

ASTRONOMY

# Watch for Eclipse

## On Sunday Morning Just at Church Time, Preachers Will Have Competition for Attention in Heavens

By JAMES STOKLEY

**A**N ECLIPSE of the sun, the first seen in the United States since the famous one of August, 1932, is the feature event on the February celestial program, and is scheduled for Sunday morning, February 3. But no parties of foreign astronomers have come to our shores to observe this one, as they did three years ago. The reason is that this is not total, but partial. The moon will not completely cover the sun as seen from any part of the earth. It is only at a total eclipse, when the moon goes squarely in front of the solar disk, that astronomers can make the observations that give an eclipse its value.

Despite its slight scientific interest, however, the eclipse on February 3 will be an interesting spectacle, and will afford keen competition to the preachers on that morning. It will be visible from all parts of the United States, in fact from all of North America except Alaska, but west of the Rocky Mountains it will be so early in the morning that the eclipse will have started when the sun rises. In Texas it will begin about 8:30 a. m., Central Standard Time. Along a line from northwestern Florida to North Dakota, it will start about half an hour later. At 10:30 a. m., Eastern Standard Time, it will start for people living along a line from Washington to the Great Lakes, while the good folks of Maine will not be able to begin their observations until 10:45 a. m. It will last about an hour to an hour and a half, the duration increasing the farther one goes to the northwest.

### Protect Your Eyes

Remember that it is always unsafe to look at the sun with the unprotected eye, and so if you are going to watch the eclipse provide yourself with some sort of screen. The traditional smoked glass is satisfactory, but better and more convenient for most of us is a dense piece of exposed and developed photographic film. Until the eclipse starts,

the sun will look as it does at any time. Then, as you watch, a little nick will appear in the sun's edge, and will gradually get larger and larger. This is the edge of the moon, about 227,000 miles from the earth, about a four-hundredth of the sun's distance of some 92,000,000 miles. At a point in British Columbia, where the sun will be seen most eclipsed, about 74 per cent. of its diameter will be covered, while over most of the United States about half will be hidden.

### Photographing an Eclipse

An interesting photograph showing the progress of the eclipse can be made with an ordinary camera. Set the camera on a tripod, or some other firm support, pointed to the southeast, and directed so that the sun will appear in the lower left hand corner of the final picture. The diaphragm should be shut down to the smallest opening, and, if you have it, a filter placed over the lens to reduce further the sun's light. Set the shutter to an exposure of a hundredth of a second or even less. Then take one picture just before the time of beginning of the eclipse. Do not move the camera or change the film, but make another exposure ten minutes later, and every ten minutes until the eclipse is

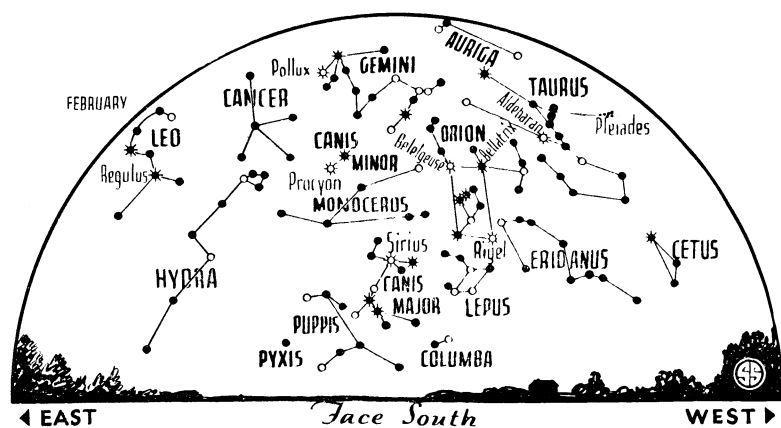
over. Your finished picture will then show a series of suns, at various stages of the eclipse. If your camera is equipped with a focal plane shutter, take care not to point it at the sun unless the lens opening is already reduced, or you may burn a hole in the shutter curtain.

### Third of Year's Seven

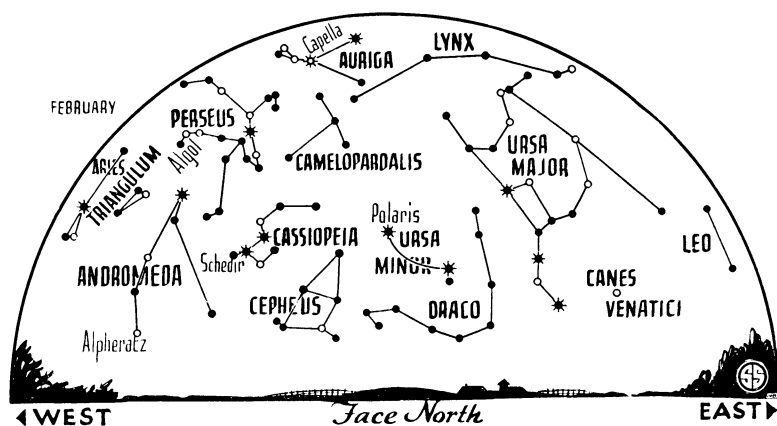
This eclipse is the third of the seven that occur during 1935, a year in which we are having the greatest number ever possible in a single year. Two of these are of the moon and five of the sun. The last time this occurred was in 1805, and it will not happen again until 2485. In 1917, however, there were three of the moon and four of the sun. This happens more often than the combination that we experience this year. In a large book written half a century ago by an Austrian astronomer, Theodor Ritter von Oppolzer, all the eclipses from 1207 B.C., to 2161 A.D. are listed. Only 48 of the years during this period have seven eclipses, and only 14 of them have the two moon, five sun combination. The other 34 have the three of the moon and four of the sun. No other combination is possible.

