

ASTRONOMY

Moon Enters Earth's Shadow

March Will Bring First Lunar Eclipse Since 1939; Annular Eclipse of Sun Visible in South America

By JAMES STOKLEY

WHEN the moon enters partly into the shadow of the earth during the night of March 12, the first eclipse visible since October, 1939, will be presented to the residents of most of the United States and Canada. Only in the western part of North America, however, will the entire phenomenon be seen. For the eastern areas, the moon will set before it is completely revealed again.

As must be the case for such an eclipse, the moon will then be full. It will stand in the direction of the constellation of Leo, the lion. This figure is high in the southeast in the evening, as shown on the accompanying maps. They are prepared to reveal the sky's appearance at 10:00 p. m. in the beginning of the month and 8:00 p. m. at the close. Since the main part of the eclipse happens after midnight, in the early morning hours of March 13, Leo will then be in the west.

Despite the fact that this is only a partial eclipse, it will be an interesting spectacle, one well worth getting up early to see. The earth's shadow has two parts—an inner core, the umbra, where the sun would be completely hidden; and, around it, the penumbra, from which an observer in space would see the earth only partly in front of the sun.

As 4:38 a. m., eastern standard time (central time one hour earlier, mountain time two hours earlier, and Pacific time three hours earlier) the moon starts going into the penumbra, but this will not produce any noticeable effect. About an hour later, however, the northeastern edge of the moon will be seen noticeably darker, and at 5:55 a. m., E. S. T., this part comes into the umbra. An hour later, it is most completely immersed in the shadow, which then covers a little less than a third of the lunar diameter.

Two interesting things can be observed as the eclipse progresses. The shaded part has a coppery red color, for even the umbra is illuminated, with sunlight that has been bent into it by the earth's atmosphere, acting as a prism. Light that penetrates the atmosphere is red, the blue rays having been scattered from it to cause the blue color of the daytime sky.

Also, the edge of the earth's shadow is seen on the moon's face as a circular arc. Centuries ago men recognized this as one of the best proofs that the earth is a ball, since only a spherical object always casts a circular shadow, regardless of the direction from which the light comes.

At 7:56 a. m., E. S. T., the moon will have left the umbra, and at 9:13 a. m., it will be out of the penumbra also. Except in the western part of the country, of course, the moon will have set, and the sun risen, when these later phases of the eclipse happen.

As a matter of fact, this is not the only eclipse of March, for there is one of the sun two weeks later, by which time the moon is new, having swung around from a place opposite the sun to one that is toward it.

Because, however, the moon will then be relatively far away, it will not appear quite as large as the sun. Even where it passes in front of that orb, a ring of the solar surface will appear around the black lunar disk.

This is called an "annular" or ring-shaped eclipse. Even though most of the sun is hidden, the small portion that remains is enough to blot out the sun's corona, and the other features for which astronomers send expeditions to see eclipses.

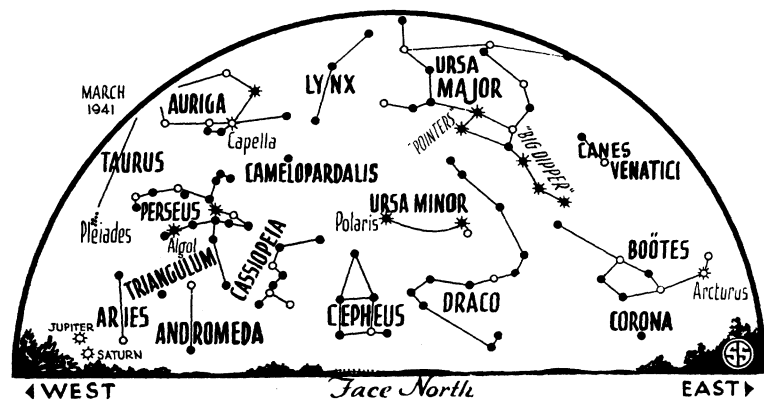
The path over which the annular eclipse will appear on March 27 starts in the Pacific Ocean east of New Zealand. Though the sun will be rising there, it will be 1:26 p. m., E. S. T., in the United

