

ASTRONOMY

# Good Eclipse Year

## Four Due in 1938, Two of Sun and Two of the Moon, The Latter Total and Visible in United States

By JAMES STOKLEY

**T**HE new year is rather well provided in the matter of eclipses, for four occur, two of the moon and two of the sun. Both lunar eclipses are total, and both are visible, partly at least, in the United States. One of the solar eclipses is total, the other partial, but neither will be seen from this country.

The first is during the night of May 13, that is, in the early morning of the 14th. At that time the moon will be obscured when it enters the shadow of the earth. All the United States will see the beginning, but the moon will have set in the eastern half before the final stages are reached. However, it will still be above the horizon for the western section, and the people in this region will see the end as well. This will be the first total eclipse of the moon easily visible in this country since July, 1935, and it will be well observed.

### Earth Causes Red Color

An eclipse of the moon is rather striking. Even though it is not of very great scientific importance, it is impressive to see the moon gradually covered by the curved terrestrial shadow, according to schedule. The red color which the moon assumes during an eclipse, due to sunlight reddened in passing through the atmosphere of the earth, is quite startling, and one can imagine the effect that it had upon the mind of primitive man.

November brings the second eclipse visible here, again total, and of the moon. This time the end of the eclipse will be seen in all parts of the United States except the extreme west. In Europe the whole eclipse will be visible.

Though persons in the east of the country will not see the whole eclipse, they will have one very strange experience, that of seeing the totally eclipsed moon and the sun in the sky at once. That is, the total eclipse commences before the moon rises, and moonrise occurs several minutes before sunset!

At first glance this seems to be impossible. In order for the moon to be in the earth's shadow, the three bodies, earth, moon and sun, must be in line.

Therefore, one might well suppose, the moon could not come up until the sun was going down. However, the atmosphere of the earth produces an effect known as refraction. This bends light rays, as in a prism, and makes an object appear a little higher in the sky than it actually is.

The effect is greatest near the horizon, where the light passes through the greatest depth of air. On the horizon the moon is raised its own diameter, and the sun is also, so that the two can be seen above the horizon though one is actually below.

### Eclipse Over Ocean

The total eclipse of the sun, on May 29, will not be visible in any part of North America. Then the moon's shadow will pass across the south Atlantic Ocean, over the South Orkney, the South Georgia and the Sandwich Islands. In the best part of this path, which is in the ocean, the sun will be hidden for 4.3 minutes, which is quite long. However, the sun will then be very low in the sky, the region of visibility is not very accessible, and the chances of bad weather are considerable, so the eclipse will not attract many expeditions from other parts of the world. Perhaps some of the South African astronomers, who are nearest, may be able to make a trip and take advantage of

good conditions, if they should happen to prevail.

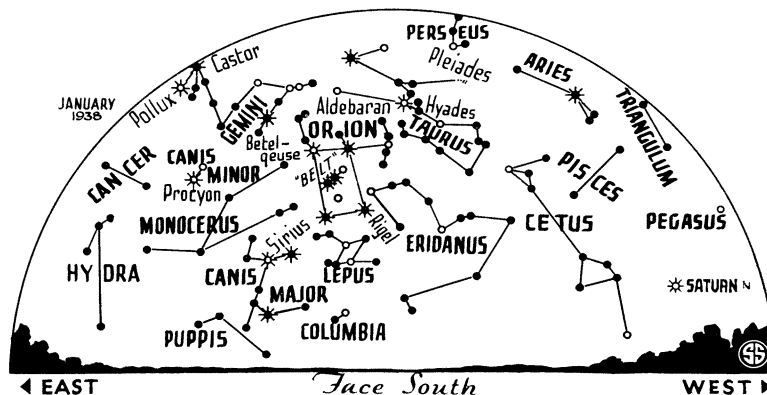
This eclipse is of interest, however, in being the first total one in a series that will have others that are remarkably favorable. An eclipse of the sun repeats itself after a period of 18 years, 10 or 11 days, called a Saros. When this one occurred last, on May 17, 1920, it was only partial and the dark part of the moon's shadow failed to reach the earth. Then it was visible as a partial eclipse in the Indian Ocean, southwest of Australia.

### Good Eclipse in 1956

When it comes again, June 8, 1956, it will again be total, the path will cross the Pacific Ocean, farther north than this year, and the duration will be even longer. Thus it will build up, until finally it will last almost as long as the record breaking eclipse of last June 8.

The year's last eclipse is a partial one of the sun, on November 21, visible over a larger section of the northern Pacific Ocean, the west coast of North America and the east coast of Asia.

Both the summers of 1936 and 1937 were favored with naked-eye comets. There is no way of telling whether 1938 will be as fortunate, though there is the possibility that one may come, unheralded, that will rival in brilliance the famous comets of the past. Of the periodic comets whose return is expected this year, the list is very meager. Gale's comet, which was found by an Aus-



*Saturn alone is still visible late enough to appear on the evening sky maps.*

tralian astronomer in 1927, will make its first return since then and may become bright enough to be seen with binoculars. It should turn up during the first part of the year in the general direction of the constellation of the scorpion. As this is best seen from the southern hemisphere, Mr. Gale, or some of his countrymen, may again pick it up first.

Another comet due back, but which will probably not be seen, is Schorr's, found in 1918 by a German astronomer. It has supposedly returned twice since then but has been observed on neither occasion. The return of Kopff's comet, which happens every 6.56 years, is also expected, but this is not a favorable one. However, it has been seen four times already, its orbit is well determined, and its recovery is not important.

