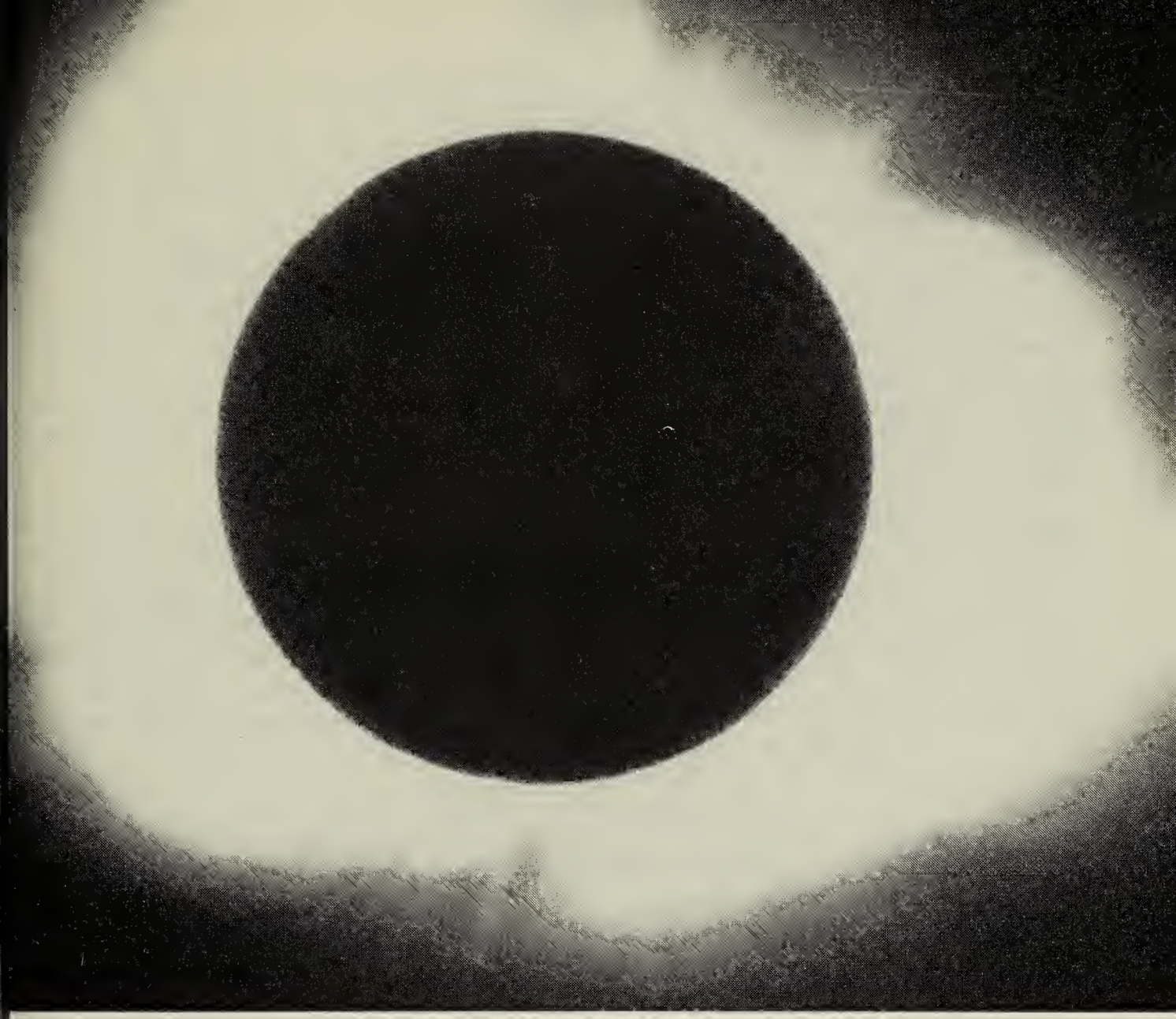

Hale Observatories

TOTAL SOLAR ECLIPSE

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Persons living in southeastern Saskatchewan will have an opportunity this winter to witness a rare celestial phenomenon. A total eclipse of the sun will be visible on the morning of February 26, 1979. This is the last chance to witness a solar eclipse in Canada during this century. The next total eclipse visible in Canada will occur only in the High Arctic on August 1, 2008.

A total eclipse of the sun occurs at the time of a new moon whenever the moon passes directly between the earth and the sun and blocks out the entire disk of the sun. A necessary condition for a total eclipse is that the apparent diameter of the moon be equal to or slightly larger than the apparent diameter of the sun as seen from earth. The orbit of the moon around the earth is not circular but elliptical so that when the moon is farthest from the earth, the apparent lunar diameter is slightly smaller than that of the sun. Should the moon pass directly between the earth and the sun at such a time, an outer ring of the solar disk will still be visible and the eclipse is then referred to as an an-

nular eclipse. On February 26 the moon will entirely block out the disk of the sun so the eclipse will be total.

