

ASTRONOMY

June Brings Eclipse

Magnificent Spectacle Will Take Astronomers To Siberia; At Home You May See Brilliant Jupiter

By JAMES STOKLEY

THE most important astronomical event in June that can be predicted is the total solar eclipse on June 19, but this will not be seen at all from the United States. Northwestern Canada and Alaska will see it, but only as a partial eclipse. At 10:50 p. m., Eastern Standard Time, on June 18, or 3:50 a. m. on the 19th, Central European Time, the tip of the moon's shadow will touch the earth in the Mediterranean Sea, south of Italy. Then it travels over Greece, including the city of Athens; Turkey; the Black Sea; the Crimea; Siberia, north of the Caspian Sea, through the cities of Omsk, Kainsk, Tomsk, Kansk, Bratsk and Khabarovsk; Japan, including the cities of Koito and Nemuro; and then out in the Pacific Ocean, where it leaves the earth at 1:50 a. m., Eastern Standard Time, at which point the sun will then be setting. (See SNL, April 11, for map.)

Near the Siberian city of Bratsk, the shadow will pass at local noon, so there the sun will be highest and the eclipse seen to best advantage. Here the shadow will take 2 minutes and 32 seconds to go past, and during that period the sun will be completely covered by the moon; in other words, the eclipse will be total. At Athens, the sun will have just risen when the total eclipse occurs, and it will last a much shorter time. Furthermore, the sun being so low in the sky, observations may be hampered by early morning clouds. At Krasnodar, on the northern shore of the Black Sea, the total phase will last about a minute and a half. In northern Japan, the duration will be about 2 minutes and the sun will be high enough to make good observations possible, provided weather permits.

Weather a Gamble

After all, it is weather that makes any eclipse expedition a gamble. And while weather statistics for various places over periods of many years may indicate the probability of a clear sky at the crucial moment, they do not permit a definite prediction. Consequently, the astronomers have very wisely scattered

themselves, with the idea that if one expedition is hampered by clouds, others will have better luck.

The wisdom of a similar policy was shown at the last eclipse seen in the United States, that of August 31, 1932. Then the shadow of the moon crossed Canada and New England. Past weather records indicated that there was a little better chance for good weather inland than near the coast, but the afternoon turned out otherwise. With the parties so scattered from the Maine coast to the province of Quebec, about half of them were successful, and a good series of observations was obtained.

U. S. Sends 2 Parties

Two American universities have sent expeditions to Siberia, one from Harvard, the other from Georgetown, the latter in collaboration with the National Geographic Society. Many other groups, from English, German, Russian and Japanese observatories, will also be ready to make the important observations possible only when the moon comes completely in front of the sun.

These chiefly concern the corona, the sun's outermost layer. Although present at all times, the corona is only about

a half-millionth as bright as the sun's disk, and is ordinarily hidden by the overpowering glare. But when this is cut off, the corona shines with a pearly glow around the black disk of the moon.

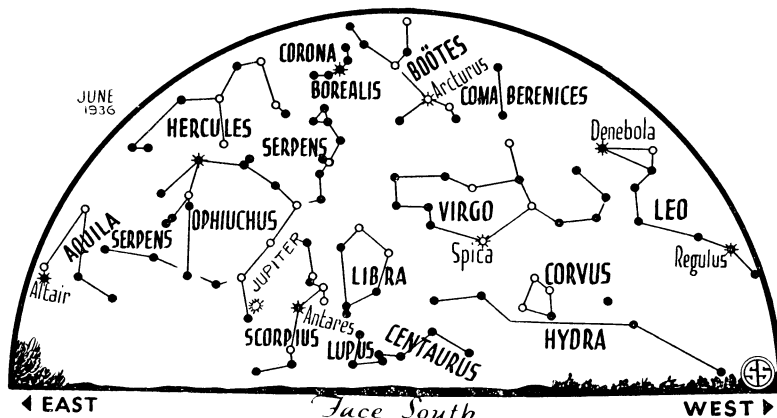
In the last few years, experiments have been made to record the corona without an eclipse, but while these may eventually be successful, they have not been perfected sufficiently so far to make the eclipse observations unnecessary.

Every Year and Half

About every year and a half, there is a total eclipse visible from some part of the earth, and not all of these are suitable for observation. An eclipse can last more than 7 minutes, but one of even 5 minutes is rare, and 2 or 3 minutes is more common. Therefore, if an astronomer were to observe all the eclipses possible during his lifetime, he would see the corona for possibly half an hour. This makes it essential to take advantage of every opportunity. New, extremely sensitive photographic plates will be used at this eclipse to record faint details of the corona, while others will record it in full color.

There are many other observations that are made by eclipse expeditions. Many of these are with the spectroscope, which analyzes the sun's light. Just at the moment the moon's disk fully covers the sun, the latter's atmosphere

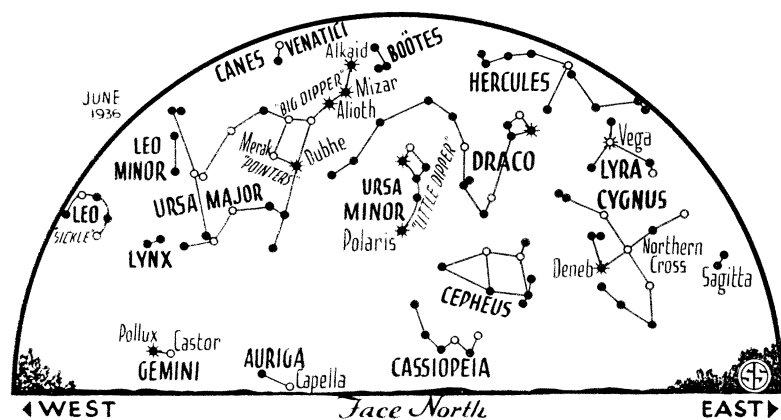
☼ * ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS



BRIGHTER THAN ANY STAR

The planet Jupiter is easily located in the southeast. On June 15 it will be only 397,981,000 miles away, shining with a splendor exceeded only by Venus, the moon and the sun.





