA NOTES



E.H. 70

NOTICE OF MEETING

Date: June 16, 1972

Place: The Theatre
Nova Scotia Museum
1747 Summer Street
Halifax, Nova Scotia

Time: 8:00 p.m. sharp

Topic: A film will be shown

All members and guests are most welcome

The Nova Notes are printed thanks to the goodwill of

The Nova Scotia Museum

The monthly meeting was held on May 19, 1972 and began at 8:15 p.m.

Dr. Reynolds of Dalhousie was our guest speaker. He spoke on ages and composition of the rocks of the moon. It was a very informative and interesting topic.

The meeting ended at 10:00.

Coffee was served and informal discussions took place.

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Notices

Election of officers for the year 1972 - 1973, will be held following the showing of the film. Nominations are requested from the membership.

On July 10, a trip to Antigonish is planned by the Society for the purpose of viewing the eclipse.

ECLIPSE OF THE SUN 1972

The table on this page is a guide of camera settings for solar eclipse photography. The table was taken from the book 'Skyshooting Photography for Amateur Astronomy' by Mayall and Mayall. Table originally produced by Eastman Kodak Company.

ASA SPEED.		Partial Phase STILL MOVIE	TOTALITY (prominences STILL MOVIE	TOTALITY Inner Coron STILL MOVIE	TOTALITY Outer Corona STILL MOVIE
25-32	F STOP. ND Filter. Exposure.	f/5.6 f/11 5.0 5.0 1/100 16FPS	f/4.5 f/8 NONE 1/100 16FPS	f/4.5 f/2.8 NONE 1/10 16FPS	f/4.5 f/1.4 NONE 1/2 16FPS
40-50	F # ND Filter Time (secs)	f/6.3 f/13 5.0 5.0 1/100 16FPS	f/5.6 f/11 NONE 1/100 16FPS	f/5.6 f/3.5 NONE 1/10 16FPS	f/5.6 f/1.9 NONE 1/2 16FPS
64	F # ND Filter Time (secs)	f/8 f/16 5.0 5.0 1/100 16FPS	f/6.3 f/13 NONE 1/100 16FPS	f/6.3 f/4 NONE 1/10 16FPS	f/6.3 f/2 NONE 1/2 16FPS
125-160	F # ND Filter Time (secs)	f/11 f/22 5.0 5.0 1/100 16FPS	f/8 f/16 NONE 1/100 16FPS	f/8 f/4.5 NONE 1/10 16FPS	f/8 f/2 NONE 1/2 16FPS
200-250	F # ND Filter Time (secs)	f/16 16FPS 5.0 6.0 1/100 16FPS	f/11 f/22 NONE 1/100 16FPS	f/11 f/6.3 NONE 1/10 16FPS	f/11 f/2.8 NONE 1/2 16FPS
400-650	F # ND FILTER Time (secs)	f/22 f/11 5.0 6.0 1/100 16FPS	f/16 f/11 none 1.0 1/100 16FPS	f/16 f/9.5 NONE 1/10 16FPS	f/16 f/4 NONE 1/2 16FPS
1250	F # ND Filter Time secs.	f/32 f/16 5.0 6.0 1/100 16FPS	f/22 f/16 none 1.0 1/100 16FPS	f/22 f/13 none 1/10 16FPS	f/22 f/5.6 none 1/2 16FPS

FPS = Frames Per Second.

ND Filter = Neutral Density Filter.

