

## ASTRONOMY

# Bright Winter Stars Appear

Two planets, Jupiter and Saturn, brighten the November evening skies, while later in the night two others appear, Mars soon after midnight and Venus just before dawn.

By JAMES STOKLEY

► IF YOU LOOK toward the eastern sky on an evening in November—and think that you see many prominent stars—it is because a region studded with brilliant orbs is now coming into view. And now its brilliance is enhanced by the presence of a very bright planet—one of two visible these late autumn evenings.

This is the part of the sky that is so glorious in the south on evenings of mid-winter. The accompanying maps show how the sky looks about 10:00 p.m., your own kind of standard time, on Nov. 1; an hour earlier at the middle of the month and two hours earlier at the end.

Brightest of all is the planet Jupiter, close to the border between the constellations of Aries, the ram, and taurus, the bull. Jupiter is high in the southeast, and now of magnitude minus 2.4 on the astronomer's scale of star brightness. On Nov. 13 the earth and Jupiter will be in the same direction from the sun and closest—only 372.5 million miles apart.

## Jupiter Below Taurus

Just below Jupiter is Taurus, with the bright and reddish star Aldebaran. This is first magnitude, which puts it among the most brilliant stars, even though it is about a 20th as bright as Jupiter. Part of Taurus extends to the left, onto the map of the northern half of the sky. And just beyond is Auriga, the charioteer, with another first magnitude star: Capella.

Below Aldebaran is Orion, the warrior, not as prominent as the constellation will be on winter evenings because it is so near the horizon. Between the stars Betelgeuse and Rigel are the three stars that form Orion's belt. To the left (again on the northern sky map) are the twins, Gemini, but Pollux, the brightest star in this constellation, is still below the horizon at the times for which these maps are drawn.

Over in the south stands Saturn, the other planet of November evenings. At mid-month it is nearly 900 million miles away. Now in the constellation of Aquarius, the water carrier, its magnitude is plus one.

Just below Aquarius is the star called Fomalhaut, in Piscis Austrinus, the southern fish, which is actually of first magnitude. However, like Betelgeuse, its low altitude and the consequent absorption of its light by earth's atmosphere cause considerable diminution in its brightness, and it is therefore shown only as second magnitude. Fomalhaut is now nearly as high as it ever gets in the sky seen from much of the Northern Hemisphere. From the Southern

Hemisphere, it may be seen directly overhead.

Cygnus, the swan, shines brightly in the west, with Deneb at the top of the stars that outline the "northern cross." Vega, in Lyra, the lyre, shines brightly below. Low in the west is Aquila.

Later in the night two other planets appear. Mars, distinctly red, rises soon after midnight in Leo, the lion. Venus, even brighter than Jupiter, comes up in the east about 4:00 a.m., some three hours ahead of the sun.

High in the south, our southern star map shows a figure marked "Great Square." Three of its stars are in the constellation of Pegasus, the winged horse, while Alpheratz, in the upper right, is in Andromeda, the chained princess. Just below and to the left of the square are the fishes, Pisces.

The ancients, who pictured the figures around the stars, represented the triangle of stars just below the square as one of the fishes, and a fainter group to the left of the square was the other. A ribbon tied them together by their tails.

Actually, Pisces is a very inconspicuous constellation, for its brightest star is magnitude 3.9, or about a 16th as bright as Aldebaran. However, it is important because it lies in the zodiac, the wide path through

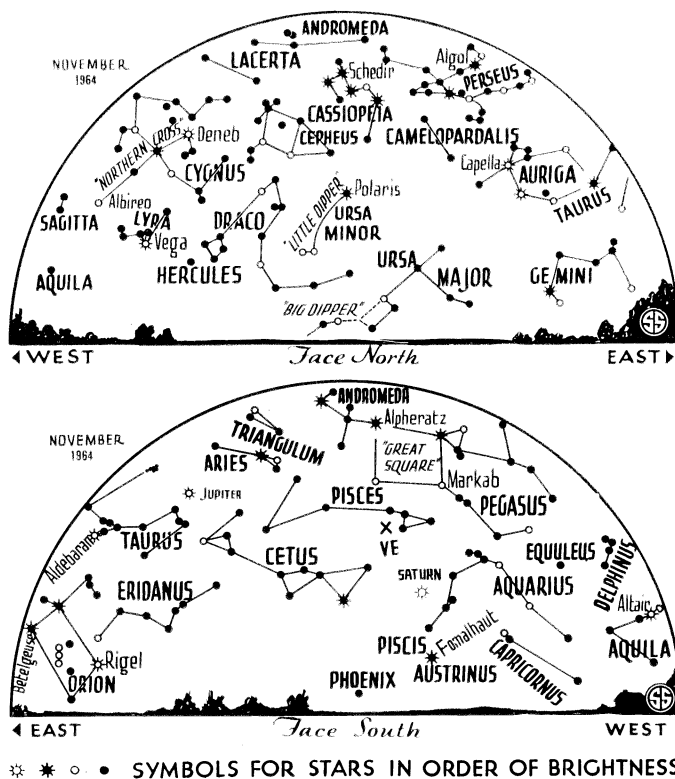
which the sun, moon and planets seem to move during the year. In addition to Pisces, of the constellations now visible, the zodiac contains Gemini, Taurus, Aries, Aquarius and Capricornus.

