

## ASTRONOMY

# Sun Eclipse Magnificent Sight

Eclipse of the sun on July 20 will be visible as a partial dimming to millions of persons in the U.S., Canada and Latin America, weather permitting.

## See Front Cover

By ANN EWING

► VIRTUALLY everyone in the United States will be able to see a portion of the sun blotted out by the moon on the afternoon of July 20, weather permitting.

Those lucky enough to live in the narrow path of the total eclipse will view an awe-inspiring spectacle, one of the most magnificent of the world's natural sights.

Sweeping out a huge arc thousands of miles long but only some 60 miles wide, the moon's deep shadow will race from northern Japan, where the total eclipse begins at sunrise, to the middle of the Atlantic Ocean, where it ends at sunset.

The dark path of the full shadow will zip along these thousands of miles at about 3,000 miles an hour. The deep shadow crosses the U.S. only in Alaska and Maine, racing over Canada in between. The totality path swings directly over Bangor. (See SNL 83:394, 1963)

## Partial Eclipse for Millions

As a partial dimming of the sun's light, the eclipse will be visible from all of North America, as well as parts of northern Japan, eastern Siberia, Central America and northern South America. Although as far as is now known there are no plans for live television shows of the total eclipse, the TV networks expect to show movies of the spectacle later in the day.

A total solar eclipse occurs when the sun, moon and earth are in a direct line, with the moon coming between the earth and the sun. Then the shadow that the moon projects into space can trace out a narrow path, never more than about 230 miles in width, on the earth's surface. The path for the July 20 eclipse is some 60 miles wide. The width is determined by the distance of the moon from the earth.

However, for thousands of miles on either side of this strip, a partial eclipse occurs, with part of the sun blotted out by the moon's lesser shadow, or penumbra.

The nearer you are to the total eclipse path, the greater is the "bite" taken out of the sun by the moon. In Boston, for instance, the sun will be 94% eclipsed; in Chicago, 77%; El Paso, 32%, and Los Angeles, 26%. If the weather is good, the July 20 eclipse will be one of the most extensively observed solar eclipses in several years, because the path of totality lies in or near many heavily populated regions.

From the standpoint of weather prospects, there are two likely favorable sections to be considered for seeing the total eclipse. Other areas are more apt to have general summer cloudiness.

One section is in Alaska. Parts of it can be reached by automobile from the Alaska Highway (Route 2), which runs from British Columbia to Fairbanks. The path of totality passes directly over the highway just at the Alaskan-Canadian border. Other likely viewing spots westward from this highway are Slana, Sourdough or Talkeetna.

Over the eastern part of Canada, the eclipse path will cross a rather densely populated area offering a large number of sites that are easy to reach. The chances of cloud cover, however, are fairly high.

Maine, on the other hand, has many easily accessible places with a high percentage of clear weather even in the late afternoon. Two good spots are Sebasticook Lake, near Newport, and Moss Pond, slightly north and west.

The total eclipse will be seen about 11 in the morning in Alaska. At Bar Harbor, it will begin at 4:44 p.m., EST, and last just less than a minute.

### WARNING!!

Never try to look at the sun, whether or not there is an eclipse, without protection for your eyes. Even when part of the sun is blotted out, you should look at the heavenly show through several layers of overexposed photographic film.

Every solar eclipse takes its tragic toll of vision. The delicate interior membranes of the eye cannot withstand even the partially eclipsed glare of the sun without special protection.

Sunglasses, and even welders' goggles, do not give adequate protection. Most "dark glasses" let 80% or more of the light through, and are totally inadequate for looking at the sun.

**ALWAYS PROTECT YOUR EYESIGHT.  
NEVER LOOK DIRECTLY AT THE SUN,  
MAKE CHILDREN DO THE SAME.**

For those in the eclipse path during the brief moments of totality, many things in the sun's transparent atmosphere, normally invisible to the unaided eye, become strikingly visible. The corona, the sun's giant pearly white halo, suddenly bursts forth in spectacular glory.

The shape and structure of the solar corona during an eclipse varies, depending on whether sunspots are at a high or low point in the 11-year cycle. At sunspot minimum, which is occurring about now, there are long streamers shooting out from the solar equator, and short plumes or tufts from the polar regions.

The sun, in total eclipse is expected to look about like it did in 1952 when the

cover photograph was taken by Naval Research Laboratory scientists on an expedition to Khartoum, Sudan.

An observer close enough to the totality path so that most of the sun is covered may see "shadow bands." A white background, such as a sheet spread on the ground, helps to make these shimmering waves of light and shade visible. The bands, one to two inches wide and five to six inches apart, are likely to be parallel to the visible edge of the sun. They will move slowly or rapidly.

When the partial eclipse is at its maximum, many images of the sun, in the form of a crescent, can be seen on the ground, wherever sunlight shines between the leaves of trees or through other small openings. That is because these openings act like small pinhole cameras, causing the shaded ground and walls to be dotted with a multitude of solar images, each in the form of a crescent like the partially eclipsed sun, but inverted.

## NEVER Look at Sun

It is safe to look at the shadow bands or at the crescents directly. However, it is NEVER SAFE to look directly at the sun. This is true not only when the sun is normal, but also when the sun is partially eclipsed.

Even the amateur photographer runs the danger of eye damage or blindness from a solar eclipse if he tries looking through the viewfinder of his camera.

The best advice for protecting all persons in a family watching the partial eclipse: hide the family binoculars, camera, field glasses and/or telescope. Better still, do your sun-gazing via newspaper, television or magazine coverage of the eclipse.

To learn as much as possible about the sun during the fleeting seconds when it is totally hidden by the moon, astronomers have traveled hundreds or thousands of miles. During totality, many of them are so busy tending to their instruments that they do not see the solar show.

The speeding shadow of a total eclipse offers an astronomical yardstick by which map-makers can measure distance on the earth's surface very accurately.

Because many of the once-urgent problems that could be studied only at eclipse time, such as verification of Einstein's predictions, have now been solved—either by previous eclipse expeditions, or by new or improved instruments—few astronomical eclipse expeditions are being planned.

Another reason for few expeditions is that the longest this total eclipse will last anywhere is only slightly more than a minute and a half, not long enough for many of the scientific observations usually made.

Many scientists, including those attending the American Astronomical Society meeting in Alaska, are planning to see the eclipse. Some will actually have their first chance to enjoy the breathtaking event of totality.

• Science News Letter, 84:10 July 6, 1963