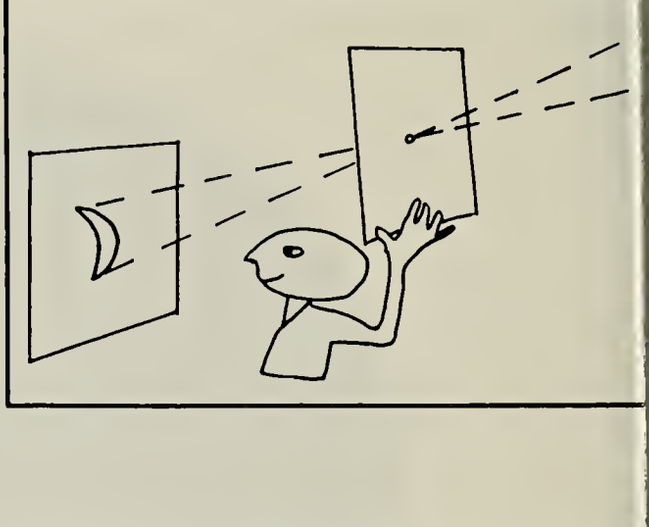
People often wonder why an eclipse of the sun does not occur at every new moon. The reason for this is that the moon's orbit around the earth is inclined at 5° to the ecliptic, which is the path of the sun across the heavens. For this reason the moon usually passes above or below the sun at new moon. An eclipse is only possible when the moon crosses or is very close to the ecliptic.

Just before and after totality, Baily's beads become visible. These are individual points of light which skim through the lunar valleys. Between the beads, the sunlight is blocked by craters or mountains on the moon.

During totality the beautiful corona of the sun with its pearly white streamers will become visible. The corona is the tenuous but hot outer atmosphere of the sun. It is much fainter than the bright disk of the solar surface so it can only be observed during a total eclipse. Near the base of the corona bright red prominences may be visible. These are hot jets of hydrogen gas ejected from the surface of the sun.

A word of caution about observing eclipses. People can seriously damage their eyes if they look directly at the sun during the partial phase of the eclipse. As larger and larger bites are taken out of the sun, the total light from the sun will decrease. However, the surface intensity of the sun remains the same and it is this intensity which causes eye damage. Do not watch the sun through clouds as a sudden clearing could then cause eye damage. Sunglasses are not safe for direct viewing of the sun.

You may view the sun directly through two superimposed sheets of completely exposed and thoroughly



developed black-and-white film. B very careful that there are no scratch in the film. Do not use colour film as does not have enough metallic silv to reflect infrared radiation. A piece No. 7 welder's glass which transmit only one 10-millionth of the incide sunlight is also suitable. The safe method is to construct a pin-hol camera as shown in the diagram. Th rays from the eclipsed sun pas through a 5mm hole in a piece c cardboard. You may then observe th projected image on a paper screen.

During the brief period of totalit you may view the totally eclipsed su directly without filters.[2] However, b very careful to terminate direc viewing at or before the instant a which the outer rim of the sun appear from behind the moon.

It should be possible to see th brighter stars and planets durin totality as the sky is then quite dark The darkening sky is also said to hav an effect on wildlife. Birds are ofte reported to head for their night roos You may want to keep notes on bir activities in your area.

The hatched region on the ma indicates the part of Saskatchewan i which a total eclipse can be observed The time of mid-eclipse along eac hatch mark is given. Further north onl a partial eclipse will be visible Although the fraction of the su eclipsed may not be very large, it wil still not be possible to see the corona

LOCAL CHARACTERISTICS

Times of Contact# (C.S.T.)

Location	First h m s	Second h m s	Third h m s	Fourth h m s	Time of Maximum Eclipse h m s	Eclipse Magnitude*
Estevan, Sask.	9 29 32	10 38 13	10 40 57	11 53 58	10 39 35	1.000
Moose Jaw, Sask.	9 29 32			11 51 34	10 38 23	0.990
Regina, Sask.	9 30 25			11 53 00	10 39 36	0.993
Saskatoon, Sask.	9 31 40			11 51 50	10 39 42	0.967
Brandon, Man.	9 33 26	10 42 56	10 45 47	11 59 07	10 44 21	1.000
Portage la Prairie, Man.	9 35 11	10 45 12	10 47 58	12 01 36	10 46 35	1.000
Winnipeg, Man.	9 36 20	10 47 00	10 49 16	12 03 23	10 48 08	1.000

First contact: Beginning of partial eclipse.
Second contact: Beginning of totality.
Third contact: End of totality.
Fourth contact: End of partial eclipse.
*Fraction of sun's diameter obscured at maximum eclipse.

outside of the region where totality occurs. If you live near the path of totality you may want to drive there.

The accompanying table gives times of eclipse for various centres in Saskatchewan and Manitoba. It is taken from computer predictions by Fred Espenak.[1] You will note that totality lasts only 2½ minutes at Estevan and will be shorter near the northern limit of the path of totality. If you plan to take pictures you should be set up ahead of time. The position of the sun at maximum eclipse as viewed from Estevan will be at an altitude of 24° and an azimuth of 140° (40° east of south).

Good viewing!

ACKNOWLEDGEMENTS: I wish to thank Prof. Ed Kennedy and Mr. Gordon Patterson, Department of Physics, University of Saskatchewan for assistance with this article.

[1]ESPENAK, F. 1978. Predictions for the 1979 Solar Eclipse. Journal of the Royal Astronomical Society of Canada 72:149.

[2]HOGG, H. S. 1976. The Stars Belong to Everyone, Double Day, Toronto. 274 pp.

[3]Eclipse Bulletin No. 4. 1972. Saskatoon Centre, R.A.S.C.