### The Planetary Program

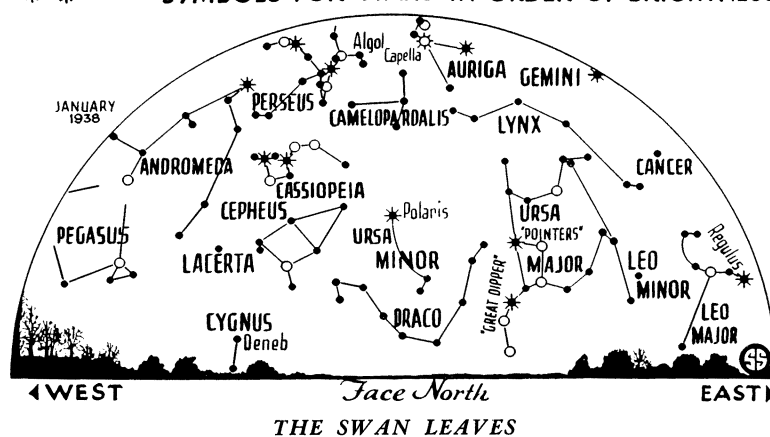
As for the planetary program in 1938, Mercury will be seen in the evening sky about July 30 and November 25. Venus will begin to appear in the evening sky about March, and will be farthest east of the sun, and visible longest into the night, September 11. On October 16 it will be at greatest brilliance, then it will quickly approach the sun, and by early November will be out of sight. Jupiter will appear as a morning star, before sunrise, during the spring and early summer, after which it will be seen during evening hours, in the constellation of Aquarius. It is gradually approaching Saturn, which is a little farther east, in the constellation of Pisces. Saturn will be visible in the evening sky at the beginning of the year. In the summer it will appear as a morning star, while in the autumn it will appear in the evening again.

### Jupiter in Line With Sun

January brings to a close the appearance in the evening skies of the three planets that were so prominent only a few months ago. Jupiter is almost in line with the sun, and cannot be seen either morning or evening. Mars is still visible low in the west soon after sunset, but is so near the horizon that it does not show on the maps. Saturn appears a little higher, and is the only one indicated.

These maps reveal the aspect of the skies at 10:00 p. m., January 1, 9:00 p. m. on the 15th and 8:00 p. m. on the 31st. Even the early morning skies are devoid of their planetary decorations, for Venus, which has been the brilliant morning star, is also coming into line with the sun and is no longer visible. For a day or two, about January 20,

### ☼ \* ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS



*Deneb, low in the northwest, is all that remain visible of the constellation Cygnus. But the glorious constellations of winter evenings are now shining high above.*

however, Mercury will be seen in the east in the morning twilight.

But despite the poor showing of the planets, this month does reveal the glorious constellations of a winter evening. Orion is high in the south, the three stars in a row representing the belt of this great warrior. Betelgeuse, above, is one of his shoulders, and Rigel, below, one of his legs. Below, and to the left, is Sirius, most brilliant star in the night-time sky, and one of the closest. This is the so-called "dog-star," part of Canis Major, the great dog. A little higher, and farther east, is Procyon, in Canis Minor, the lesser dog. Still higher are the twins, Castor and Pollux, of the constellation of Gemini. Pollux is slightly brighter than his brother.

### Creamy-White Capella

Directly overhead is creamy-white Capella, in Auriga, the charioteer. As we follow around still farther, we find high in the south, to the right of Orion, the group of Taurus, the bull. Aldebaran, a star that is distinctly red in color, forms an eye of the animal. This is in a V-shaped group of stars, the Hyades, which outline the face. Farther over, in the shoulder, is a little cluster of stars, six of which can be seen with the normal eye, called the Pleiades, the "seven sisters" of mythology.

To the northeast, the great dipper, part of Ursa Major, the great bear, is swinging around into a higher position than it held during the late autumn, and the handle points downwards. The top two stars are the pointers, which show the direction of the pole star, Polaris, to the left. On the opposite side of Polaris is the figure of Cassiopeia, shaped like a W on its side.

Just north of the east point, the

"sickle," in Leo, the Lion, with brilliant Regulus at the end of the handle, is making an appearance. Very low in the northwest, where it is rather difficult to find, is Deneb, another first magnitude star, all that now remains visible of Cygnus, the swan.

The moon is nearest the earth on January 14, 9:00 p. m., 222,850 miles; farthest January 27, 1:00 p. m., 252,200 miles.

### Phases of the Moon

		E.S.T.
New	Jan. 1	1:58 p.m.
First Quarter	Jan. 9	9:13 a.m.
Full	Jan. 16	12:53 a.m.
Last Quarter	Jan. 23	3:09 a.m.
New	Jan. 31	8:35 a.m.

*Science News Letter, January 1, 1938*

### GEOLOGY

## Expedition To Seek Age Of the Panama Isthmus

**S**EEKING the birthdate of the Isthmus of Panama, which may have been as much as 20,000,000 years ago, two University of Chicago geologists, Drs. Paul C. Miller and Paul O. McGrew, are enroute to the province of Gracias, Honduras, where they hope to unearth the desired evidence.

Digging in the tertiary strata of the isthmus, these two geologists, who will later be joined by Everett C. Olsen, a student of fossils, hope to determine just when South American animals were able to walk to North America. Once, before the isthmus existed, this was not possible. If the fossil remains of South American animals can be found and dated in Honduras, the birthdate of the isthmus can be determined.

*Science News Letter, January 1, 1938*