

ASTRONOMY

Sun Eclipse Spectacle

Eclipse of the sun on Wednesday, June 30, will be visible as a partial dimming to millions of people in the U. S., Canada and Europe, weather permitting.

By ANN EWING

► PRACTICALLY EVERYONE in the United States east of the Rockies will be able to see a portion of the sun blotted out by the moon near sunrise on Wednesday, June 30. And 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 natural sights. Weather permitting, of course.

Sweeping out a huge arc as it touches the earth, the moon's deep shadow will race from Nebraska, where the total eclipse begins at sunrise, to India, where the eclipse ends at sunset. Zipping along at about 3,000 miles an hour, it will cover these thousands of miles in two and three-quarters hours. (Time difference between Nebraska and India is 11 and one-half hours, local time.)

In the U. S., the deep shadow swings over Nebraska, South Dakota, Iowa, Minnesota, Wisconsin and Michigan. The arc then proceeds over eastern Canada, Labrador, southern Greenland, Iceland, the Faeroes and Shetland Islands, southern Norway and Sweden, Russia, Iran, Afghanistan and Pakistan to its ending at sunset in northern India.

Will Be Widely Viewed

The June 30 event will be one of the most widely viewed eclipses of this century. Not until 2151 will there again be another total eclipse during which the path of totality spans both North America and Europe.

As a partial dimming of the sun's light, the eclipse will be visible over most of the land areas of the Northern Hemisphere, except for western North America and the eastern part of Asia. Although as far as is now known, there are no plans for live television shows of the total eclipse, at least two TV networks expect to show movies of the spectacle later in the day.

A total eclipse of the sun occurs when the moon comes between the earth and the sun, and the moon's shadow traces out a narrow path, never more than about 230 miles in width, on the earth's surface. Width of the June 30 eclipse path is less than 100 miles, and three and a half minutes is the longest it lasts at any one spot.

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.

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

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 equator, and short plumes or tufts from the polar regions.

Plans Made Long Ago

Plans mapped as long as two years ago will make the coming solar spectacle one of the most thoroughly observed in history. At least one astronomer from almost every observatory in the U. S. and Europe will be somewhere along the eclipse path. And

astronomers here "presume" that Soviet scientists will be carrying out their own studies.

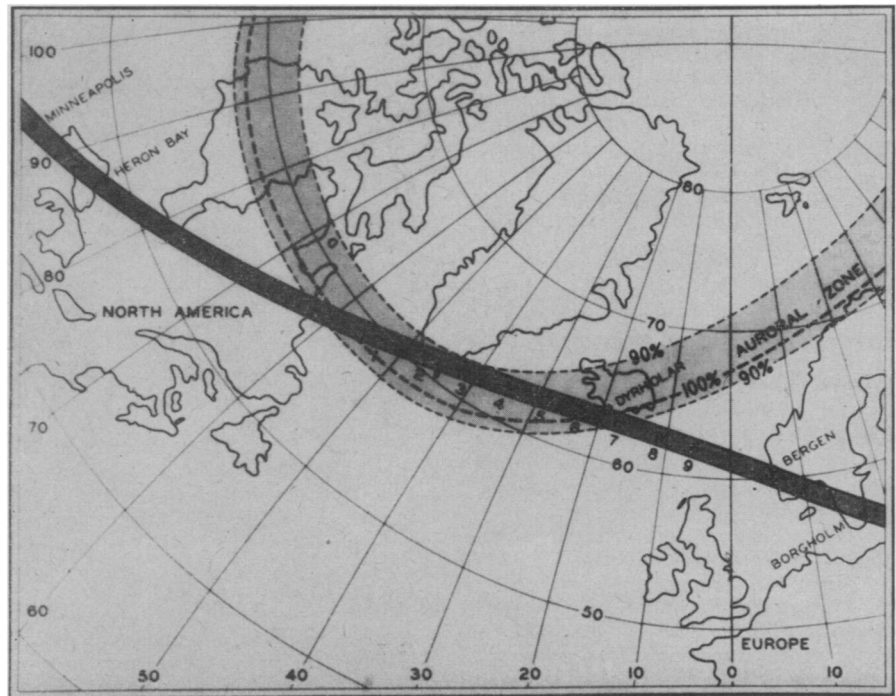
Two of the planned observations will be the first of their kind:

Scientists, flying in speedy Royal Air Force planes in the auroral zone where it is crossed by the eclipse path, will try to catch the first daytime glimpse of the northern lights. Being above the level of most clouds when the sun's bright light is suddenly shut off by the moon, they hope to confirm what is now only a suspicion: that the aurora is much brighter during the day than at night.

Check Shadow Band Speed

The shimmering curtains of the northern lights are thought to be caused by radiation and particles poured out by the sun, but sunlight is so brilliant that auroras have never been seen during the day, and have been spotted only infrequently at twilight.

