Winter skies brighten

by James Stokley

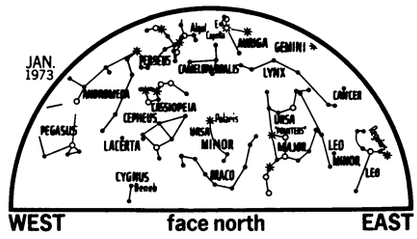
The usual display of bright stars in the January evening sky is enhanced this month by a planet shining prominently among them. This is Saturn, which has faded only slightly from its maximum brilliance in December.

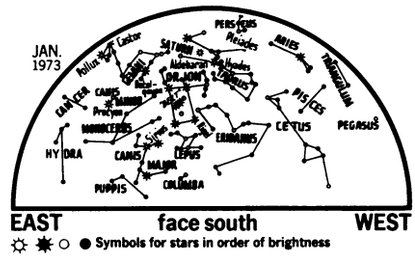
High in the south stands Orion. You can recognize this easily because of the three stars in a row that form the belt of the warrior. It contains two very bright stars, Betelgeuse and Rigel.

Higher and farther to the right is Taurus, where Saturn is located. This constellation also has a first-magnitude star: Aldebaran. Saturn is about two and three quarters times as bright as the star.

Lower in the southwest, in Canis Major, is Sirius, brightest star ever seen in the night sky. It's more than four times as bright as Saturn. Higher, and just below Gemini, is Canis Minor, where Procyon stands. Going northward from Taurus you come to Auriga, near the zenith. It's shown on the map of the northern sky.

The northern map shows two more first-magnitude stars. One is Regulus, to the east in Leo. The other is Deneb in Cygnus, low in the northwest. Both are dimmed because of their low altitude.





Polaris, the polestar, is in the north in Ursa Minor. Because it stands almost directly over the earth's North Pole the altitude of Polaris is equal to your latitude. From Washington (39° north) it is about 39 degrees above the horizon. At New Orleans its altitude is only 30 degrees, while people in Minneapolis see it at a height of 45 degrees. Its altitude at Anchorage, Alaska, is 61 degrees.

To the right of Ursa Minor is Ursa Major, where two stars known as the pointers indicate the direction of Polaris. Cassiopeia is in the northwest. Above it, just west of Auriga, you can see Perseus, the location of the variable star Algol.

Two more planets appear in the eastern sky before sunrise. Mars, now second magnitude because it's so far away, comes up about three hours before the sun. About an hour and a half later Venus rises. It's about 25 times brighter than Saturn.

Directly overhead, the constellation Auriga is now at its best evening position of the year. On the old star maps, which showed around the stars the figures they supposedly represented, it was pictured as a seated man holding a goat on his shoulder and a pair of kids in his hand.

The name of the brightest star, Capella, is Latin for a small female goat and it marked the heart of the imaginary animal. The kids were the little triangle of fainter stars close to Capella toward the south. Being so faint, these stars have no special names, but are usually designated by a system astronomers have used for centuries. Each of the brightest stars in a constellation is called by a Greek letter in order of its brightness, followed by the Latin name of the constellation in the genitive case. Thus Capella, the brightest in Auriga, is alpha Aurigae. The second brightest is beta Aurigae, sometimes called Menkalinan, which is to the east of Capella. The trio that form the kids are epsilon, zeta and eta; that is, the 5th, 6th and 7th.

Epsilon Aurigae, closest to Capella (marked on the map by a letter E), is one of the most interesting stars in the sky. Like nearby Algol in Perseus it is an eclipsing binary: that is, two stars revolving around each other. One is brighter, the other considerably fainter. We are in the plane in which they revolve. On each revolution the dark one partially hides its brighter companion, causing an eclipse which reduces its brightness.

For Algol an eclipse comes every two days 21 hours but for epsilon Aurigae it's 27 years and a month. Each eclipse lasts for 700 days. It takes 185 days to reach maximum eclipse; then, for 330 days, about half of the bright star remains visible. In another 185 days the eclipse comes to an end and the brighter star is again fully exposed.

While the eclipse occurs astronomers use their spectroscopes to analyze the combined light of the two stars. The data gathered tell much about the system, including diameters, temperatures and the size of their orbits of revolution about each other. The brighter orb is about 200 times the sun's diameter, about 173 million miles. But the other is many times larger, nearly two billion miles in diameter. The largest star known, it's so big that all the planets of the solar system out to Uranus could revolve inside it.

But despite its great size—some 8 billion times the sun's volume—it contains only about 23 times as much matter as the sun does. Its density is that of a good vacuum on earth!

The accompanying maps, depict the northern and southern halves of the sky at about 10:00 p.m., local standard time, on Jan. 1. They look the same at 9:00 p.m. on the 15th and at 8:00 p.m. on the 31st. □

CELESTIAL TIMETABLE

Jan.	EST	
1	10:10 pm	Algol (variable star in Perseus) at minimum brightness
2		Earth nearest sun, distance 91,400,000 miles
4	10:42 am	New moon
	7:00 am	Algol at minimum
10	4:00 am	Jupiter behind sun
12	12:27 am	Moon in first quarter
15	5:00 pm	Moon passes north of Saturn
16	4:00 pm	Moon nearest, distance 225,200 miles
18	4:28 pm	Full moon
21	midnight	Algol at minimum
24	8:40 pm	Algol at minimum
26	1:05 am	Moon in last quarter
27	5:30 pm	Algol at minimum
28	11:00 am	Moon farthest, distance 251,600 miles
	3:00 pm	Mercury behind sun
29	8:00 pm	Moon passes south of Mars
31	1:00 pm	Venus passes south of Jupiter