

ASTRONOMY

Jupiter Now Visible

Mars' light dimmed by its closeness to horizon. Most brilliant star to be seen in September is Vega, shining directly overhead this month.

By JAMES STOKLEY

➤ ALTHOUGH THE planet Mars, so brilliant in the evening sky a few months ago, has faded and barely remains visible, Jupiter is now taking its place.

Both of these planets appear on the accompanying maps, which show the sky about 10 p.m., your own kind of standard time at the first of September, an hour earlier in the middle of the month and two hours earlier at the end. (Add one hour if you are on daylight time.)

Mars, at the beginning of September, sets about three and a half hours after the sun, so it just manages to be shown low in the southwest.

Still as bright as any first magnitude star, its brilliance is dimmed by its lowness, which means that its light is greatly absorbed by the greater length of terrestrial atmosphere through which it has to pass. Earlier in the evening than the times for which these maps are drawn, it is, of course, higher, farther south and brighter.

During September, Mars passes through two constellations in its easterly motion. On the first it is in Scorpius, the scorpion; then it enters Ophiuchus, the serpent-bearer. This, by the way, is not officially one of the 17 constellations of the zodiac, the path of the planets, though it occupies more of that band of the sky than some that are.

Jupiter Ten Times Brighter

Jupiter, of magnitude minus 2.2, is a little more than ten times as bright as Mars and now stands in the constellation of Aries, the ram. It can be seen low in the northeast, rising nearly three hours after the sun sets.

Thereafter, it is brilliantly visible through the rest of the night, climbing highest when it is directly south, about 4:30 a.m. at the beginning of September.

Venus has also come into the evening sky, though it sets so soon after the sun that it does not appear on our maps. However, especially toward the end of September, when it sets slightly more than an hour after the sun, one might get a glimpse of it near the western horizon as dusk is falling.

Its magnitude is minus 3.3, more than two and a half times as bright as Jupiter, so there is no danger of confusing it with any other planet.

Among the stars, the most brilliant shown is Vega, in Lyra, the lyre, which is seen nearly overhead. Just east of this group

is Cygnus, the swan, with the star Deneb. A little south of the western end of Cygnus is Aquila, the eagle, in which first-magnitude Altair shines.

Low in the northwest is Bootes, the bear-driver, with Arcturus, though this bright star, like Mars, is dimmed by reason of its low altitude. Also low, but in the northeast to the left of Jupiter, is Capella, part of Auriga, the charioteer, which is coming into better view in the coming months, like Jupiter.

This is not true of Fomalhaut, also seen low, but toward the south. Part of Piscis Austrinus, the southern fish, it is during the autumn months as high as it ever gets, as seen from our latitudes.

Autumnal Season Starts

Ever since June 21, when it was farthest north, the sun has been moving southward through the sky. On Sept. 22, at 9:24 p.m. EST, it reaches the half-way mark, when it stands directly over the equator of the earth.

This is the autumnal equinox, which marks the beginning of autumn in the northern hemisphere. But now the sun's southward motion, which is taking it low in the skies of northern countries, is carrying it into a higher place for people south of the equator. Consequently, our autumnal equinox is their vernal equinox, the beginning of spring.

The constellation of Lyra, in which Vega shines so brightly overhead these evenings, has several points of interest. For one thing, Vega has been the pole star in the past, and will be again in the future.

Our present pole star, Polaris, in Ursa Minor, the lesser bear, happens to have that distinction because it is practically in the direction of the northern end of the earth's

axis. Since the apparent daily turning of the sky from east to west is really due to the spinning of the earth itself on its axis in the same period from west to east, the whole sky turns about the vicinity of the pole star.

Its own movement is very small; that is why it always stays in about the same place, and can be used to find one's direction at night.

Wobbling-Top Motion

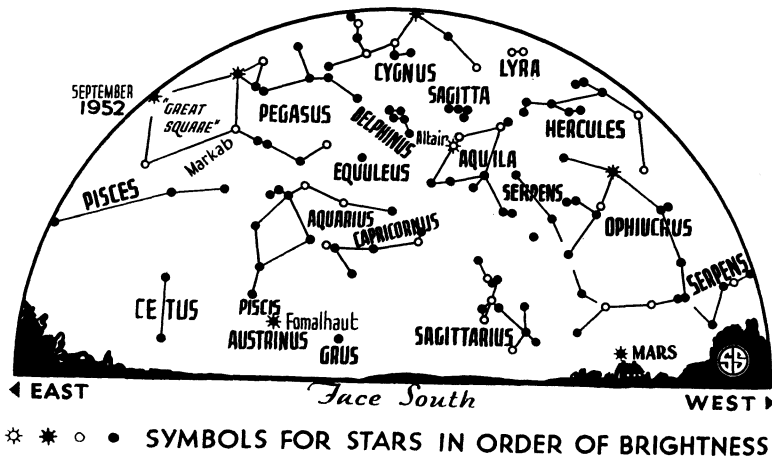
However, the axis of the earth does not remain fixed. In the course of about 26,000 years it describes a conical motion, like the wobbling of a top. Now the axis points to a part of the sky close to our Polaris, but during this period, known as the "precessional" cycle, it points to a number of other stars. In 12,000 B.C., it was directed to a point near Vega, and it will be again in 14,000 A.D.

