

LUNAR OCCULTATIONS SECTION

This bulletin is one of several to be issued reporting the activities of the Lunar Occultations Section. It is hoped that through this bulletin a number of Centres will be encouraged to participate in this fascinating and useful program. Wherever a Centre has not already done so, I would ask that the name of a member be submitted who can provide a liaison between the Centre and the Lunar Occultations Co-ordinator. Proper recognition can then be given to those already active in the program and a means provided whereby new observing groups can be established. Please appoint your representative no later than your October meeting.

Why observe lunar occultations?

The precise timing of the moon crossing our line of sight to a star is valuable information which the amateur can provide to the professional astronomer. The irregular period of rotation of the earth was first discovered from occultation timings. The small variation in its rotation period led to the introduction of ephemeris time.

Analysis of occultation work may reveal in the future the effect on the earth's period of rotation of glaciation and internal crust movements. Man's activities on the moon will require an accurate determination of the details of the orbit of our satellite which can also be obtained from lunar occultations. The observation of "grazes", where the star skirts the edge of the moon's limb, are now considered important as they provide precise information on the moon's celestial latitude and polar topography.

What equipment is required?

Occultation predictions supplied by the H.M. Nautical Almanac Office, Royal Greenwich Observatory, generally covers these events for stars brighter than +7.5; therefore, a relatively small telescope can be used. Magnifications from 50 to 200 are most common. In addition to the telescope, a stopwatch reading to 1/10 sec. is required. A short-wave radio should be used to monitor the radio time signals from WWV in Washington or CHU in Ottawa. If a radio is not available on the observing site, a telephone call to a friend with a short-wave radio would be quite acceptable. A small photograph or drawing of the full moon is useful in determining the position angle of the star's disappearance. This is the point on the edge of the moon's disk where the star makes "contact", and is measured in degrees (through 360°) from the North through East. "Fixes" may be made on certain lunar craters to obtain position angles with reasonable accuracy.

How do you get started in observing lunar occultations?

After acquiring the necessary physical equipment - telescope, stopwatch and radio - occultation predictions for your locality are required. In the OBSERVER'S HANDBOOK occultations are listed for Halifax, Montreal, Toronto, Winnipeg, Edmonton and Vancouver. If you are located within 300 miles of any of these cities, these prediction times may be used but will only be approximate for your station. A more precise

estimate of the predicted occultation time for your site is obtained by applying the "a" and "b" corrections given in the OBSERVER'S HANDBOOK. The same information is supplied in SKY AND TELESCOPE in its yearly supplement on occultations.

With all preliminaries completed, you are now seated at the telescope; select an eyepiece so that any sky haze does not affect your viewing (use higher powers when there are hazy conditions). With experience, you can control the "motion" of the moon so that the occultation occurs when the star is in the middle of the field of view. Just prior to the event, determine the position angle of the star with respect to the limb of the moon. Then with your stopwatch fully wound, start the watch at the moment of disappearance of the star. Immediately after this the short-wave time signals from WWV (5, 10, 15 and 20 megacycles) or CHU (3.330, 7.335, 14.670 megacycles) should be used to stop the watch at the beginning of a known time signal. By subtracting your watch time from the radio time you obtain the actual time of the occultation. Where the star is approaching the moon's limb at right angles, this should take less than 10 minutes. If the radio signal is heard more than 5 minutes after the watch is started, then prior calibration of your stopwatch over longer time periods is desirable. Sometimes observers prefer to reverse this procedure - stopping the watch upon seeing the occultation.

The information should then be transferred to our special form; mail these to the National Co-ordinator at the end of each month. A sample report form is attached; additional copies are available upon request.

The next bulletin will include a list of observers, the local contact in your Centre, as well as some "tricks of the trade" useful to the new observer. Good viewing until then!

Franklin C. Loehde,
National Co-ordinator,
Lunar Occultations Section,
Standing Committee on Observational Activities,
8332 Jasper Avenue,
Edmonton, Alta.

21 September, 1966.