ASTRONOMY

Orion Heralds Winter

In November this star begins appearing in the evening skies. The planet Jupiter is also visible but sets a few hours after sunset.

By JAMES STOKLEY

➤ IF THERE IS any group of stars that characterizes the evenings of winter, it is Orion, the warrior. It shines high in the south in January and February. With the coming of November, it begins to make its appearance in the evening skies, thus heralding the winter that so rapidly approaches.

Its position is shown on the accompanying maps. These give the appearance of the heavens at about 10:00 p. m., your own variety of standard time, on Nov. 1; an hour earlier in the middle of the month and two hours earlier at the end. Orion is shown on the map of the southern sky, close to the east point of the horizon. The three stars that mark the warrior's belt are upright. Brilliant Betelgeuse, in his shoulder, is to the left, and Rigel, in his upraised foot, is to the right. As we see it now, the giant is on his back, looking up towards Taurus, the bull, a group in which Aldebaran, another star of the first magnitude, can be seen.

Next to Taurus, to the left, is Auriga, the charioteer, with first magnitude Capella. Below it is Gemini, the twins, of which the brightest star is Pollux, of similar brilliance. The fact that it is so low—and that its light has to pass through a considerable thickness of the earth's atmosphere—dims it so that it appears about a magnitude fainter.

"Great Square"

High in the south are the four stars that make up the "great square" which is mostly in the constellation of Pegasus, the winged horse. Alpheratz, the star in the upper left, is in Andromeda, the chained princess, as the story in Greek mythology had it.

Continuing to the west we find, low in the sky, three more stars of the first magnitude. One is Deneb, at the top of the northern cross; actually part of the constellation of Cygnus, the swan. At the bottom of the cross, now standing upright, is the fainter star, Albireo. To the right of this orb we find another of the highest brilliance, Vega, in Lyra, the lyre. About as high and farther left is the third, Altair, in Aquila, the eagle.

Low in the south there is still another star which the astronomer rates as magnitude one, though like Pollux, its lowness in the sky makes it seem dimmer. This is Fomalhaut, in the constellation of Piscis Austrinus, the southern fish.

One planet can be seen on November evenings. It is Jupiter, magnitude minus 1.5, in the constellation of Sagittarius. It sets only a few hours after sunset, before the time for which the maps are prepared. About midnight Saturn, of magnitude 0.9, rises in the constellation of Leo. It is near the bright star Regulus. Before sunrise Venus appears in the east, in the constellation of Virgo, the virgin. Around Nov. 4 Mercury, then farthest west of the sun, also appears low in the east as dawn is breaking. It stands in the group of Libra, the scales. Our remaining naked eye planet, Mars, is in the figure of Ophiuchus, the serpent carrier, which is so low in the southwest just after sunset that it can hardly be seen.

Third Eclipse

November brings the year's third eclipse. On the first of the month the tip of the moon's dark shadow will cross the surface of the earth, and along its path the sun will be completely hidden. This will not, however, be visible from the United States, nor from any part of the western hemisphere.

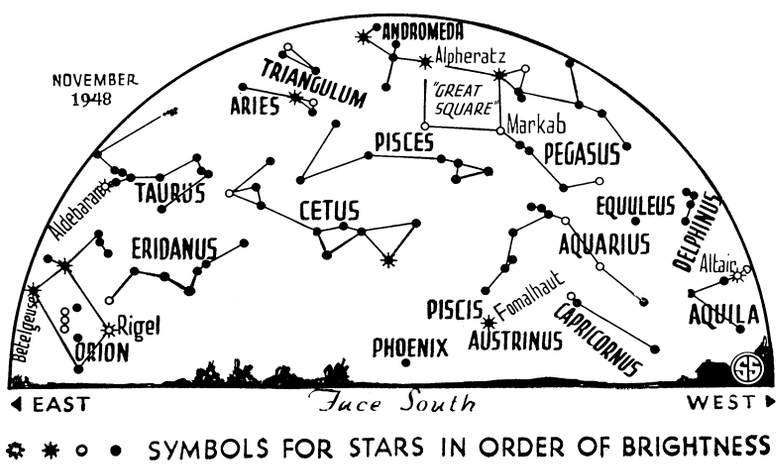
Actually, this eclipse already will be taking place as the month of November begins in the United States and Canada, but by Greenwich time, which astronomers use, it is entirely on Nov. 1. At 11:19 p. m., E. S. T., on Oct. 31, the Nov. 1 sunrise will just be taking place in the Belgian Congo, in Central Africa. In that country, at a point a couple of hundred miles west of Stanleyville, the tip of the moon's shadow will first touch earth. From there it sweeps across Uganda and Kenya to the Indian Ocean, and after that effectively misses land. At 2:38 a. m., E. S. T., as the sun is setting in the Pacific a few hundred miles to the west of the south island of New Zealand, the shadow leaves the earth.