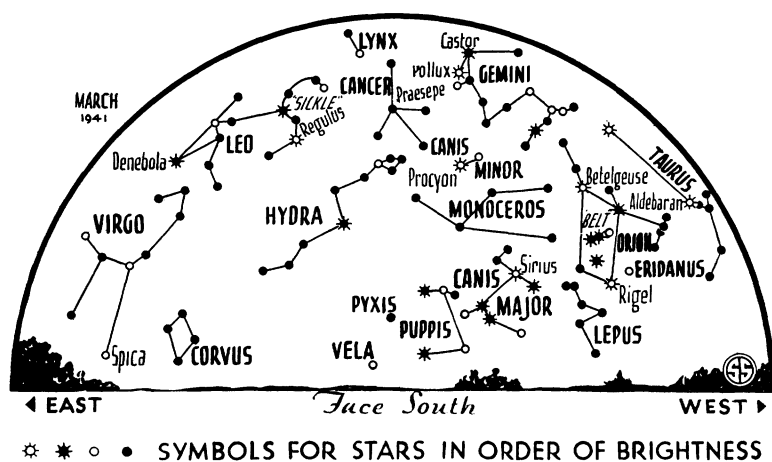
States. Then the path goes just to the north of Easter Island, reaches the coast of Peru, sweeping over the cities of Lima, Huancayo and Maldonado, and ends in interior Brazil. Over most of Central and South America and the southern Pacific Ocean, the sun will be seen partly covered, but the United States will not even get as much as that.

Another kind of eclipse—technically called an "occultation," when the moon covers a star, may be watched with interest by astronomers around noon on March 5. Aldebaran, brightest star in Taurus, the bull, is so occulted. The event is visible over the eastern half of the country. Happening in the daytime, it will not be visible to the naked eye, but a telescope shows a star, even when the sun is shining. Such occultations afford an excellent means of checking the moon's motion, and Aldebaran is the brightest star that can be occulted.

As it has been for many months, Jupiter continues as the most spectacular star or planet in the evening. Shining to the west in Aries, the ram, it sets about four hours after the sun. Below it and quite bright also, compared with the stars, is Saturn. Jupiter passed Saturn last month, but now they are drawing apart.

Orion, the warrior, and his celestial neighbors, who so dominated the winter evening sky, have now shifted to the southwest, but still are most conspicuous. Orion himself we find by the three stars of his belt; Sirius, the dog star, in Canis Major, the great dog, most brilliant star of the night sky, is to the left. Above is Procyon, in Canis Minor and nearly overhead Castor and Pollux, the twins, Gemini. Taurus, with Aldebaran stands





in the west, and Capella, in Auriga, the charioteer, to the northwest.

Other stars of the first magnitude seen on March evenings are Regulus, in the sickle, which is part of Leo; Arcturus, in Bootes, to the northeast, and Spica, in Virgo, the virgin, which is below and to the left of Leo.

A welcome astronomical event of the month comes on March 20, at 7:21 p. m., eastern standard time. Then, for the northern hemisphere, the season of spring commences.

Celestial Time Table for March

Saturday, March 1, 12:57 a.m., Algol at minimum. **Sunday, March 2**, 4:00 p.m., Moon farthest, distance 251,800 miles. **Monday, March 3**, 3:44 a.m., Moon passes Saturn; 5:31 a.m., Moon passes Jupiter; 9:46 p.m., Algol at minimum. **Wednesday, March 5**, about noon, Occultation of Aldebaran.

