

ASTRONOMY

Mars Continues to Fade

Venus is most prominent object in September evening skies. Galileo's discovery of the planet's phases showed that sun was center of solar system.

By JAMES STOKLEY

➤ MARS, WHICH shone so brilliantly in the early part of the summer, has now dimmed considerably.

However, the planet Venus still brightens, so that it is by far the most prominent star or planet seen on September evenings. It appears in the southwest as dusk is falling and sets about two hours after the sun.

Thus, Venus does not quite get on the accompanying maps which depict the evening skies at a somewhat later hour—about 10:00 p.m., your own variety of standard time at the first of September, and an hour earlier at the middle of the month. (Add one hour for daylight saving time.)

Mars, however, is farther east, in the constellation of Sagittarius, the archer, a group shown in the southern sky. On the astronomical scale Mars in September is of magnitude minus 0.7, which represents a brightness only about a quarter what it was in early July.

Nevertheless, this is still considerably brighter than any of the stars now visible. Venus, of magnitude minus 4.1, is about 25 times as bright as Mars.

Saturn Also Seen

The planet Saturn is also in the evening sky; like Venus, in Virgo, the virgin. In fact, on Sept. 15, Venus passes Saturn, well to the south, but one will have to look rather carefully to see the latter planet. It is only about a hundredth as bright as Venus, although still comparable to a first-magnitude star.

Among stars now visible the brightest is Vega, in Lyra, the lyre, which is shown high in the west. Directly above it, at the zenith as shown on the maps, we find the figure of Cygnus, the swan, where first magnitude Deneb appears.

Below it, toward the south and just above Sagittarius, can be seen Aquila, the eagle, of which the brightest star is called Altair.

Low in the south and toward the east, Piscis Austrinus, the southern fish, can be located. In it we see the star Fomalhaut. This also is of the first magnitude, although it does not look it as represented here. That is because it is so low that the greater thickness of atmosphere through which its light has to penetrate dims it appreciably.

For people in our northerly latitude, Fomalhaut never rises much higher than it does now, but for those who live in south-

erly countries, it climbs high overhead and can be seen in all its glory.

Low in the northwest Arcturus, in Bootes, the bear driver, can be found. This star also is shown fainter than its actual brightness would indicate, again because of its low altitude. A few months ago, however, this star did shine high overhead for us, and was then seen at its full brilliance.

As we watch the skies through the year, we can see them go through their continual cycle of change. Those now visible at the middle of the night will not be seen so easily six months from now, because the sun will be in their direction.

Pattern Repeated Yearly

On the other hand we will then see, during the night, the stars which are now hidden because they are in the same part of the sky as the sun. Year after year, we can see the same constellations on the same date at the same time of night.

The planets, however, do not go through such a regular sequence. Venus, now so prominent, was not seen in the evening a year ago. It is a planet, like the earth, revolving around the sun. As a planet, it shines not by its own glow, the way the stars do, but by the sunlight it reflects to us. Counting outward from the sun, Venus is the second planet, at an average distance of 67,200,000 miles. The earth is third, at about 93,000,000 miles from the sun.

In size Venus is almost as large as the earth, with a diameter of 7,580 miles compared with our 7,927 miles. And whereas we encircle the sun once in 365¼ days, Venus takes only 223.7 of our days for the trip. It probably turns on its axis once in about 30 days, but this is not certain.

Since Venus is continually covered with

clouds, of which only the tops are visible through earthly telescopes, we cannot observe any permanent markings like those on other planets which give us landmarks by which to measure their rotation.

When Venus is on the far side of the sun, as it was last Jan. 29, it is not visible, but this condition does not last very long. Its rapid motion soon brings it to the east of the sun, then we see it in the evening sky after the sun has gone down. Finally it reaches its greatest distance from the sun, as it does on Sept. 6, and then remains visible longest in the evening sky.

After that, it draws in toward the sun again. When it comes most nearly between sun and earth, as it will on Nov. 15, once more it is lost in the solar glare. Afterwards it appears to the west of the sun, thereby rising before sunrise. That is, it becomes a morning star.