For the California Academy of Sciences, Dr. Porter Butler and an associate will go to Sweden to check, with photoelectric equipment, the speed of the mysterious shadow bands. There are dark, ripple-like streaks that appear on every white surface



JUNE 30 ECLIPSE PATH—This map shows the path of totality for the June 30 eclipse and also the auroral zone, where the shimmering curtains of light are most frequently seen throughout the year. Where the two cross, scientists in airplanes will try to spot, for the first time, the northern lights during the day.

a few minutes before the moon's shadow engulfs an observer. Their cause is not known, and eye-witness descriptions are often conflicting. With two photoelectric eyes, set up 300 feet apart, the two scientists hope to get an accurate timing of the speed of these dark streaks and, perhaps, find out what causes the shadow bands.

The seemingly impossible task of searching for eclipse effects where the sun cannot be seen will be attempted by Drs. G. Van Biesbroeck, A. B. Meinel and Robert Weitbrecht of Yerkes Observatory, Williams Bay, Wis. Dr. F. E. Roach of the Naval Ordnance Test Station, Inyokern, Calif., is associated with the endeavor.

At a site along the path where the eclipse would be seen if the sun were above the horizon at that point, they will try to spot the faint zodiacal light. This observation must be attempted before the sun climbs into the sky, since even the relatively faint light of the corona, invisible except during an eclipse, is enough to block out the even fainter glow of the zodiacal light. The part of the zodiacal light that is visible as a faint beam in the west on a moonless night just after twilight is caused by sunlight reflected from meteoric material concentrated within the earth's orbit.

By looking at the horizon before the eclipsed sun rises, the three Yerkes astronomers hope to get the first good picture of the zodiacal light close to the sun.

Improve Distance Measurement

Other important observations to be made on June 30 will aim at giving a much more precise knowledge of actual distances between points in the United States and in Europe. Three different ways of finding long distances, especially across oceans, will be used. They are the Bonsdorff, Lindblad and Gaviola methods, named for the scientists who employed them for the first time. Each requires highly sensitive photographic and photoelectric equipment.

The Bonsdorff method directly photographs the crescents of the sun as the moon passes across it. The Lindblad method, also employing photography, shows the flash, or reversed spectrum, as the moon comes between the sun and the earth. The Gaviola method measures the decreasing light intensity as the moon shuts out the sun.

Because the speed of the moon's shadow

is known and its position can be precisely timed, distances can be computed accurately using these three methods.

Four major and eight minor eclipse observation posts are involved in the mapping program, all under the direction of the Air Force Cambridge Research Center. Co-operating groups include the American Geographical Society, New York; Georgetown University, Washington, D. C.; Ohio State University, Columbus, and the Ernst Norrman Laboratories, Williams Bay, Wis.

Path of the next total eclipse visible in the United States, on Oct. 2, 1959, will start in Gardner, Mass., and cross the Atlantic Ocean to the Sahara Desert. On March 7, 1970, a three-minute eclipse will be visible along part of the East Coast.

Always protect your eyesight. Never look directly at the sun. Even when part of the sun is blotted out, you should use several layers of overexposed photographic film or a piece of smoked glass. Sun glasses, and even welder's goggles, are inadequate protection.

Science News Letter, April 3, 1954

BIOCHEMISTRY

No Alcohol Smell On Drunk's Breath

➤ WHAT YOU smell on a drunk's breath is not alcohol. It is "mainly the highly aromatic substances used in various alcoholic beverages," two Yale University scientists declare.

Aromatic or alcoholic, if the intoxicated person wants to cut the smell, he may get some help from "properly formulated chlorophyll products," but police who use chemical tests measuring the alcohol content of blood and breath will still be able to spot the inebriate.

The Yale scientists, Leon A. Greenberg and David Lester, report these findings in the *Quarterly Journal of Studies on Alcohol*.

Science News Letter, April 3, 1954

BIOCHEMISTRY

Toad Venom Material Aids Heart Ease Studies

See Front Cover

➤ THE PHOTOGRAPH on the cover of this week's SCIENCE NEWS LETTER shows a toad, *Bufo marinus*, with its venom gland exuding toxic material that contains a potent vasoconstrictor, serotonin, and cardiotonic steroids, related to digitalis.

Both of these classes of compounds are under biochemical investigation in laboratories of the National Heart Institute of the National Institutes of Health, Bethesda, Md.

This toad allows the biochemist to study the formation of substances ordinarily formed in minute quantities, in a living factory producing relatively huge amounts of the material for the size of the animal.

Science News Letter, April 3, 1954

GENERAL SCIENCE

Modern Medicine Creates Problems in South Africa

➤ A PRIME example of social problems created by medical advances is South Africa, Dr. Raymond B. Cowles, professor of zoology at the University of California at Los Angeles, reports.

"With vaccination and modern drugs checking such killers as smallpox, cholera and malaria, the population is increasing at a more rapid rate than ever," he pointed out on his return from a seven-month study of the country. "As a result malnutrition and prolonged diseases such as tuberculosis are becoming more widespread.

"A more equitable distribution of the land, much of which is held by the small white population, would not be a long range solution," he said.

"It might alleviate the situation temporarily, but the birth rate of the Negro and Indian populations and lowered death rate would bring the situation right back where it is today in a few years.

"Birth control," he noted, "is the obvious solution, but there are so many factors working against such a program that it seems out of the question."

Science News Letter, April 3, 1954

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