THE NEWSLETTER OF THE

ROYAL ASTRONOMICAL SOCIETY OF CANADA - KINGSTON CENTRE

AND THE

QUEEN'S UNIVERSITY ASTRONOMY CLUB

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Occultation Observing

Many amateur astronomers become involved in occultation observing and timing. It is fascinating on a clear night towatch a star being hidden from our view for a period of time by the moon and then to see the star reappear suddenly as the moon sweeps along in its orbit. The word occultation is derived from the Latin word "to hide", and it tells precisely what happens to the star or other heavenly body for a period of time. Sometimes it is actually a game of hide-and-seek as astronomers seek the abrupt reappearance of the celestial object at the western limb of the moon. Even more memorable than games of hide-and-seek involving the moon are the rare occasions when a star is occulted or hidden from our view by a planet or an asteroid. These occasions are ones of very particular fascination for the occultation observer.

Many of us may know that, because the moon, astronomically speaking, is very close to us, the time at which occultations begin and end is considerably different for those who are in widely different locations on the face of the earth. But do we fully appreciate the implications of this fact for both our Society and our Centre. Members of our Society in widely separated cities could set up some very interesting occultation observing and timing projects. Members of our centre are especially fortunate in having members spread over widely separated areas of the country. Add to that the fact that one member who is over 3,000 kilometers away (Yes! That's right! In miles, it's over 2,000 of them!), Paul Brown, is eager to become involved in just such a project. Let's see if over the coming year we could get a few people involved in occultation observing and timing.

I hope that the following hints for beginners in this area will prove helpful.

Firstly, I suggest that you plan well ahead for all occultation observing. Gather all the information possible on the subject and on predicted occultations. Use the Observer's Handbook or similar reliable information for the predictions.

Secondly, it is important for beginners that they choose lunar occultations of seventh and eighth magnitude stars until later. For the novice, it is best to select first,second,or third magnitude objects.

Thirdly, for beginners, choose the observation of the <u>disappearance</u> aspect of the phenomenon first. This means watching the star for a period of time rather than watching <u>for</u> it.

Fourthly, choose an observation of a disappearance, I would suggest, at the <u>dark</u> limb of the moon. In that way an evening-night session can be carried out rather than an early morning one. That kind of disappearance is easier to observe because of the contrast between the brightness of the star and the darkness of the near limb of the moon. This means choosing a time between new moon and full moon.

Fifthly and more specifically, I suggest choosing an occultation for which the elongation of the moon will be between 30° and 140°. This should allow two things which are desirable: (1) for most times during the year, the moon should be sufficiently high after sunset (at least 30° elongation from the sun) for the star about to be occulted to be easily located if it is a fairly bright one, as was suggested above, and (2) at an elongation of less than 140°, the moon should still be not too close to full moon, so that the left limb of the lunar disk is not so bright for the occultation that moon filters would be necessary on the binoculars or telescope. This suggestion, along with the previous ones, is aimed at producing a situation that gives maximum contrast between the star and its surroundings at the point at which the event is seen to occur. It should be easy to see that this means choosing the times during the month when the moon is approximately from three or four days old to ten and a half or eleven days old.

Finally, as far as the observation is concerned, on several nights previous to the occultation prepare yourself by using your binoculars or telescope to look at the particular star very carefully and try to imagine how it and its neighbouring stars will appear with the moon very close to them.

As a final hint, I want to suggest what is perhaps one of the best methods of performing occultation timings. Many amateurs may be aware of the procedure to follow using the CHU or WWV time signals and a stopwatch. It seems to me that certain facts of modern electronics now make the stopwatch method almost obsolete. A modern good-quality portable cassette tape recorder is now less expensive than a good quality stopwatch. Timing occultation disappearances, for example, can now be done very simply. A couple of minutes before the event, all one has to do is start the time signal receiver and start the tape recorder which should be very close to the observer. Then when the person says, "Time!" at the precise moment of the event, his word will be a "voice-over" on the atomic-clock simultaneously recorded, and by replaying he can hear and record the precise fraction of a second at which he recorded the event. When recording the event, the observer should not stop the tape until the next full minute has elapsed and he should then identify carefully the event that has taken place, so that he has a good, permanent record of what has happened.

Just as we have been able to stimulate interest in some other areas recently, I hope that these hints or suggestions will encourage some of us to become involved in occultation timing.

Several times, Paul Brown has suggested long-base-line observing, and before long, if weather and other things cooperate, we may be able to coordinate an occultation timing project. In fact, in reply to Paul's most recent letter, I have written to him suggesting that we attempt it on the following dates:

(1) March 5: Some of the stars of the Hyades are occulted that evening. In the Kingston area, the times may be too soon after sunset for us to see the occultation of all of the ones mentioned on page 74 in the Observer's Handbook, but I strongly urge that we try to observe the disappearance of these two stars.
   1) ZC 669 - θ^1 Tauri (4th mag.)
   2) ZC 671 - θ^2 Tauri (3.6 mag.)

(2) April 29: On that date, let's try to observe the very bright star, Aldebanan, though in the East it may be quite close to the horizon.

(3) June 7: We should be able to observe and time the occultation of the star ZC 2033 (98 K Vir)

The above stars are all fairly bright ones and the conditions fit in with the suggestions mentioned in the above section on observing.

If there is anyone who would like the challenge of observing a daytime occultation of a very bright star, plans could be made for that of Aldebanan on June 22.

I most certainly hope that these suggestions are helpful and that we derive some enjoyment out of our involvement with occultations.

A MOST WELCOME GUEST!

We were very pleased on January 11 to have as a guest at our regular meeting a man who is extremely well-known in the field of radio astronomy, in fact a pioneer in the field in Canada, Mr. Arthur Covington. We welcome him and hope that Mr. Covington will continue to attend our meetings, and sometime in the future perhaps we may even have the chance to hear a talk or presentation on some topic that he might choose for us.

SOMETHING FOR YOUR COMPENDIUM OF ESOTERIC FACTS

Add this to your compendium.

Did you know that the birthdays of two of the most influential of all astronomers may be celebrated on consecutIve days? Copernicus, regarded as the father of the heliocentric understanding of the solar system, was born on February 14, 1473 ('old style'). Galileo Galilei, regarded as the first telescopic astronomers, was born at Pisa in Italy on February 15, 1564.

IMPORTANT MEETING

We look forward to our next meeting, February 22, and to having Dr. John Percy, President of the R. A. S. C. speak to us at that time.

Good observing!

Leo