Thursday, March 6, 2:43 a.m., Moon at first quarter; 6:35 p.m., Algol at minimum. **Thursday, March 13**, early a.m., Partial eclipse of moon; 6:47 a.m., Full moon. **Friday, March 14**, 5:00 p.m., Moon nearest, distance 223,800 miles. **Monday, March 17**, 3:00 a.m., Neptune nearest, distance 2,716,000,000 miles. **Wednesday, March 19**, 9:51 p.m., Moon in last quarter. **Thursday, March 20**, 7:21 p.m., Vernal equinox; sun crosses equator and spring begins in northern hemisphere. **Friday, March 21**, 2:42 a.m., Algol at minimum; 4:31 p.m., Moon passes Venus. **Sunday, March 23**, 11:31 p.m., Algol at minimum. **Tuesday, March 25**, 6:08 a.m., Moon passes Mercury; 10:00 a.m., Mercury farthest west of sun. **Wednesday, March 26**, 8:20 p.m., Algol at minimum. **Thursday, March 27**, Annular eclipse of sun; 3:14 p.m., New moon. **Sunday, March 30**, 5:00 a.m., Moon farthest, distance 252,400 miles; 4:07 p.m., Moon passes Saturn; 11:11 p.m., Moon passes Jupiter.

Eastern standard time throughout.

Science News Letter, February 22, 1941

CHEMISTRY

Good May Come out of War By New Scientific Discoveries

Many Important Chemical Developments Have Come From Search for Substitutes Made Necessary by War

IF ANYTHING good is to come out of the present war, perhaps it will be some new scientific discoveries and applications resulting from interest in what are so generally called 'ersatz,' Dr. Harrison E. Howe, editor of *Industrial and Engineering Chemistry* and Chemical Priority Executive in the Office of Production Management, declared before the New York Section of the American Chemical Society.

Many important chemical developments have come from the search for such substitutes, made necessary by war

or national emergency, in the United States and other countries, he stated. "The World War gave us the synthetic organic chemical industry," he said.

"Ersatz," according to Dr. Howe, is only another instance in history where science has been used to lift a nation out of its difficulties. Science also broke blockades by discovering beet sugar, oleomargarine, and how to make soda from common sea salt, Dr. Howe pointed out.

When the price of sugar increased extraordinarily on the Continent because of

Napoleonic policy, Franz Carl Achard in 1801 established a beet sugar factory near Breslau in Silesia, using the knowledge learned from his professor, Andreas Sigismund Marggraf of the Berlin Academy of Sciences, who in 1747 first discovered the existence of common sugar in beetroot. Beetroot sugar factories were soon started in many centers in Germany and France.

Oleomargarine was first made in 1870 by a French chemist, Mege-Mouries, who experimented to obtain a cheap butter substitute for the benefit of the poor. Another French chemist, Nicolas Leblanc, in 1787 was attracted to the urgent problem of manufacturing carbonate of soda from salt. In 1792 he was granted a patent for his process, and a factory was started near Paris. As a result of the French Revolution, the factory was confiscated soon after its opening.

Dr. Howe pointed out a fundamental difference between American "ersatz" materials born of research and those produced in Germany. Ours, he said, are supplements and equivalents of the things which they replace, rather than makeshift products.

"Our scientists have displayed persistence, ingenuity, invention, and powers of discovery equal to those from overseas," said Dr. Howe.

"Our 'ersatz' covers a wide range of articles. We too have produced synthetic fibers, new resins, and clad metals. These new things are obliged to make their way on their merits because fortunately we can still decide what to use and how to spend our dollars. Consequently our 'ersatz' materials must make their way on price and service."

Science News Letter, February 22, 1941

MEDICINE

Simplified Iron Lung Covers Only the Torso

ASIMPLIFIED iron lung, used for aiding artificial breathing, in the treatment of conditions when the respiratory muscles fail to function, has recently been invented. It encloses only the patient's torso. New means are used for the prevention of air leaks, which are especially troublesome in a small respirator, with its limited total volume of air. (Patent 2,227,847, Theodore J. Shoolman, Brookline, Mass.)

Science News Letter, February 22, 1941

War has delayed England's nylon yarn production, but nylon is being developed for surgical thread, brush bristles and fishing lines.