NATIONAL NEWSLETTER

Total Solar Eclipse, July 1972

Single copies of the following articles are now available, free of charge, by writing to *RASC Eclipse Reprint 252 College Street, Toronto 130, Ontario*:

1 "The Alcan (Alaska, Canada – editor) Total Eclipse of July 10, 1972" by Charles H. Smiley, reprinted from *Sky and Telescope* January 1971 (4 pages).

2. "Climatic Data for the Day of the Eclipse, July 10, 1972" by F. D. Manning, Canadian Meteorological Service (11 pages).

An independent but less complete study of potential weather conditions has been made by Si Brown of the Montreal Centre. Brown's results are essentially in agreement with Manning's. Manning summarizes as follows:

> "... it can be said that there is a greater probability of drier conditions in the area from Tuktoyaktuk to Chesterfield than in the area southeastward from Poste-de-la-Baleine to Sable Island. However, warmer and less cloudy conditions prevail in the area around Mont Joli, Summerside and Charlottetown, though, it should be pointed out, all these data are averages. Movements of weather systems over the continent on July 10, 1972 could produce weather ranging from heavy overcast to bright sunny conditions at any place along the path. Therefore, those planning to observe the eclipse are advised to read or listen to the public weather forecasts for a few days in advance of the eclipse and especially during the few hours prior to the occurrence of this fascinating event."

New Neighbours in Space

Eight California astronomers believe that they have discovered two new members of the Local Group, the small family of galaxies to which our Milky Way galaxy belongs. The two galaxies were previously unrecognized because of their location behind the obscuring clouds of dust in the plane of the Milky Way. Three Canadian radio astronomers made a significant contribution to this discovery.

The two objects were first noticed by the Italian astronomer Paolo Maffei, who recorded their nebulous images on an infra-red photograph of the Milky Way. Some months later, Maffei 1 and 2 (as they have been called) caught the interest of Robert Landau, a graduate student at the University of California. He obtained further infra-red photographs of them with a 30-inch telescope, and soon his interest spread to staff members of the Hale Observatories (Mount Wilson and Palomar) and the Lick Observatory. A variety of photographic, spectroscopic and photometric equipment was then put to use to study these objects.

The spectrum and brightness contours of Maffei 1 are consistent with those of an elliptical galaxy, dimmed by at least 5 magnitudes by interstellar dust. Those of Maffei 2 are consistent with those of the nucleus of a spiral galaxy. Both objects have low radial velocities, unlike distant galaxies which show large red shifts. The distance to Maffei 1 and 2 has been estimated to be 3,000,000 light years, about twice the distance to M31. If they were not obscured by interstellar dust, they would be visible as sixth magnitude objects.

Drs. M. Bell of the National Research Council, L. D. Braun and E. R. Seaquist of the University of Toronto have observed Maffei 1 and 2 with the 150-foot telescope of the Algonquin Radio Observatory. From Maffei 1 they observed no radio radiation. This indicates that Maffei 1 must be an elliptical rather than a spiral or irregular galaxy. The latter contain interstellar gas, which emits radiation at radio wavelengths. From Maffei 2 they observed radio radiation similar to that from a normal nearby spiral galaxy.

This important and unexpected discovery indicates very clearly the unpredictability of scientific advance, the international nature of astronomy, and the role which large (and small) telescopes can play.

The Purkinje Effect

The following letter may be of interest to variable star observers, and others; it was recently received from Mr. J. E. Isles, who is Director of the Binocular Sky Society, Flat 3, 116 Long Acre, London W.C.2, England. We thank Mr. Isles for his interest.

Herbert A. Lange has published an account (*J.R.A.S.C.* **64**, 311, 1970) of his visual estimates of the brightness of Nova HR Del 1967, in which he included remarks on the phenomenon known to variable star observers as the Purkinje Effect.

The origin of the Purkinje Effect is as follows. Light-sensitive cells in the retina are of two types, rods and cones. The rods operate at low intensities of illumination are more sensitive to blue light, and do not detect colour. The cones come into operation at a higher level, are more sensitive to red light, and are responsible for colour vision. Consequently, when one estimates a red variable against white comparison stars with telescopes of different apertures, one will, in general, obtain a brighter result with the larger instrument.

Mr. Lange has noted two other forms of the Purkinje Effect: when a red star is thrown out of focus, reducing the light intensity, a fainter result ensues; when a blue star is thrown out of focus a brighter result ensues. For this reason he has decided not to use the out-of-focus method when making estimates of bright red stars.

I believe that it is better practice to use the out-of-focus method whenever the colour of a red variable is discernible – i.e. to use rod vision in preference to cone vision. If in-focus estimates are made, when the star brightens past a level about $2^{m}.0$ above the limit there will be a 'jump' of as much as a magnitude as the cones take over, resulting in a distorted light-curve of exaggerated amplitude. A similar argument applies to blue variables. Moreover, use of the out-of-focus method brings closer agreement between simultaneous estimates by observers using different apertures, and by rendering star colours undetectable, or nearly so, it eliminates the psychological difficulty of comparing sources of different colour.

This is the method we recommend to Binocular Sky Society observers. It can, however, give a light-curve which is fainter than photoelectric V magnitudes by a few tenths of a magnitude.

LONDON, ENGLAND J. E. ISLES

*A comparison of Mr. Lange's measures with photoelectric visual band (V) measures (Barnes and Evans 1970, Publications of the Astronomical Society of the Pacific, **82**, 889) indicates that Mr. Lange's measures are consistently brighter than the photo-*

electric measures by 0.2 ± 0.1 magnitude. This comparison was restricted to measures made prior to October 1968; photoelectric measures were not made after that date. – Editor.

