ASTRONOMY

Jupiter and Saturn Rule Skies

Jupiter and Saturn will be brighter than the other visible planets in the July skies while Vega, in the constellation Lyra, will be the brightest star seen at this time.

By JAMES STOKLEY

➤ TWO of the five planets ever visible to the naked eye will be more conspicuous than others on July evenings. Four planets in all can be seen.

Jupiter will be shining brightly in the southwest, in the constellation of Virgo, the virgin. On the scale of brilliance used by the astronomer it will be of magnitude minus 1.4.

Low in the south stands the constellation of Scorpius, the scorpion, the group in which Saturn may be seen. Its magnitude is plus 0.4. This makes it about a fifth as bright as Jupiter.

Both Jupiter and Saturn are shown on the accompanying maps, which depict the sky as it looks about 10:00 p.m. your own kind of standard time (add one hour for daylight saving time) at the first of July, or an hour earlier in the middle of the month. The other two planets that are now visible set before these times, so you will have to look for them quite early in the evening.

Venus, of magnitude minus 3.3, is about six times as bright as Jupiter, but it sets before twilight is completely ended, a little more than an hour after sunset. Look near the horizon in the west, about half an hour after the sun has gone down, and Venus should be clearly visible.

Mars, in the same part of the sky but far fainter, also sets early.

Of the second magnitude, it is considerably fainter than Venus, making it much more difficult to locate. However, Venus passes just to the north of Mars on July 11, so that evening they will be close together. Look at Venus with a pair of binoculars; you should see Mars close by.

As for the stars, Vega is the brightest seen on July evenings. This is high in the east, in Lyra, the lyre.

Below it toward the horizon is another first magnitude star, Deneb, in Cygnus, the swan. About as high in the southeast is Altair, in Aquila, the eagle. Since Altair is attended by two fainter stars, one just above and the other below, it can easily be identified.

High in the southwest is Arcturus, in Bootes, the bear-driver. Another way of finding this star is to start with the big dipper, part of Ursa Major, the great bear, in the northwest. The dipper now hangs with the bowl below. The bottom stars are the pointers, Merak and Dubhe, which indicate the direction of Polaris, the pole star, toward the right. But if you go upwards from the bowl of the dipper, and follow the curve made by the stars that form its handle, Alioth, Mizar and Alkaid, they are called, around to the south, it will bring you to Arcturus.

Following it still farther, you reach Spica, in Virgo. Jupiter is in this group, farther to the right.

Finally, among stars of the first magnitude, there is Antares, in Scorpius, where Saturn is now seen. The star is just below the planet Saturn. Since Antares is quite red in color, it is not hard to find.

Lyra Leads the Way

Although it is a relatively small constellation, Lyra, which we can see high in the east on July evenings, has many points of interest. For one thing, it is where we are going!

It is often stated that the earth moves around the sun in an almost circular path, and this is correct. However, the sun itself, and all the planets with it, are moving through space at a speed of about 12 miles per second. Therefore the motion of the earth in space is not really in a circle, but in a helix, what is often—and mistakenly—called a spiral; the same path that one follows climbing a so-called "spiral" staircase. And the direction in which the sun, and the whole solar system, is traveling is toward Lyra.

Star of Distinction

As for Vega, that has several distinctions.

It was the first star to be photographed, in 1850, from the Harvard College Observatory, when the recently developed daguerreotype process was applied to astronomy.

Another of Vega's distinctions is that about 12,000 years from now, as it was 14,000 years ago, Vega will be the Pole Star. At that time Polaris, now the pole star, will be as far away from the pole, the point of the sky directly over the north pole around which all the stars seem to revolve once a day, as Vega is now.

This is because of a slow movement of the heavens called "precession of the equinoxes." It is similar to the movement of a top. As the top slows down, it "wobbles," that is, its axis does not stay in one position, pointing upwards, but slowly swings around in a circular movement.

Similarly, the earth wobbles, and, over the course of about 26,000 years, the place towards which our axis points in the northern sky moves around in a large circle. At present, in 1957, it happens to point nearly to the star we call Polaris. About the year 14,000 it will point towards Vega instead.

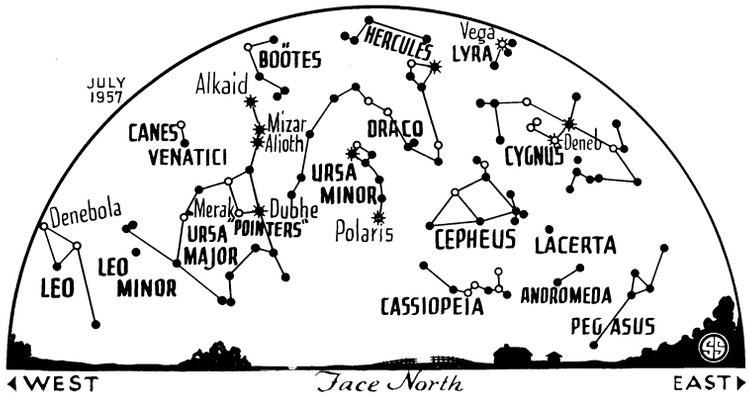
Vega itself is relatively near. It is so distant that its light—traveling 186,000 miles every second—takes about 23 years to reach us. Many stars are hundreds, or even thousands, of light years away.