Also in Lyra there is an interesting star, known as epsilon Lyrae. Quite close to Vega are two fainter stars, forming an equilateral triangle with it. The star toward the northeast is the one referred to. It is not really a single star. A keen eye shows it to be two, separated by a distance equal to about a tenth of the moon's apparent diameter in the sky. The duplicity is very easily seen if one looks through a pair of binoculars.

But this is not the whole story, for if one looks at epsilon Lyrae through a telescope, it is seen that each of the two stars themselves are double. The separations of the stars in these pairs are about a seventieth and a ninetieth of the distance between the pairs themselves. Because of its composition, epsilon Lyrae is often called the "double-double."

Just below Lyra is the constellation of Hercules, and this is interesting because it is where we're going. Long ago astronomers found that the stars in that direction seem to be drawing apart, while those in





the opposite part of the sky, toward the southern constellation of Columba, the dove, seem to be gathering together.

Furthermore, the stars all around the sky in a great circle at right angles to the direction of these groups show a marked tendency to be moving from Hercules toward Columba. The spectroscope shows whether a star is moving towards us or away from us, and it has been found that the stars in the direction of Hercules are approaching, while those toward Columba show a general recession.

All these effects could be explained if the sun and its attendant planets were fixed in space, and all the other stars were rushing past us. However, this is in the class of "everybody's out of step but Johnny," so it is much more reasonable to assume, as astronomers have done, that the solar system is moving through space, towards Hercules, at a speed of about 12 miles per second.

Thus while the earth revolves about the

sun in an orbit that is nearly circular, the fact the sun itself is moving at the same time means that our movement is actually that of a helix, like the thread of a screw, or the wire in a spring.

Celestial Timetable for September

| Sept. | EST | |
|-------|------------|---|
| 3 | 1:00 a.m. | Moon nearest; distance 222,700 miles. |
| | 10:19 p.m. | Full moon. |
| 8 | 9:51 p.m. | Moon passes Jupiter. |
| 10 | 9:36 p.m. | Moon in last quarter. |
| 15 | 2:00 p.m. | Moon farthest, distance 252,100 miles. |
| 19 | 2:22 a.m. | New moon. |
| 21 | 9:18 a.m. | Moon passes Venus. |
| 22 | 9:24 p.m. | Equinox; autumn commences in northern hemisphere. |
| 25 | 1:22 p.m. | Moon passes Mars. |
| 26 | 3:31 p.m. | Moon in first quarter. |

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

Science News Letter, August 30, 1952

TECHNOLOGY

Electronic Truck Scales

► ELECTRONIC SCALES buried under highways now can weigh trucks as fast as they speed by.

Often used to measure weights of moving railroad cars, the scales were adapted to highways by engineers of the U. S. Bureau of Public Roads. The scales may replace the costly and time-consuming process used at present.

The truck's gross weight, speed, axle weights and axle spacings all can be measured in a fraction of a second when a fast-moving truck rolls across an inconspicuous platform laid into the road.

Electric strain gages and an oscilloscope combine to produce patterns on a screen that reveal the data about the trucks.

Strain gages are lengths of wire of a known resistance which allow a certain amount of current to flow through them. When the wires are stretched or compressed, the resistance changes and so does the cur-

rent through them. That, in turn, is recorded on the screen of the oscilloscope.

The accuracy of the scales compares favorably to the accuracies of scales that weigh trucks standing still. Research engineers believe even more accuracy can be obtained in time.

At present, weighing trucks on the nation's highways requires about a six-man party equipped with portable loadometers. The party can weigh only about 200 trucks in eight hours, and a day's work costs about \$125. Truckers often take round-about routes to avoid being delayed at a weighing station.

By using the electronic scales, more trucks can be weighed without producing traffic tie-ups. Overloaded trucks can be spotted quickly and checked on conventional truck-weighing scales to obtain a more accurate weight.

Science News Letter, August 30, 1952

HOW TO RETIRE SOONER

by earning a small income

Government figures prove you need much less money if you retire to the country, and now a new book shows over and over again how to make the money you do need, whether you retire with or without a lot of money in the bank.

Fred Tyler's **HOW TO MAKE A LIVING IN THE COUNTRY** is "virtually a blue print for the retired man or woman wanting to make their own way," says the Chicago Daily News.

With this book, you learn:

- how to make the most income from tourist cabins and a trailer camp (including where to locate for the most business at highest rentals);
- what to do to earn \$3000 a year from a week end roadstand (even if you never raise a green thing);
- how 500 chickens will bring you a fine living on your own bit of land;
- the best way known to learn which business to start;
- the only sure way to get a good buy in a business put up for sale;
- how a \$2500 investment in a part-time business will bring you all the income a retired family may need in the country;
- the dozens and dozens of other dignified, easy to start part-time enterprises that pay well in the country (from renting out equipment for week end farming to dozens of other profitable ideas).

Read this 75,000 word book now. Check off the ways you'd like to earn a small income in the country. See how easily they make retirement possible for you—now. Despite its big size, **HOW TO MAKE A LIVING IN THE COUNTRY** costs only \$1. Money back, of course, if not satisfied.

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