Observing Mars in 1971

Many members of the Society will want to observe Mars in 1971 for, despite the unfavourable low declination of a summer opposition, this is the year in which Mars reaches its minimum distance from the Earth, some 35,000,000 miles on August 10. Ken Chilton sends the following instructions.

Before observing Mars, the observer should be sure that his eyes are fully dark-adapted. When this has been successfully achieved, a cursory examination of the planet should be made. At first glimpse, a view of Mars may be somewhat disappointing. The viewer is liable to see only a pale pink disc with no features at all. The secret to drawing out the famous and illusory markings is to keep the eye at the eyepiece. Through prolonged staring, the features of the Martian surface will become visible.

From night to night, certain Martian features appear to undergo changes. The observer might keep a careful record of the intensities of these areas (0 being the lightest area and 10 being the colour of the background sky. All of the features may then be ranked on this scale.) Areas suspected of change are: Thoth, Solis Lacus, Trivium Charontis, Lunae Palus and Tempe. These may be found on the map on page 67 of the 1971 OBSERVER'S HANDBOOK.

Of course, any clouds, dust storms or other atmospheric phenomena should be noted.

Those who possess telescopes of 10″ aperture or larger may find that it will be possible to take photographs of Mars. This may be done without filter, or with either blue or yellow filters. The diameter of the photographic image ought not to be less than 3 mm. Ilford Pan F or Tri X, exposed from 2 to 4 seconds, may be used to good advantage. The developing time should be protracted slightly. A little experimentation will yield good results.

The writer would appreciate progress reports from observers who undertake the observation of Mars in 1971.

HAMILTON, ONT. K. E. CHILTON

The Art of Comet Hunting

It is a pleasure to note that the Halifax Centre, long dormant, is again active. Their address is: Halifax Centre, RASC, Nova Scotia Museum, 1747 Summer St., Halifax, Nova Scotia. Their newsletter – NOVA-NOTES – contains such informative and interesting articles as the following.

On September 8, 1965, Kaoru Ikeya, a piano-factory worker, was peering through the eyepiece of his homemade eight-inch reflector when he noticed a little spot of haze in the field of view. Ikeya, knowing the sky, was fairly certain that that object was not supposed to be where it was. His star atlas showed nothing in that position, and a look through the eyepiece a short while later convinced him that he really was looking at something new, for the fuzzy patch had moved.

This new object was doubtlessly a comet, and Ikeya lost little time in sending a

wire to the Tokyo observatory. Just one hour later, Tsutomu Seki found the same object, and the finding of new comet Ikeya-Seki was made known to the world,

The rest of that story is familiar to most of us – an eighth magnitude fuzz that sprouted a tail and danced around the sun, rivalled the full moon in brightness and the Sistine Chapel in beauty, displayed a gorgeous tail seventy million miles long, and started to move away toward the dark void of interplanetary space from where it came.

All this started through the effort of one amateur astronomer who, with a little enthusiasm, quite a bit more patience, lots of warm clothes and an eight-inch telescope, has since found several comets.

Although there are several modes of comet hunting, the type that is the most challenging and, in my opinion, the most fun, is the telescopic comet hunt. Point your fairly short focus telescope at any area of the sky. Looking through the eyepiece, check the field of view for any fuzzy object. After a five-second gaze, move on to the next field, and to the one after that. Sooner or later a little spot of haze will enter your field and you must then refer to a star atlas to locate the precise position of the object you see. In almost every case something will be shown there, for the sky is full of galaxies, star clusters and nebulae (gas and dust clouds) which are thousands of light years from us. In a telescope, however, a comet bears strong resemblance to these masqueraders. Luck and perseverance will one night bring you an object that does not belong, and, before panicking, make sure of the position, and see if there is any motion. If there is, panic. The Smithsonian Astrophysical Observatory in Cambridge should, however, be informed of the reason for your unusual psychological state, in the form of a telegram stating all the information about your new object. The observatory will try to confirm your discovery of it; and if it succeeds, the comet will be named after you; otherwise you try harder next time.

Comet hunting has attracted the fancies of many men, including William Brooks, who, in the late 19th century, hunted in his yard with a nine-inch refractor and picked up over twenty comets, Charles Messier, better known for his "non-comets", Leslie C. Peltier, who between 1925 and 1954 gathered twelve comets and an assortment of novae, and David H. Levy, who between 1965 and 1970 has found nothing – absolutely nothing.

How long should you count on hunting before a little comet hails you? A rough average is 400 hours for your first comet and 200 hours for each subsequent comet. But you could go on almost forever without any luck. Or to be more optimistic, you could have the luck of Alcock, who found two comets within a week, or Brooks who dared discover three comets in five weeks.

How can we justify these many hours at the eyepiece in a seemingly hopeless search? Leslie Peltier (*Starlight Nights*, 1965) rationalizes this way:

> Time has not lessened the age-old allure of the comets. In some ways, their mystery has only deepened with the years. At each return a comet brings with it the questions which were asked when it was here before, and as it rounds the sun and backs away toward the long, slow, night of its aphelion, it leaves behind with us those questions, still unanswered.
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> To hunt a speck of moving haze may seem a strange pursuit, but even though we fail the search is still rewarding, for in no better way can we come face to face, night after night, with such a wealth of riches as old Croesus never dreamed of.

HALIFAX, N.S. DAVID H. LEVY