

ASTRONOMY

Total Eclipse on June 30

Moon's shadow, rushing across earth's surface at 3,000 miles an hour on June 30, will be used to check the distances between special observing sites set up in totality path.

By ANN EWING

▶ WHEN THE moon's shadow of the total eclipse on June 30 rushes across the world, Russia included, its arrival will be clocked to aid in measuring distances more accurately than by any other method now in general use for mapping long distances.

The U. S. Air Force is financing eclipse expeditions of American astronomers to several major sites in the path of totality.

The rushing moon's shadow can be likened to an express train whose speed is known traveling past stations whose distances apart are unknown. These stations are sites of the Air Force's expedition parties, spanning the mainland of North America and Europe.

They stretch from James Bay, Ontario, to Iran, and include Knob Lake, Quebec; the Okak Islands off the coast of Labrador; Greenland; Iceland; the Faeroe and Shetland Islands; Koster Island and Lyckas, Sweden; and Bandar Shah, Iran.

Distance Measuring Method

Since the speed of the moon's shadow is known fairly accurately, if its arrival at these stations is precisely timed, the distance between the stations can be computed. Three methods will be used to get the exact timing:

1. In the Bonsdorff method, the crescents of the sun as the moon passes across it are directly photographed.
2. The Lindblad method also uses photography to show the flash, or reversed spectrum, caused by light from the sun's outer envelope, and visible only at the very beginning and end of a total eclipse.
3. The Gaviola method measures the decreasing light intensity as the moon shuts out the earth.

In addition to intercontinental distance measurements, many of the eclipse expeditions will make new and painstaking tests to determine whether light rays from certain stars are bent as the rays pass near the sun on their way to earth, as predicted by Einstein's general theory of relativity.

A total eclipse of the sun offers the only chance to make this test, as ordinarily the light of the stars in the same direction as the sun is drowned out by the sun's glare.

Dr. Edwin Finlay-Freundlich of St. Andrews University Observatory, Scotland, has recently found that this bending of light toward the sun is 30% higher than had been thought. He will go to Sweden for eclipse observations that should show whether this disagreement is real.

Practically everyone in the United States east of the Rockies will be able, weather permitting, to see at least a partial eclipse early in the morning on June 30. For those who are planning early summer trips, the rare and beautiful spectacle of the totally eclipsed sun is well worth driving a few hundred miles to the totality path to see.

A booklet on the eclipse, including a map showing the exact eclipse path, is available for 40 cents from the U. S. Naval Observatory in Washington, D. C.

Path of Totality

Sweeping along at 3,000 miles an hour, the moon's shadow will touch the earth first in northeastern Nebraska at sunrise. It then rushes northeastwardly, crossing southern South Dakota and the extreme northwestern corner of Iowa into Minnesota, northern Wisconsin and the upper Peninsula of Michigan.

Dr. E. M. Brooks of St. Louis University has predicted that the best spot in the U. S. for viewing the total eclipse is Minneapolis. From study of past Weather Bureau records, he found that the early morning sky is less often overcast there than elsewhere along the totality path in North America.

Nevertheless, the chance that the eclipse will be visible from Minneapolis is only about 50%, but it is even less than that at

other spots along the totality path on this side of the Atlantic Ocean.

No reliable weather forecast for June 30 will be available until just a few days before the date. There are as yet no known plans for a live television show of the eclipse, but at least two networks expect to present movies of the heavenly show later in the day.

Spans Two Continents

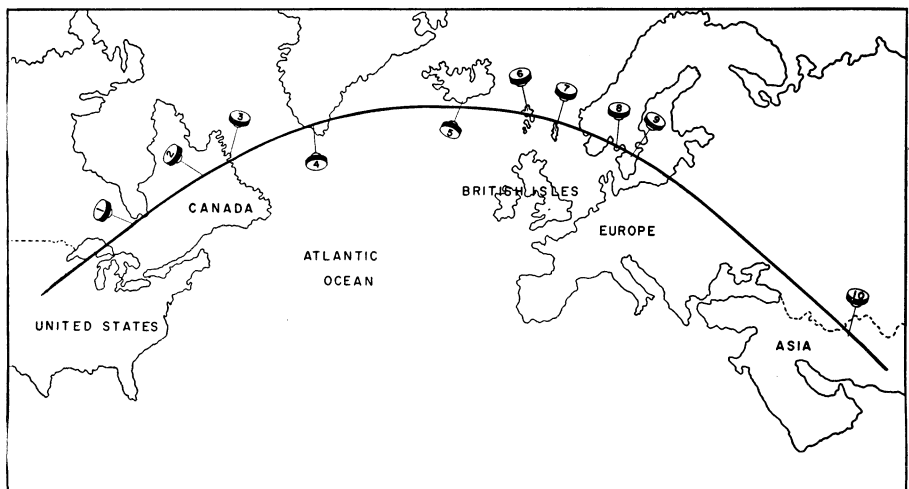
Many persons besides astronomers will be interested in a weather forecast, for the eclipse will be visible in the early morning as a partial dimming of the sun's light over most of the land areas of the Northern Hemisphere, except for western North America and the eastern part of Asia. Not until 2151 will there again be another total eclipse whose path spans both North America and Europe.