HANDLE UP AND HANDLE DOWN

Hanging "right side up" is the familiar Great Dipper. The other side up is the Little Dipper with important pole star, Polaris, marking the end of the handle.

shines for an instant unmixed with the light from the disk. Ordinarily the sun's spectrum consists of a band of colors, crossed by numerous dark lines, but the "flash spectrum," which appears at such a moment, is made up only of bright lines. Its study gives astronomers much information about the distribution of the gases in the solar atmosphere. The Harvard University expedition will be mainly concerned with such researches.

Measures of the transmission of radio waves through the moon's shadow, of the temperature changes, of the radiation of the eclipsed sun are also often made by such parties.

Magnificent Sight

Quite aside from its scientific importance, however, an eclipse of the sun is truly a magnificent spectacle, and this will be most impressive to the thousands of spectators, Russian, Japanese and foreign, who will undoubtedly line the path of totality. They will see the moon gradually cover the sun. Just as the eclipse is about to become total, the Baily's beads will appear, a series of points of light caused by the light from the sun's edge shining through valleys on the moon. Then the corona will flash out, and possibly a few prominences will be seen, flame-like clouds of hydrogen that rise sometimes to hundreds of thousands of miles above the solar surface. If the prominences appear, they will be the brightest objects visible. Venus, Mercury and Mars will be seen, all to the west of the sun. With totality over, the Baily's beads reappear, but on the opposite edge of the moon, the corona and prominences disappear, and a narrow crescent of the sun's disk comes into view, which enlarges until the entire sun is shining again.

The moon this month will be new on the 19th, since an eclipse of the sun must always occur when the moon is at this phase. Full moon will come on the 5th, last quarter on the 12th and first quarter on the 26th. This means moonlit evenings during the first and last weeks of June. The moon will be closest the earth on June 15, at a distance of 227,650 miles, while it will be at its greatest distance on the 27th, 251,200 miles away.

Still another interesting event will come on Sunday, June 21, at 9:22 a. m., Eastern Standard Time. Then the sun will be at its farthest north in the sky, and at this moment summer will start.

With Sirius gone from the evening sky, Vega is now the brightest star to be seen. It marks the constellation of Lyra, and appears in the east at the times for which the accompanying maps are drawn (10:00 p. m., standard time, on June 1, 9:00 p. m. on the 15th, and 8:00 p. m.—before it is dark—on the 30th). Just below Vega is part of Cygnus, the swan, otherwise known as the northern cross. The cross now rests on one side, the top, the star Deneb to the north. A little lower, and directly east, is Aquila, the eagle, with Altair.

Brightest Object

Most brilliant of the objects seen in the evening during June is the planet Jupiter, to the southeast, where its great brilliance leaves no doubt as to its identity. This month it is of the minus 2.2 magnitude, brighter than any star, and is only 397,981,000 miles away on the 15th. Only Venus, the moon and the sun exceed its splendor. To the right of Jupiter is the constellation of Scorpius, the scorpion. The heart is marked by the red star Antares. Higher, and farther

to the right, is Virgo, the virgin, with Spica; above this is Boötes, with Arcturus.

Hanging handle upwards northwest of the zenith, is the Great Dipper, most familiar part of Ursa Major, the great bear. The pointers, the two stars at the bowl farthest from the handle, indicate the direction of Polaris, the pole star, directly north. Polaris is at the end of the little dipper's handle, which is pointed downward.

To the west is the constellation of Leo, the lion, the lower part of which is called the sickle, because of its shape. The first magnitude star Regulus is at the end of the handle. Low in the northwest there are two bright stars, Castor and Pollux, all that now remains visible of Gemini, the twins, while still farther north is Capella, in Auriga, the charioteer, another conspicuous group during winter evenings, but now scarcely visible.

During June, Mars and Venus are so close to the sun that they cannot be seen either in the morning or the evening. About four hours before sunrise, however, Saturn appears in the east as a "morning star." About June 25, Mercury, then at its greatest distance west of the sun, will join it as a herald of the new day, but it will not come up until dawn has already begun.

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ANTHROPOLOGY

To Hunt Oldest Americans At Doorstep of Continent

A HUNT for the most ancient human beings in America will be conducted this summer, by an expedition to the northwestern doorstep of the continent, where the first immigrants presumably entered.

Led by Henry B. Collins, Jr., of the Smithsonian Institution, the expedition sponsored jointly by the National Geographic Society and the Smithsonian is en route to the westernmost point of North America, Cape Prince of Wales, Alaska. This is the most likely place where ancient men would have crossed from Asia, only 55 miles away via Bering Strait.

Previous Alaskan expeditions by Mr. Collins and other archaeologists have pushed Eskimo pre-history back to about 1000 B.C. The expedition has hope of finding skeletal remains or discarded weapons of still earlier people who must have passed this "port of entry" region at the dawn of American habitation.

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