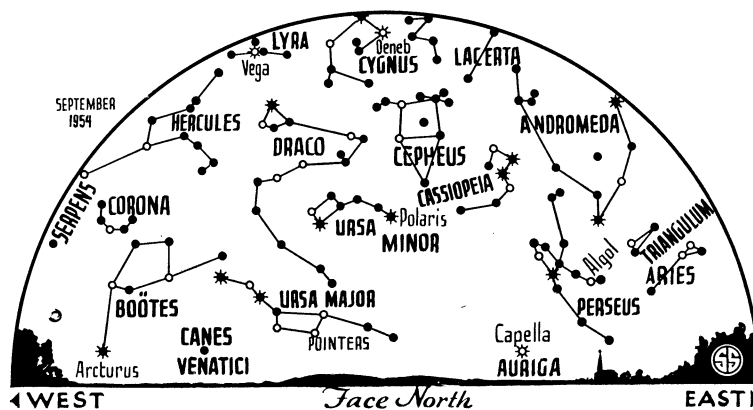
Since Venus is illuminated by the sun, the hemisphere receiving sunlight is bright, while the other half is dark. When out beyond the sun, all, or nearly all, of the sunlit hemisphere is presented to our view. Then, if you look at it through a telescope, you see it as a disk.

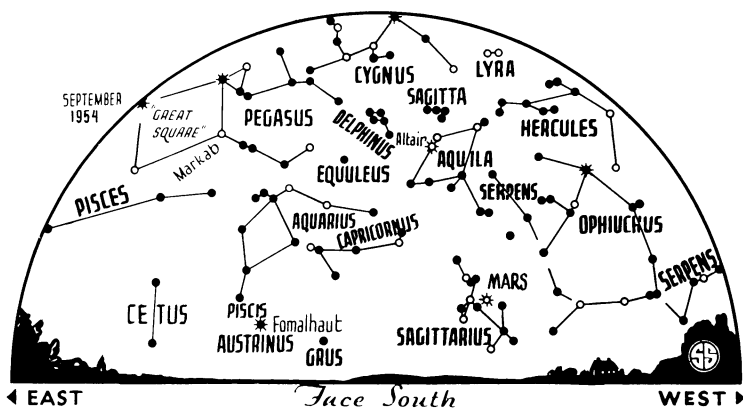
Phases of Venus

As it swings in between earth and sun, however, more and more of the dark half is turned toward us, and less than half of the bright part remains visible. That is, it appears as a crescent, similar to that shown by the moon soon after it is new.

But the moon remains at about the same distance, no matter whether we see it as a crescent, as a half-moon at first quarter, or as a complete disk, when full. Thus, it does not change in apparent size with change in phase.

This is not true of Venus. Last winter, as it began to become visible, it was about 150,000,000 miles away. At the middle of September this will be shortened to some 56,000,000 miles. When closest, in mid-November, it will be only 26,000,000 miles





◊ * ◦ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

- 2 9:16 a.m. Moon passes Saturn.
5:00 p.m. Moon farthest, distance 251,600 miles.
 - 5 7:28 a.m. Moon in first quarter.
 - 6 1:00 a.m. Venus farthest east of sun.
 - 7 4:41 a.m. Moon passes Mars.
 - 12 3:19 p.m. Full moon (Harvest moon).
 - 14 3:00 p.m. Moon nearest, distance 225,000 miles.
 - 15 10:00 p.m. Venus passes Saturn.
 - 19 6:11 a.m. Moon in last quarter.
 - 21 10:45 a.m. Moon passes Jupiter.
 - 23 8:56 a.m. Sun over equator, beginning of autumn.
 - 26 7:50 p.m. New moon.
 - 29 9:19 p.m. Moon passes Saturn.
 - 30 9:00 a.m. Moon farthest, distance 252,300 miles.
5:14 p.m. Moon passes Venus.
- Subtract one hour for CST, two hours for MST, and three for PST.
- Science News Letter, August 21, 1954

away. Thus when in a crescent phase, as now, its diameter is considerably bigger than when it is full. But even the large crescent is still too small to be seen without the aid of a telescope.