The zodiac is a belt extending eight degrees (about equal to the distance from Aldebaran to the star just above the letter U in "Taurus") above and below a great circle across the sky called the ecliptic. This is the line along which the sun seems to move slowly through the sky during the year, from west to east. But really the earth moves around the sun and the ecliptic (so called because eclipses of the sun and moon occur along it) is the projection in the distant sky of the plane of the earth's orbit. As we revolve around the sun, we see it in a changing direction during a year.

## Celestial Equator

Another important imaginary line in the sky is the celestial equator, which is directly over the earth's equator. It passes through Orion, Cetus, Pisces, the northern part of Aquarius and Aquila, among other constellations. One of the two places where the ecliptic crosses the equator is in Pisces. It is called the vernal equinox, and it is the position of the sun Mar. 21, the usual beginning of spring in the Northern Hemisphere. (A small cross, marked "VE," shows its position on our southern sky map.)

The vernal equinox is also important because astronomers measure positions in the sky from it. Here on earth we give the



position of a place by its latitude and longitude. Latitude is measured in degrees of arc (360 to the complete circle) north or south of the equator. Corresponding to it in the sky is declination, measured in degrees north or south from the celestial equator.

Longitude on earth is measured east or west of the meridian of Greenwich, which is the line extending from pole to pole through Greenwich, England, where the Royal Observatory was formerly located. The vernal equinox is the Greenwich of the skies. From it the astronomer measures right ascension, which is the celestial equivalent of terrestrial longitude.

Also the vernal equinox is important to navigators of ships and airplanes, but they call it "the first point of Aries." This may seem surprising, since the constellation of Aries, the ram, is some distance away. But there is a slow movement in the sky, which takes nearly 26,000 year to complete, called "precession" of the equinoxes. During this cycle the equinoxes slip completely around the ecliptic.

Thus the vernal equinox is now in Pisces, but several thousands of years ago it was in Aries.

### Celestial Timetable for November

NOV.	EST	
2	9:20 p.m.	Algol (variable star in Perseus) at minimum brightness
4	2:17 a.m.	New moon
5	early a.m.	Meteors visible, apparently radiating from constellation of Taurus
	6:10 p.m.	Algol at minimum
8	5:00 p.m.	Moon farthest, distance 251,900 miles
12	7:21 a.m.	Moon in first quarter
	9:00 p.m.	Moon passes south of Saturn
13	5:00 a.m.	Jupiter opposite sun and nearest earth; distance 372.5 million miles
16	early a.m.	Meteors visible, apparently radiating from constellation of Leo
18	11:00 p.m.	Moon passes south of Jupiter
19	10:43 a.m.	Full moon
20	7:00 p.m.	Moon nearest, distance 223,500 miles
22	11:00 p.m.	Algol at minimum
25	7:50 p.m.	Algol at minimum
26	2:11 a.m.	Moon in last quarter
	11:00 a.m.	Moon passes north of Mars
30	11:00 p.m.	Moon passes north of Venus

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

• Science News Letter, 86:266 October 24, 1964

### PUBLIC HEALTH

## Smoking Shows Evidence Of Communicable Disease

► **SMOKING CIGARETTES** has the earmarks of a communicable disease, the director of the special Advisory Committee on Smoking and Health to the Surgeon General told a meeting of more than 500 physicians in New York City.

Dr. Eugene H. Guthrie, Public Health Service, Washington, pointed out that in smoking, as in communicable diseases, there is evidence of epidemic and much susceptibility among the general population.

• Science News Letter, 86:267 October 24, 1964

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