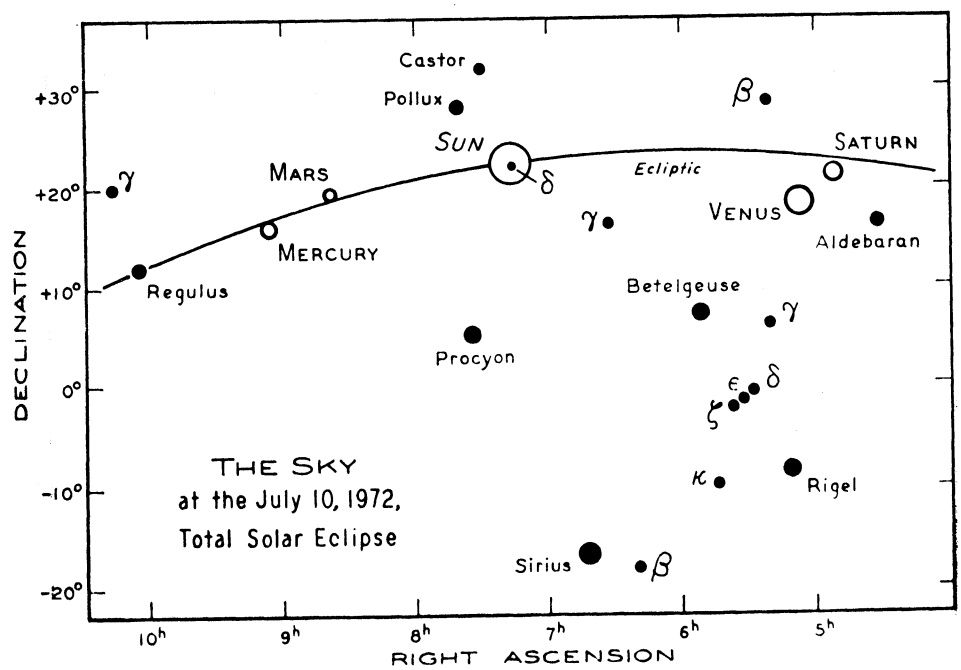
JULY 10th. STARS AND PLANETS VISIBLE DURING TOTAL ECLIPSE

(abstracted from 'Sky and Telescope' May 1972)

During the July 10th solar eclipse the sun will be in the constellation Gemini. Venus will be the brightest object at mag. -4.1, about 30 deg. west of the Sun, but, like Saturn at mag 0.3, will be close to the horizon. Mercury will be at mag 0.7, 26 deg. east of the Sun. Stars visible are procyon (0.3), capella (0.1), pollux (1.1), castor (1.6). Sirius will be near the horizon. Delta Gem. (3.5) will be only one solar radius from the SW limb of the sun, though not visible to naked eye should be conspicuous on long exposure photographs of the outer corona. Generally objects fainter than 2nd mag. are not visible to naked eye during total eclipse of the sun.

This should be an excellent opportunity to see the elusive planet Mercury, if you can take your eyes away from the eclipse.

H. F.



As seen from the Canadian Maritime Provinces, the sun will be about 35 degrees above the western horizon. The coordinates are for 1950.

STARSTRUCK

It is well known to astronomers that bright city lights tend to spoil the visibility of the sky. A rather extreme example was reported recently in the British Press.

As a result of a lengthy strike by coal miners, production of electricity was reduced and London was plunged into darkness for several nights. Scotland Yard received phone calls from worried Londoners who reported seeing 'strange lights in the sky'. The detectives at Scotland Yard informed callers that these lights were called 'stars'.

H. F.

NOVAE

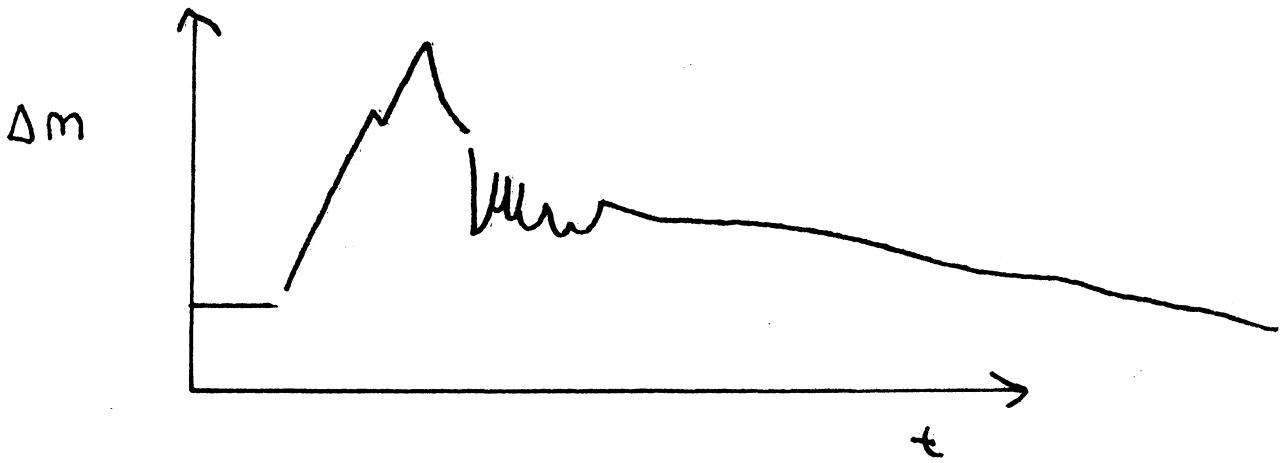
Gerald Diamond

Someone who knows the sky may find himself confronted with an apparently new star in a position where one had not been before; or he may find a rather insignificant star has suddenly become very prominent in the heavens. These are probably novae or "new stars". It is estimated that there are two or three dozen of these in the Milky Way Galaxy each year, but most of these go unobserved due to either their distance of the chance of occuring in the daytime sky.