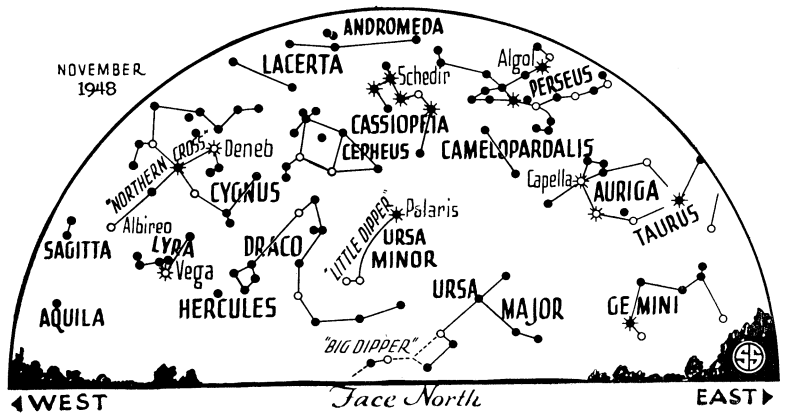
Along this "path of totality," whether on a ship or on land, an observer will see a total eclipse of the sun. The bright disk of that important star will be completely hidden from view, and the pearly white corona becomes visible around the dark disk of the moon. At the Indian Ocean coast of Africa, the total eclipse will last only for about 50 seconds. From the point in the Indian Ocean where the eclipse will occur at local noon, latitude 33° 25′ south and longitude 76° 37′ east of Greenwich, totality will be greatest—1 minute 56 seconds. Over a much larger area, including central and south Africa, Arabia, practically all of the Indian Ocean and most of Australia and New Zealand, there will be a partial eclipse, with the moon only partly hiding the sun.

No doubt astronomers from observatories in South Africa, and there are a number in that country, will make some effort to observe the total eclipse. The short duration of totality and the low altitude of the sun at land stations, where large instruments may be erected, make this eclipse considerably less attractive than others in recent years. There will not be the large attendance of astronomers from Europe and the United States, like those who went to South America and Africa last year to observe the eclipse of May 20.

Path of Totality

After 1948, the next good chance to observe a total eclipse of the sun occurs on Feb. 25, 1952. Then the path of totality traverses Africa, Arabia, Iran and Siberia, with a maximum duration of about three minutes. After that the next is on June 30, 1954. The path on that date starts in the eastern United States at sunrise, and crosses the Atlantic Ocean and Europe. At the





longest this will obscure the sun for 2 minutes 30 seconds. But the following year brings the best total eclipse in centuries. On June 20, 1955, the moon's shadow will cross Ceylon, Siam and the Philippines, and the maximum duration of totality will be the unprecedented figure of 7 minutes 10 seconds, only about 20 seconds less than the greatest possible length of an eclipse. That one will certainly be well observed.

Time Table for November

Nov.	EST	
1	1:02 a. m.	New moon, total eclipse of sun, visible from vicinity of Indian Ocean
3	11:54 a. m.	Moon passes Mars
4	2:00 p. m.	Mercury farthest west of sun, visible before sunrise
	2:54 p. m.	Moon passes Jupiter
8	11:46 a. m.	Moon in first quarter
10	10:00 a. m.	Moon farthest, distance 251,400 miles
15	early a. m.	Meteors of Leonid shower, though brightness of moon will interfere with visibility
16	1:30 p. m.	Full moon
23	4:22 p. m.	Moon in last quarter
	9:26 p. m.	Moon passes Saturn
25	8:00 p. m.	Moon nearest, distance 229,500 miles
28	1:01 a. m.	Moon passes Venus
30	1:44 p. m.	New moon

Subtract one hour for CT, two hours for MT, and three for PT.

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MINERALOGY

Sources of Oil Shale

➤ OIL SHALE, important raw material to furnish fuel oils as petroleum deposits approach exhaustion, is not always a true shale, and it does not contain oil, the American Society of Mechanical Engineers was told in Amarillo, Tex., by Tell Ertl, Union Oil Company of California, Rifle, Colo.

Oil shale is a sedimentary rock containing organic matter insoluble in ordinary solvents but capable of yielding an oil on heating. Some is a true shale since its inorganic matter is argillaceous, that is, composed of clay, but in many the inorganic matter is calcareous or dolomitic. These should be called marlstones, limestones, dolomites or magnesian marlstones. The Green river oil shale of Colorado, Utah and Wyoming is a magnesian marlstone.

The organic matter in oil shale is a solid known as kerogen, that probably consists of a mixture of compounds of carbon, hydrogen, oxygen, nitrogen and sulfur, he stated. On heating oil shale to a temperature above 750 degrees Fahrenheit, the kerogen is cracked into coke, gases condensable to an oil, and non-condensable gases.

Oil shale is found in most of the countries of the world and most of the states of the United States, he said. It was formed in lakes or seas in which the deposit of inorganic matter was slow and in which abundant organic matter lived or was accumulated. The organic matter of the better known oil shale deposits consists largely of macerated and putrefied microscopic vegetal organisms such as spore cases and algae. Larger vegetal matter, such as leaves and stems, and also animal matter, form part of the organic constituents of oil shales.

The most extensive oil shale deposit in the United States is the black shale of the Chattanooga formation, which is richest in Indiana, Ohio and Kentucky, though found also in 14 surrounding states. It will probably not yield over 15 gallons per ton for any large tonnage.

The richest oil shale deposit in America is found in the Green river formation of Colorado, Utah and Wyoming. It is in this region that the U. S. Bureau of Mines is recovering oil in its plant at Rifle, Colo. The oil shale is resistant to erosion and forms the tops of plateaus, one in each of these three states. The Piceance Creek Basin of northwestern Colorado contains the greatest thickness and highest grade of oil shale deposits known in the United States.

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Aluminum alloys are now being used in electrical house-wiring; their use reduces the weight of wire employed by about 50%.