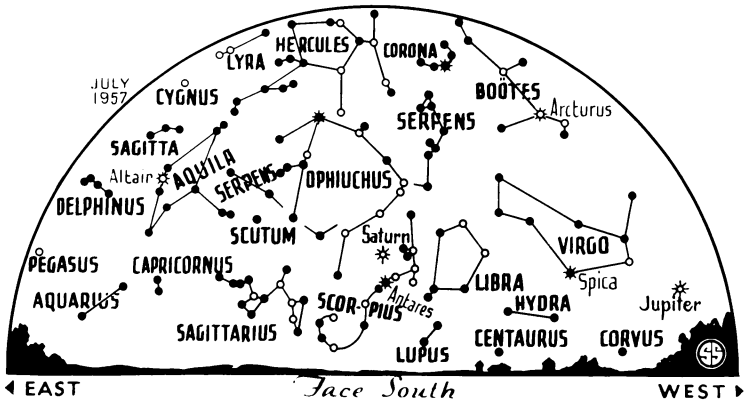
Double-Double Star

Close to Vega, in the general direction of Deneb, the bright star in the nearby constellation of Cygnus, is the star called epsilon Lyrae.

This is rather faint, of the fifth magnitude, which is not far above the faintest that can be seen with the naked eye. But if your eyesight is keen, you will be able to see this is not one, but two stars. If you are unable to see them with the unaided eye, look with a pair of binoculars. Better still is the view through a small telescope. Then each member of the naked eye pair itself is shown to be a pair. Thus, this star is often called the double-double.

Going from Vega towards Altair, you come to two other stars, delta and zeta Lyrae, and a little farther to two more, about as far apart but a little brighter, beta and gamma Lyrae. These four form a little parellelogram. Between beta and gamma there is located the ring nebula of Lyra.





☼ ✸ ○ ● SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

This object is visible only through a telescope. A small one, say with a lens three inches in diameter, shows it as an oval patch of light, while a larger instrument reveals it as a ring of nebulosity. This is called the "ring nebula in Lyra," a member of the class of "planetary" nebulae. They were called this in the early days because, through smaller telescopes, they resembled planets.

At the center of the Lyra ring there is a star of the 15th magnitude, visible only through good-sized telescopes. Somehow, the radiations from this star seem to excite the whole nebula to brightness.

But even this does not end the interesting points about Lyra.

The star delta Lyrae, for example, is also shown by a pair of binoculars to be double. And beta Lyrae is a famous variable star. Every 12.9 days it drops from magnitude 3.4 to 4.5. At maximum it is brighter than its neighbor, gamma, but at minimum it is fainter. These changes can be observed with the naked eye.

Thus Lyra, small though it is, offers much of interest to the amateur astronomer.

Celestial Time Table for July

JULY	EST	
2	8:00 p.m.	Earth farthest from sun for 1957, distance 94,452,000 miles
3	5:12 a.m.	Moon passes Jupiter
	midnight	Mercury on far side of sun
4	7:09 a.m.	Moon in first quarter
8	12:14 p.m.	Moon passes Saturn
11	2:00 p.m.	Venus passes Mars
	5:50 p.m.	Full moon
15	10:00 p.m.	Moon farthest from earth, distance 251,900 miles
19	9:17 p.m.	Moon in last quarter
26	11:28 p.m.	New moon
28	5:00 a.m.	Moon nearest earth, distance 223,400 miles
	9:44 a.m.	Moon passes Mars
29	3:02 a.m.	Moon passes Venus
30	6:41 p.m.	Moon passes Jupiter

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

Science News Letter, June 22, 1957

EDUCATION

U.S. Schools Rival Europe's

➤ AMERICAN colleges and universities have gained enough stature in the past ten years to rival western European institutions as the most sought-after seats of learning.

This is implied in a report issued by the National Science Foundation showing there are now as many foreign students studying in this country as there are foreign students studying in all the universities of Western Europe.

Based on enrollments in 1953-54, the report indicates there are two main reasons for the influx of foreign students to the United States.

"The increase," the Foundation notes, "is indicative of the demand for professional and technical personnel in all parts of the world, as well as the fact that United States institutions of higher learning have achieved internationally recognized status."

The report, based on surveys made by the Institute of International Education, New York, also shows the majority of U. S. students who now study abroad do so at the graduate level, while the majority of foreign students in this country are studying at the undergraduate level.

Last year, 36,500 foreign students, of whom 13,600 were at the graduate level, were studying in the United States. This is in contrast to the fact that, 30 years ago, western European universities attracted three times as many foreign students as those in the United States.

Based on the 1953-54 enrollment figures, 5,150 foreign graduate students here were taking courses in the fields of natural science and engineering. This number, more than 50% of the total figure, far surpassed the 26% of all American graduate students in the U. S. taking similar programs.

The study was made to complement a report of graduate school enrollment and stipends in the academic year 1953-54 to be published by the Foundation.

Science News Letter, June 22, 1957