ASTRONOMY

Orion Appears in East

Other stars of the first magnitude can be seen in the west. Planets Venus and Jupiter are brighter than any stars in the evening sky but they set very early.

By JAMES STOKLEY

➤ WITH the beginning of winter less than two months away, the brilliant constellation of Orion, the warrior, now comes into easy view in the evening skies. Our maps, which depict the heavens as they appear about 10 p.m. at the first of November, an hour earlier at the middle of the month, and 8 p.m. at the end, show this figure in the east. The three stars in a vertical row mark Orion's belt; Betelgeuse, to the left, is in one shoulder, and Rigel, to the right, indicates one of his feet. As he rises, Orion is on his back, though by the time he stands high in the south we see him in a more dignified position.

Just above Orion is Taurus, the bull, with first magnitude Aldebaran in the animal's eye. To the left of Taurus, we see Auriga, the charioteer, with bright Capella. Below this figure stand Gemini, the twins, with Castor and Pollux (the brighter of the pair) as the most conspicuous stars.

For other stars of the first magnitude, we must look toward the western half of the sky. Standing vertically in the northwest is the "northern cross," actually part of Cygnus, the swan. Below it and a little to the right is Lyra, the lyre, with the star Vega, while Altair, in Aquila, the eagle, stands to the left. And low in the southwest we find Fomalhaut, in Piscis Austrinus, the southern fish. Some other fishes may be seen still higher, the constellation of Pisces, below and to the left of the "great square" of Pegasus, the winged horse.

Planets Outshine Stars

The two planets visible these November evenings are brighter than any of the stars mentioned. These are Venus and Jupiter, but they set so early that the former fails to get on our map at all, while the latter barely makes it, being shown just above the horizon in the southwest. In this position its brightness is greatly dimmed.

Ever since last April, when it was practically behind the sun, Venus has been drawing to the east of that body, and on Nov. 20 is at its farthest distance. Usually, this would mean that Venus is seen high in the western evening sky, long after sunset. However, it happens now that the path along which the sun and planets move is very low in the southern sky. Therefore, even though Venus, on the 20th, is 47 degrees from the sun, it merely means that it is farther to the south, and not as much higher as one might expect it to be. However, at sunset, Venus is about 20 degrees above the southern horizon, to the southwest, and of magnitude minus 4.

At sunset, Jupiter, which is somewhat fainter, of magnitude minus 1.7, is almost directly south, a little to the left of Venus. Both of these planets are in the constellation of Sagittarius, the archer. Venus is approaching Jupiter, and passes it Dec. 6.

Mars To Rise in East

After midnight, at the beginning of the month, the planet Mars, which has now just reached the first magnitude, rises in the east, followed after a couple of hours by Saturn. However, Mars is approaching Saturn, and passes it at a distance about a third the apparent diameter of the full moon, on Nov. 30. By this time both rise about midnight, and the two planets, of similar brilliance and so close together, with Mars to the north, will make a most striking sight.

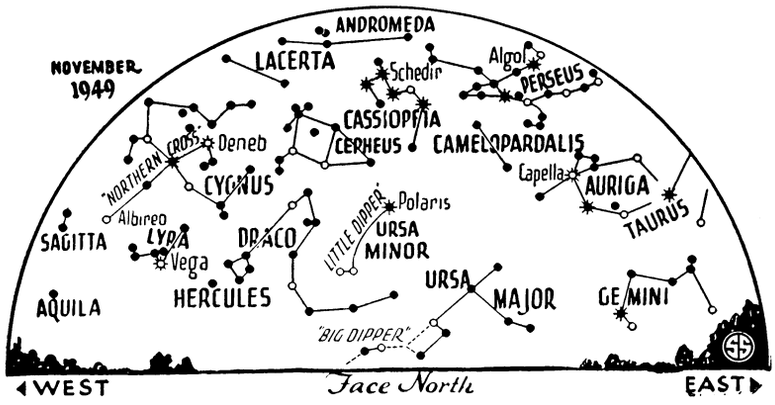
Probably, to the layman, one of the most puzzling things about astronomy is how astronomers find the distances of the stars and planets. Basically it is very simple, and makes use of methods similar to those often used by surveyors on the earth. Suppose, for example, that the surveyor wanted to measure the width of a river without actually going across it. To do this he would pick out two points on the same side and measure the distance between them, perhaps with a tape. Then he would take his transit instrument to each of these locations. With it he would measure the angle between some feature on the opposite side of the river—a tree, perhaps—and the other position. Thus he would be able to draw a triangle, its base the distance between the two observing posts. Since the angle made by this base with each of the other sides is known, only one triangle is possible, and so he could compute by trigonometry, the branch of mathematics dealing with triangles, the height of his triangle, that is, the distance across the river.

