

ASTRONOMY

# 1936 Brings Important Eclipse

## Astronomers Now Planning Journey to Siberia or Japan for Total Eclipse of the Sun in June

By JAMES STOKLEY

IN JANUARY most people make some sort of preliminary plans for their activities during the rest of the year, and astronomers are no exception. Just now some of them are making their preparations for a trip half way around the world, in June, to observe the first total eclipse of the sun since 1932 to be visible from an easily accessible part of the earth. In the summer of that year one was seen from Canada and New England. The following year there was another, of which the path crossed some small islands in the Pacific Ocean, and observations of it were made by a Japanese expedition. Though 1935 had the greatest number of eclipses ever visible in one year, none that occurred of the sun were total.

But on June 19, the tip of the moon's shadow will touch the earth in the Mediterranean Sea, about 250 miles south of Sicily, just as the sun is rising. Then the shadow, about a hundred miles in diameter, will sweep across Athens and some other parts of Greece, Turkey, the Black Sea, Siberia, including the cities of Omsk, Kainsk, Tomsk, Kansk, Bratsk and Khabarovsk; northern Japan, through Koito and Nemuro; then out into the Pacific Ocean. Just as it reaches the international date line, the meridian of 180 degrees longitude, the shadow leaves the earth, as the sun is setting. The beginning will be at 10:50 p. m., Eastern Standard Time, June 18, and the end at 1:50 a. m., which indicates the speed at which the shadow travels to cover so much territory.

### Europe to See Partial

Only along the narrow strip crossed by the shadow will the dark disk of the moon totally obscure the sun, but a partial eclipse will be visible over a much larger area—practically all of Europe and Asia, northern Africa and Alaska, northern Canada and Greenland, as well as the north polar regions. But the partial eclipse is of little scientific value, so the astronomers will travel to points along the path of totality, particularly in central Siberia and Japan, where the

corona, the sun's outermost layer, will appear for the longest time. At Bratsk the total phase will last 2 minutes and 32 seconds, while in Japan it will last 1 minute and 57 seconds, a little more than the New England Eclipse of 1932. Probably Japan will be the most popular observing point, because of its advantage in accessibility, but the extra time in Siberia will be a strong attraction. As the cities from which it will be seen are near the line of the Trans-Siberian Railroad, they can be reached by conventional means of transportation. Their latitude is about the same as that of England, so the chances of satisfactory weather are fairly good.

### Three Others

The other three eclipses of 1936 will not attract very much attention. On January 8, the moon will be eclipsed, when it enters the shadow of the earth, but this will not be visible from the United States. Practically the whole eastern hemisphere, and Alaska, will witness it, however. The total phase will start at 12:58 p. m., Eastern Standard Time, and end at 1:21 p. m., so it will be over before the moon rises in America. An eclipse of the sun always occurs when the moon is new, and eclipse of the moon itself when it is full, and the full

moon always rises at sunset and sets at sunrise.

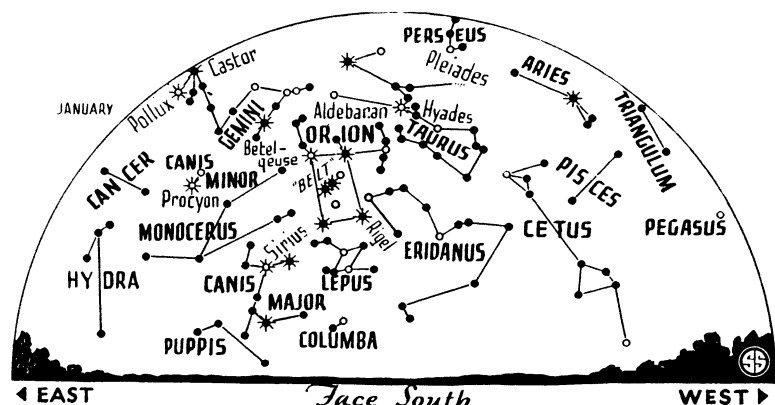
Another eclipse of the moon will be seen, over the south polar regions, most of the southern hemisphere, and parts of Europe and Asia, on July 4, but this will only be a partial one, as the moon will only advance about a quarter of its diameter into the earth's shadow.

The fourth eclipse will come on December 13, and will be annular. That is, the moon will then be farther away than its average distance, and its disk will not fully cover the sun. The ring of sunlight, which will remain visible, even when the eclipse is at its height, is called the annulus, hence the name for such an eclipse. This will be an interesting spectacle, but of little scientific interest, because even though most of the sun will be covered, the ring remaining will hide all the effects that make a total eclipse of interest. Along a path crossing Australia and New Zealand, including the city of Auckland, the annulus will appear. People over a larger area, including the southern part of the Philippine Commonwealth, will see the sun in partial eclipse.