A nova is a star which blows off part of its material in a spectacular fashion, often increasing in luminosity by as much as 11-13 magnitudes. This increase in brightness occurs rather rapidly, usually over a few hours or days. From then on its brightness decreases more or less smoothly over a much longer period from a few weeks or months up to a few years or even centuries in some cases.

There are two classes of novae -- fast and slow. The fast novae are characterized by a rise to maximum luminosity and a return to the pre-nova state in a few months or years and usually increase in brightness by 12 or 13 magnitudes. The pattern of their "decay" is as follows: They lose 2 or 3 magnitudes in a few days after attainment of maximum brightness, and thereafter diminish quite slowly while undergoing a series of fluctuations in brightness followed by a final smooth decline to its initial brightness.

Figure



Slow novae, on the other hand, can take as long as a month to rise to maximum brightness. Their return to the pre-nova state involves years and, in some cases, even centuries. All the while, the slow nova experiences erratic fluctuations of the same sort that plague the fast nova, the fluctuations of the slow nova often being of longer duration. These fluctuations are most pronounced. Slow novae are usually one or two magnitudes fainter than their faster counterparts.

Theories of the "why" of novae are numerous. Two will be presented here.

The first holds that novae are stars at or near the point of exhaustion of their normal energy sources in the stellar core. It then begins to "burn" hydrogen in an expanding envelope or shell around the core. As this shell source approaches the surface the weight of the overlaying layers can no longer contain the reaction and a tremendous explosion results. A shell of matter is ejected, this matter containing 10^{-4} or 10^{-5} of the star's mass. This shell becomes visible to a camera (attached to a telescope) after a few months and can be tracked for several years before it becomes too tenuous to be observed.

A second and opposing theory is rapidly gaining credence as more and more supporting evidence becomes available. It claims that novae always occur in binary star systems where the two stars are very close together. Material is transferred from the companion to the nova, and this mass transfer triggers the outburst. Little is known concerning the reasons for the transfer.

Both theories suggest that all novae are hot, white stars of types O and B.

A related group of stars is the recurrent novae. These are stars which appear to go through whole nova cycle, die down to passivity for a while and then flare up again at more or less regular intervals. Again, as information comes in there is some indication the rise in brightness is directly proportional to the logarithm of the average rise in luminosity. If this is o, then all novae are probably recurrent with periods of thousands of years in some cases.

The big brother of the nova is the supernova, which is far more rare but greatly more spectacular. A supernova is the true and final death of a star, very little being left behind to commemorate the star's passing.

Only three have been observed in our galaxy in the past thousand years. Tycho Brahe reported one in 1575, Kepler recorded a supernova in 1604, and the Chinese noted one in 1054 in the constellation Taurus. The explosion was visible during the day and outshone Venus. The remnants of this form the beautiful Crab Nebula, and the very small, hot, white star at its centre. The Crab is a

powerful radio source.

Supernovae are spotted in various other galaxies. Sometimes a supernova outshines the rest of the galaxy it resides in. There have been fifty observed in the past hundred years and it is estimated that one occurs every three to four hundred years in our galaxy.

As it was with novae there are two types of supernovae. Type 1 is characterized by an absolute magnitude of -16 (about 10^8 times as bright as the sun) though -20 has been recorded. They rise quickly to maximum, decline rapidly for the first hundred days thereafter and then decline more slowly but more smoothly. They have been found to be particularly deficient in hydrogen.

Type 11 usually only rise to absolute magnitude -13.5 (ten to thirty million times as luminous as the sun). They decline to obscurity much more slowly and are thought to lose more of their mass than type 1.

Both have "decay" curves similar to those of novae, the curves being exponential in character. The half life for a type 1 being about 55 days.

These explosions dwarf all other stellar activity, but to have an idea of their size consider the following. At maximum, a supernova is giving out more energy in one second than our sun gives out in several years! Furthermore, it ejects gases at about 4000km./second, compared with the 1000 km./ second velocity characteristic of nova ejecta.

I spoke earlier of three supernova being recorded in the last millenium. Approximately 2000 years ago, I believe, one was visible in the eastern, evening sky.

This paled the other three and was recorded so that one may still read of it today.