The path of totality of this eclipse, from its first contact with the earth at sunrise in Nebraska to its last contact at sunset in India, unlike the greater number of total solar eclipses, passes over more land than water.

Weather permitting, more people will view this eclipse than any previous one: Nearly one-third of the world's population will see at least a part of the sun blacked out, and about 2,000,000 live in the totality path.

The closer a person is to the path of totality, the greater is the part of the sun that will be covered by the moon.

For a table listing the times of the partial eclipse for a few typical places in the United



ECLIPSE OBSERVATION SITES—Major sites for observing the June 30 total solar eclipse under Air Force sponsorship are shown on this map. The black line indicates the path of totality, about 80 miles wide, inside which scientists will make the most comprehensive eclipse study in history. The partial eclipse will cover most of the U. S., Canada, all of Europe and much of Asia.

States, and the percentage of the sun's diameter that the moon will cover, see SNL, May 22, p. 330.

Besides the Air Force sites, other expeditions will use the very short period of totality to make observations that have been in the planning stage for two years or more:

In the U. S., an expedition sponsored by the National Geographic Society will explore the mysteries of the zodiacal light while the sun is in total eclipse below the horizon. Using photoelectric scanners, scientists will try, for the first time, to spot the wedge-shaped finger of light that is seen rising vertically from the horizon at twilight and dawn. It is believed to be caused by sunlight reflected from meteoric material concentrated within the earth's orbit. This expedition to Nebraska and Colorado sites will be headed by Dr. George Van Biesbroeck of Yerkes Observatory, Williams Bay, Wis.

The path of totality, after leaving North American shores over Labrador, crosses Greenland, Iceland, the Faeroes and Shetland Islands, southern Norway and Sweden, Russia, Iran, Afghanistan and Pakistan to its ending at sunset in northern India.

In Sweden, under the auspices of the California Academy of Sciences, C. P. Butler and Leon E. Salanave will try to learn more about the mysterious shadow bands that ripple across all light-colored surfaces on the ground as the moon's shadow approaches.

Cause of the shadow bands is not known, but the two scientists hope to check the bands' speed with two photoelectric eyes set up 300 feet apart.

Also set up in Sweden, at Oskarshamn on the east coast, will be radio telescopes as

well as optical instruments of the Naval Research Laboratory in Washington. Rain or cloudy weather will not interfere with the radio observations, under the direction of Dr. John P. Hagen, which will be aimed at studying the effects of the sun's outer envelope on the sun's radio radiations.

From the North American coast to Iceland, the totality path crosses the auroral zone. Taking advantage of this unusual occurrence, scientists in Royal Air Force planes will try, for the first time, to spot the aurora during the daytime. They will fly above any clouds, and hope to confirm that northern lights, usually hidden by the sun, not only shine during the day, but are brighter during the day than at night.

Don't Look at Sun Without Eye Protection

Do not, at any time, try to look at the sun without protection for your eyes. Even during a partial eclipse, the sun's glare is still brilliant enough to injure the delicate eye membranes.

Use several layers of overexposed photographic film or a piece of very densely smoked glass when looking at the sun, whether or not there is an eclipse.

Because of widespread public interest, every solar eclipse takes its tragic toll of vision. Sunglasses, and even welder's 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.

Science News Letter, June 19, 1954

NUTRITION

World Food Supply

► THE WORLD food supply could be easily doubled through modern engineering and agricultural technology, Lord Boyd-Orr, Nobel prize winner and famed British food authority, declared in a report to the Nutrition Foundation.

The doubling of the food supply will be needed within the next 25 years if the anticipated increased numbers of people in the world are to be fed enough food of good enough quality to maintain full health and vigor.

How this might be done and what it would mean are described by Lord Boyd-Orr as follows:

"Soil erosion which is believed to have destroyed or damaged about half of the original fertile areas of the earth would need to be halted by vast forestation projects on every continent and the destructive force of river floods converted by projects like the T.V.A. to hydro-electric power and irrigation. Deserts once fertile would need to be reconditioned.