Incidentally, the discovery of the fact that Venus changes phase, made by Galileo in Italy in 1610, was a most important event in the history of science. Prior to that time, the old Ptolemaic theory was generally believed.

This taught that the sun and other heavenly bodies revolved about the earth. Galileo, however, favored the Copernican theory, which had been proposed in 1543 and held that the earth and other planets

revolved around the sun. Under the Ptolemaic concept, Venus could never get out beyond the sun, hence it could never show a full phase. When Galileo discovered that it went through a complete cycle from "new" to "full" and back to "new," it clearly demonstrated that something was wrong with the old ideas.

It provided a fine piece of evidence in favor of the theory of Copernicus, which was eventually completely accepted.

Celestial Time Table for September

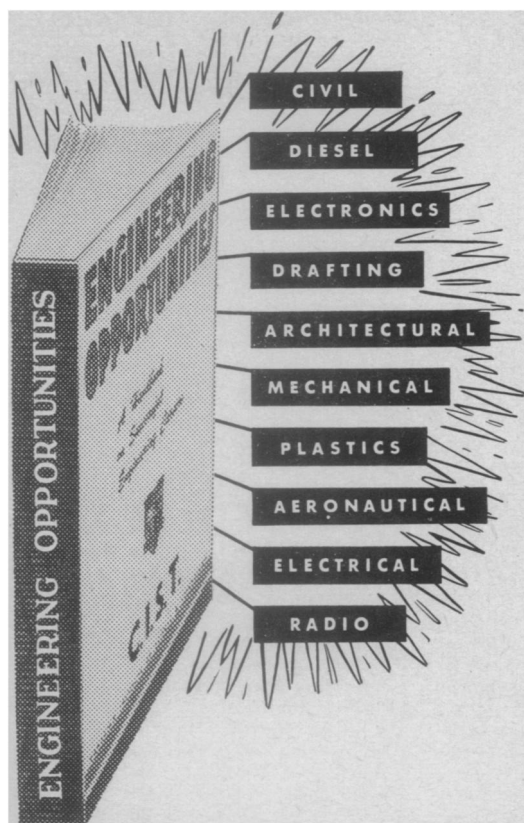
Sept. EST
1 9:31 a.m. Moon passes Venus.

INVENTION

Inventors Patent Walking Doll

► A WALKING doll with a "comparatively simple, low-cost, thoroughly practical hip-joint or limb-joint" has been devised by Abraham I. Ravich and Irving Mauskopf of Brooklyn, N. Y. They invented interlocking devices in the hip-joint that are combined with the helical spring device usually used to fasten dolls' legs to receive patent 2,685,759.

Science News Letter, August 21, 1954



THOROUGH TRAINING WILL PUT MORE MONEY IN YOUR POCKET

Get This 120 Page GUIDE for Ambitious Men

More knowledge is the power that lifts men out of the rut. Best-paying positions always go to men who have the technical "know-how". Send for free book, "Engineering Opportunities" which tells you how to get promotion, bigger pay and security through home study courses. This plan has proved successful for thousands of ambitious men who, like yourself, needed further guidance and training. Send the coupon today for "Engineering Opportunities" which describes over ninety courses, including:—

FREE!

- | | | | |
|------------------|---------------|-------------|------------|
| Industrial | A.M.I.Mech.E. | Building | A.M.I.C.E. |
| Air Conditioning | Mining | Television | Chemical |
| Automobile | Structural | A.F.R.Ae.S. | B. Science |

MAIL THIS COUPON

Canadian Institute of Science & Technology Ltd.
579 Century Building, 412 5th Street N.W.
Washington, D. C.

Please forward without cost or obligation the 120 page guide, "Engineering Opportunities".

NAME.....
ADDRESS.....
COURSE INTERESTED IN.....