### Sun Now Closest

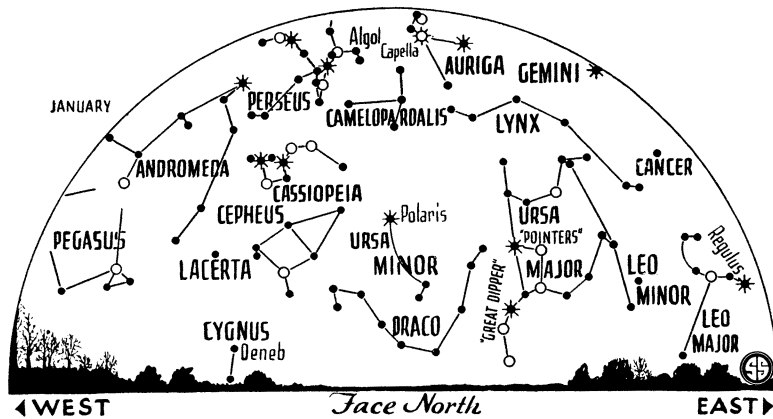
Even though January is a cold month, the sun is now closest to the earth. On January 4 we will be in perihelion, which merely means "nearest the sun." At that time 91,312,000 miles will separate us. Aphelion, when we are farthest, will come on July 3, with the sun

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



### BRIGHTEST STAR IN THE SKY

Sirius, the dog star, excels all others but the sun because it is very close to the earth. It may be seen in the southern sky below and to the left of Orion's familiar bright belt.



### NO COMPETITION

The bright stars of winter shine this month without having their splendor dimmed by the light of the planets.

at a distance of 94,424,000 miles. At first glance, one might think that we should have warm weather when the sun is closest, but there are other factors that much more than compensate for this change. Because the earth's axis is inclined, at about 23 degrees, to the plane in which it revolves around the sun, the northern half of the earth leans away from it in winter and towards it in summer. This in turn affects the sun's height, as we all know it comes near to the zenith at noon in June, but now its noon-day height is less than a third of a right angle. Thus, its rays of heat are spread over a much larger area than when they fall directly downwards, and the heating effect is much less. In the southern hemisphere conditions are reversed, of course, for when the sun is low for us it is high for them. Consequently the people in Australia and South Africa are now enjoying mid-summer.

### No Planets

The glorious stars of the winter sky shine in their full splendor this month, without competition from the planets, none of which can be seen during most of the evening hours. As soon as darkness falls, Mars and Saturn can be seen low in the southwest, but both are faint, and they set soon after the sun. On January 16, Mercury is at its greatest distance to the east of the sun, when it sets latest, then it may be glimpsed in the western twilight. Venus and Jupiter are close together in the constellation of the Scorpion, which rises about 4:30 a. m.

At ten o'clock on the first, nine on the fifteenth and eight on the thirty-first, the times for which the accompanying maps show the skies, Orion is the most conspicuous constellation, high in the

south. It is easy to recognize because of the three stars in a row that form the belt of this heavenly warrior. The two stars north of the belt, Betelgeuse and Bellatrix, form his shoulders, while to the south are two others, Rigel, the brighter, the Saiph, the fainter, which mark his legs. A curved row of stars to the west of Bellatrix represents one of the giant's arms over which is thrown a lion skin, and the stars just above Betelgeuse are supposed to outline the other arm, in which he is brandishing a club. And well might he need this defense, for next to him, to the right, is Taurus, the bull, charging towards him.

### Horns and All

The red star, Aldebaran, is the bull's eye, and the Hyades, the V-shaped group of which it is part, outline his face, while the two stars just above Orion are the tips of his horns, as shown on the old star maps. In the shoulders of the bull are the Pleiades, the "seven sisters" of mythology, though most people can only see six stars there with the naked eye.

The part of the sky in and near Orion contains more bright stars than in any other similar area, which is the reason that the evening skies of winter seem so much more brilliant than those of summer. Below and to the left of the warrior is the brightest star in the sky (except, of course, for the sun) Sirius, the dog star, part of Canis Major, the greater dog. This star is bright, not because of great intrinsic brilliance, but because it is very close. In fact, from northern countries no closer star can be seen, except with the aid of a telescope. But so far are even the nearest stars that the light of Sirius, travelling at the speed of eleven million miles a

minute, takes more than eight years to reach the earth. Higher in the sky is the lesser dog, Canis Minor, with the star Procyon. Still higher, and almost due east, are the twins, Gemini, with Castor and Pollux. Capella, in Auriga, the charioteer, is in the zenith.

Standing on one corner in the west are the four stars called the "great square of Pegasus," though the uppermost, Alpheratz, is in the neighboring constellation of Andromeda. This, in turn, is next to Cassiopeia, seen in the north, and shaped like a letter W on one side. In the northeast is the great dipper, the handle hanging downwards. The uppermost pair of stars are the pointers, and a line from them to the left indicates the direction of Polaris, the pole star, close to the north pole of the sky, and always, therefore, appearing in about the same place. Polaris is at the end of the handle of the little dipper. If you follow the direction of the pointers in the other direction, you will come to Regulus, in Leo, the lion, seen at this time of evening rising in the northeast. Low in the northwest Deneb can be seen, all that now remains visible of Cygnus, the swan.

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### ENGINEERING

## New Radio Device Detects Leaks in Water Mains

OTHMAR W. Pies, valveman in the Water Department in Cincinnati, has perfected a device to detect leaks in water mains and pipes. As patented, his apparatus consists of a set-up of radio tubes with a very sensitive microphone pick-up which detects and locates the leaks. He connects his device with a fire hydrant, valve or ordinary house stop-cock having a direct connection with the main or house line.

A leak is disclosed by a sizzling sound which grows into a roar as the equipment nears the leak. By taking a reading on each side of the leak by use of a graph, he is able to find the exact location. He has seldom missed finding the leaking valve or pipe.

Science News Letter, December 28, 1935

### ZOOLOGY

## Immersed Beavers Can Stop Hearts and Hold Breath

BEAVERS held under water can apparently stop their heartbeats as well as hold their breath for considerable periods of time, experiments by Dr. Laurence Irving and M. D. Orr of the Uni-