"These projects, some of which are already being carried out in different parts

of the world, together with the need for millions of tractors and other agricultural equipment to modernize primitive agriculture, and the setting up of the necessary secondary industries for the maintenance of equipment and road and rail means of transport for food, would demand enormous quantities of industrial products.

"Then, as agricultural products increased, the enhanced purchasing power of the 60% of the families in the world engaged in agriculture would provide an expanding market for consumer goods.

"Thus a world food plan, based on human needs, would provide a greatly increased world market for industrial products. As the creation of wealth, in this case beginning with food, is a cumulative process, it would contribute to the rapidly expanding world economy which is needed to balance the growing industrial potential and also to take up the slack as rearmaments slow down, and so keep the wheels of industry turning with full employment and economic prosperity."

Science News Letter, June 19, 1954

Eight New Items

PHOTOGRAPHIC FILTERS

50,000 solid glass filters, each one worth at least 75¢. Bag of 10 assorted colors and sizes, as they come. Special Bargain only \$1.00 plus 10¢ P.P. per bag. Buy several.

ALCOHOL LAMPS

12,500 Glass alcohol lamps 1-oz. with metal cap and cotton wick. Gives heat at the point you need it. Worth several times the price we ask. Always useful.

25¢ plus 10¢ P.P. each

6 for \$1.25 plus 20¢ P.P.

12 for \$2.40 plus 30¢ P.P.

RECTANGULAR MAGNIFIERS 2" x 4"

Greatest unmounted lens bargain ever in America. 10,000 slightly imperfect 2"x4" rectangular magnifiers—not Japanese, made in U.S.A. Worth 5 times what we ask for them. Easy to give them to your family and friends.

Priced @ 25¢ plus 10¢ P.P. each

6 for \$1.35 plus 30¢ P.P.

12 for \$2.40 plus 60¢ P.P.

BRUSH-OFF GOGGLES

Keep brush, twigs, leaves, brambles and sticks AWAY from the eyes during hikes and walks in woods and countryside. Very well made with wire screening and cotton strapping originally for the U.S. Dept. of Forestry from which these are SURPLUS. Worth 3 times our price wholesale.

Only 25¢ per pair postpaid.

BINO-TACH

Attaches ANY make or power of Prism binoculars to any photographic tripod or Panhead. On and off in seconds. Reduces fatigue and improves seeing by 100% because of steadiness. Worth twice our asking price in usefulness.

Only \$6.60 each, P.P.

PRECIOUS STONES

30 Genuine Gemstones "in the rough" including Agate, Ruby, Sapphire, Turquoise, etc. These beautiful gems come in a book 5 1/2" x 4". Neat, valuable gems suitable as ring stones when polished. A German import giving gem localities of this collection as well as the hardness in Moh's scale, Specific Gravity, Mean Refractive Index, Crystal system, and Formula for each Gem stone. A beautiful piece of work makes a wonderful gift for yourself or teachers, collectors, jewelers, gem experts or students. Worth twice our low price of only \$3.00 each postpaid.

SAFETY SUN FILTERS

The SAFE AND SANE way to look at the sun—use our Special Safety Sun Filters. Each one is 50 mm. (2") diameter and 2 mm. (1/16") thick; polished flat on both sides. (1/16") This Special Safety Sun Filter can be used in any of the following three ways:

1. View the sun directly by looking through filter with unaided eyes.
2. Place filter at the eyepoint of the ocular and observe with any power after limiting the objective (with a diaphragm) to less than 2".
3. Use filter as a limiting diaphragm in front of the objective of the telescope.

For Winter sunlight use #WF12

For Summer sunlight use #SF14

Only \$2.00 each or \$3.00 per set of 2 (containing one of each of above).

TELESCOPE PLANS

Complete detailed plans and specifications to make the four wonderful Newtonian telescopes first described by Mr. J. V. Lawrence in the June, 1953, issue of "Sky and Telescope." Blue-prints, diagrams, work sheets, bill of materials, photographs of finished parts are included. Every needed help to make each size of telescope you may choose—3" or 4" or 5" or 6"—is in this one booklet.

Only 50¢ Postpaid

Include Postage—Remit with Order

No open accounts—No C.O.D.

Send 30¢ for "Know-How" Catalog

HARRY ROSS

TELESCOPES MICROSCOPES

Scientific and Laboratory Apparatus

70 West Broadway, Dept. NL-60

New York 7, N. Y.