During the month of February the moon is new on the third of the month, at first quarter on the 10th, full on the 18th and at last quarter on the 26th. On February 3, it will also be closest, or at perigee, with 226,950 miles separating it from the earth. Apogee,

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



Low in the east, this constellation is now coming into the evening sky.



### NO PLANETS

The later evening hours are devoid of these bright bodies, but look low in the southwest during the gathering twilight for Mercury and Venus.

when the two bodies are farthest, comes on the 17th, and then we shall be 252,500 miles away. New moon is on Feb. 3 at 11:27 a. m., E.S.T.; first quarter on Feb. 10 at 4:25 a. m.; full moon on Feb. 18 at 6:17 a. m., and last quarter on Feb. 26 at 5:14 a. m.

During the month of February, Orion and its brilliant neighbors are again the principal spectacle in the evening skies. Orion himself, the great warrior, is to the south, and is easily recognized from the three stars forming his belt, with the bright star Betelgeuse above and Rigel below, the former in his shoulder and the latter in a foot. To Orion's left are two very prominent stars, Sirius, the dog star in Canis Major, the greater dog, the nearer and lower, and Procyon, in Canis Minor. Sirius is the most brilliant star in the heavens, and the closest seen from the United States, unless one can look through a telescope at one of three other stars which are closer but not visible to the naked eye. Above Procyon is the group of Gemini, the twins, with the two stars Castor and Pollux, the latter the brighter and lower.

### Six Pleiades Visible

In the zenith shines Capella, part of Auriga, the charioteer. Below, to the southwest, is Taurus, the bull. The brightest star in this group is Aldebaran, which marks the animal's eye, and is part of a V-shaped group of fainter stars, the Hyades, outlining his face. Farther west, in his shoulder, is a famous little cluster of stars, the Pleiades, of which six are usually visible to the unaided eye.

Directly east, Leo, the lion, is now coming into the sky. In this group is seen the "Sickle," a group of six stars

shaped like that implement, with the first magnitude star Regulus at the bottom, marking the end of the handle. To the northeast is the Great Bear, Ursa Major, in which is the familiar "Big Dipper," the handle hanging downwards. In a similar position to the northwest is Cassiopeia, the queen, the stars arranged in the shape of the Greek letter sigma, or a W on one side. Very low in the northwest Deneb may be glimpsed, part of Cygnus, the swan, but the rest of the constellation is only visible early in the evening, and is not shown on the maps.

### No Planets to Watch

No planets are visible this month during the evening hours for which the maps represent the skies, but several are to be seen earlier or later. On February 1 Mercury is at its greatest distance east of the sun, and sets about an hour later, so for a day or two at that time it may be glimpsed in the gathering twilight in the southwest. When one looks for Mercury, Venus will also be observed. It is farther from the sun, setting about an hour and three quarters after sunset, and is much more brilliant than any of the other stars or planets. During the coming months it will become more and more conspicuous in the western early evening sky. It is in the constellation of Aquarius, the water carrier.

At about 10 p. m., the red planet Mars appears in the east, in the group of Virgo, the virgin. Its red color leaves little doubt as to its identity. Jupiter, now in Libra, the scales, rises about midnight, and is more brilliant than Mars. Saturn this month is close to the sun, and cannot be seen.

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### AERONAUTICS

## Stratosphere Balloon Ripped Because Fabric Stuck

**B**ECAUSE the giant stratosphere balloon, Explorer, on its ill-fated flight in July had the lower part of its rubber-sticky fabric tucked up inside the balloon, great tears occurred which brought a precipitate ending to the flight.

This is the finding of a scientific inquiry as to the cause of the accident made by a board of review consisting of Dr. L. J. Briggs, Chairman, National Bureau of Standards; Dr. John O. La Gorce, National Geographic Society; Brig. Gen. O. Westover, U. S. Army Air Service; Dr. W. F. G. Swann, Bartol Research Foundation; and Dr. L. B. Tuckerman, National Bureau of Standards; as reported by Dr. Briggs and Dr. Tuckerman.

### Rubberized Fabric Stuck

It is as though the Explorer were an agile young lady of the skies, who to be unencumbered for a great leap upwards had reefed up her skirts out of the way, only to find that when she needed them they tore asunder.

To avoid difficulty in inflation and launching, great folds of fabric that would not be expanded by gas until the balloon had risen about 60,000 feet in its 75,000 foot projected climb were accordion-folded inside, with the idea that as the bag increased in size in the rarefied atmosphere it would come loose neatly. But the designers did not realize that the new way of folding would not allow the adherent rubber-coated fabric to peel loose, as happens with the usual methods of folding. The inside layers became taut first, setting up shearing stresses that broke the fabric. So at 60,000 feet the tears began and forced a descent.

### Hydrogen Exploded

An explosion of the lifting hydrogen gas mixed with air oxygen admitted by the torn balloon was the final act in the disaster and caused the disintegration of the balloon. The three Army officers scrambling for parachute jumps from the gondola below heard no explosion. Set off by a spark of static electricity, the explosion took from 5 to 6 seconds, Dr. Tuckerman estimated, and its low rumble was masked by the sound of the motor of an airplane flying nearby. This explosion disintegrated the up-