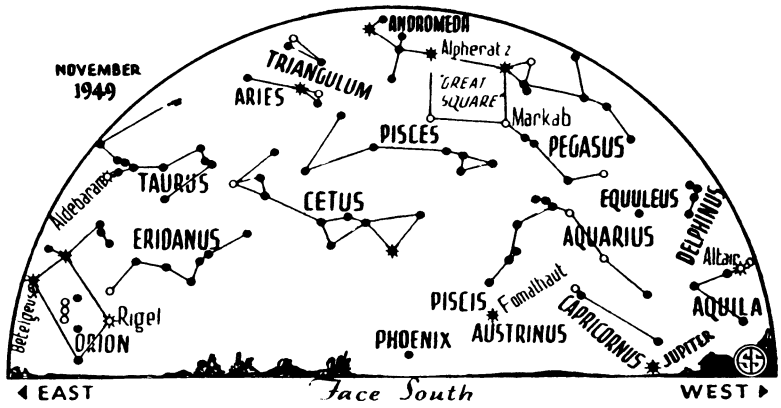
For the heavenly bodies, we need much longer baselines, which can be obtained in some cases by observing from different parts of the earth. For an astronomer in New York and another in Santiago, Chile, almost directly south, observing the moon at the same time, that body would be in slightly different directions. As seen against the background of far distant stars, the South American would observe a little farther north than his northern colleague. Thus, by measuring this shift, or parallax, as it is called, and knowing the distance between the two observatories, the distance of the moon from the earth could be found. As used by astronomers, the parallax of the moon is the difference between the directions as seen from both ends of a standard baseline equal to the radius of the earth. Since the moon's distance changes, this varies through the month.

Distance of Moon

During November, it would be at its greatest parallax, a little over a degree of arc, on the 18th. The larger the parallax, the nearer the object, so this is the date of "perigee," when the moon is nearest. Its distance is then 223,400 miles. On Nov. 3 the parallax will be 54 minutes of arc, about 10% less than one degree. This is called "apogee," when the moon is farthest, with a distance of 252,300 miles.

In angular measure there are 360 degrees in a complete circle, 60 minutes in a degree and 60 seconds in a minute. It is to seconds that we have to go in measuring the parallax of Venus, for example. On Nov. 20, when that planet is farthest east of the sun, its parallax is 13 seconds. This would be equal to a shift of one inch at a distance of about 1400 feet, rather a small amount. For the earth's radius, it corresponds to 62,955,000 miles, the distance of Venus on Nov. 20.





☼ ✱ ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

By the time we get to the stars, the greatest distance available on the earth is much too small to produce any measurable parallax, but fortunately we have a larger baseline. If we take measurements six months apart, the earth has shifted a distance equal to twice its distance from the sun, or about 186,000,000 miles, and for the nearest of the stars this produces a small parallax. None, however, has one as large as a second.

The largest is that of a faint star in the southern constellation of Centaurus, proxima Centauri, its parallax being slightly over three-fourths of a second, equal to a distance of 25,284,000,000,000 miles. But since this is rather a large figure to handle, astronomers usually use other units for stellar distances. One is the light year—the space covered in a year by a beam of light, traveling 186,000 miles every second, some six trillion miles. Proxima Centauri's distance is 4.3 light years. At the other extreme are the most distant galaxies of stars that can be photographed with the new 200-inch telescope—about a billion light years away!

Time Table for November

Nov.	EST	
3	1:00 p. m.	Moon farthest, distance 252,300 miles
5	4:09 p. m.	Full moon
8	3:27 a. m.	Algol (variable star in Perseus) at minimum
11	12:16 a. m.	Algol (variable star in Perseus) at minimum
13	10:47 a. m.	Moon at last quarter
	9:05 p. m.	Algol at minimum
14	7:52 p. m.	Moon passes Mars
15	8:31 a. m.	Moon passes Saturn
16	early a. m.	Leonid meteors visible
	5:54 p. m.	Algol at minimum
18	9:00 p. m.	Moon nearest, distance 223,400 miles
20	2:29 a. m.	New moon
	1:00 p. m.	Venus farthest east of sun
23	2:10 p. m.	Moon passes Venus
24	7:38 a. m.	Moon passes Jupiter
27	5:01 a. m.	Moon in first quarter

Subtract one hour for CST, two hours for MST, and three for PST.

Science News Letter, October 29, 1949

ETHNOLOGY

Clue to Vanished People

See Front Cover

➤ DIGGING in the hard ice of a bleak, uninhabited island in the far north within the Arctic Circle, scientists have found a drawing made by an unknown artist some 500 years ago which shows that once a vanished people lived there. The island is Cornwallis Island in the Canadian Arctic Archipelago.

The drawing, made on a snow knife used for cutting snow blocks for building temporary snow houses, shows five men in an "umiak" a typical Eskimo boat. The men are on a whale hunt. This is made clear by the fact that one in the bow is shown in the act of throwing a harpoon into a whale. The whale is also shown. The find was made this summer by Dr. Henry B. Collins, Jr. of the Smithsonian Institution, assisted by J. P. Michea of the National Museum of Canada.

Times must have changed weather conditions because now there are no whales near the island to hunt and no men to hunt them. The scientists believe that a change has occurred in ice conditions in the past 500 years which altered the direction of ocean currents.

The currents washed a considerable amount of driftwood to the island. This is shown by finds of articles such as weapon handles and boat frames made of wood. No wood reaches Cornwallis Island in these days.

The vanished people are believed by the ethnologists to be of the "Thule culture," ancestors of some of the present-day Eski-