

## ASTRONOMY

# Mars Near and Bright

The red planet Mars will come closest to the earth in November than it will be in many years. Its brightness makes it easy to locate.

By JAMES STOKLEY

► THE PLANET Mars is now most conspicuous in the southeastern evening sky. It shines with a brilliant reddish color as it approaches closer to earth than it will again until 1971. It is in the constellation of Taurus, the bull, close to a group of bright stars that shine prominently in the winter evenings.

These are shown on the accompanying maps, which depict the skies as they appear about ten o'clock in the evening (by your own kind of standard time) on Nov. 1, an hour earlier on the 15th and two hours earlier at the end of the month.

The brightness of Mars makes it easy to locate. A little lower and to the left, also in Taurus, is the bright star Aldebaran. Farther to the left, in the neighboring constellation of Auriga, the charioteer (and shown on the map of the northern sky), is Capella.

Below Taurus you may see Orion, the warrior. Just barely above the eastern horizon, it is not as brilliant as it will be on midwinter evenings. However, you can see the three stars that form his belt, now in a vertical row, with Betelgeuse to the left and Rigel to the right. Farther to the left is the constellation of Gemini, the twins, but Pollux, the brightest star, does not rise by the times for which the maps are drawn.

Even though we are well into autumn, the "summer triangle" is still with us in the west. It consists of Deneb, Vega and Altair. Deneb is at the top of the northern cross, now vertical, and part of Cygnus, the swan. A fainter star, Albireo, marks the foot of the cross. Vega is in Lyra, the lyre, which stands to the right of Albireo; while Altair is in Aquila, the eagle, off to the left.

Except for Albireo, all the stars mentioned are of the first magnitude, which means that they are among the brightest in the sky. Low in the south you will see another of this magnitude: Fomalhaut, in Piscis Austrinus, the southern fish, which is now about as high as we ever see it in these latitudes. Due to its low altitude, Fomalhaut's brilliance is considerably dimmed by absorption of its light in the earth's atmosphere; thus it is not as bright as a first-magnitude star is expected to be.

High in the south is another group that is characteristic of the autumn evening skies. This is the "great square," most of which is in Pegasus, the winged horse. Alpheratz, the star in the upper left corner, is in the next-door constellation of Andromeda. Markab, diagonally opposite, is in the horse's shoulder; the row of stars extending down from it toward the west, forms his head, according to the way the group was pic-

tured on the old star maps. For some reason, the constellation is upside down!

The familiar "big dipper," part of Ursa Major, the great bear, is near the northern horizon, at its poorest position of the year. Above it is the "little dipper," part of Ursa Minor, the little bear, and in which is Polaris, the pole star. Still higher is Cassiopeia, the queen, of which the five most prominent stars form a letter M. Her husband, Cepheus, the king, is represented by the constellation below and to the left.

To the right of Cassiopeia you will find Perseus, the champion. In it is Algol, a famous variable star. Every two days, 20 hours and 49 minutes, it is dimmed to about a third of its normal brightness, as a much darker companion star passes in front of the brighter orb and partially eclipses it.

Early on November evenings another planet is visible, low in the southwest. This is Saturn, in the constellation of Scorpius, the scorpion. It sets about two hours after sunset. About Nov. 20 Mercury will also be in the southwestern sky just after sunset, but so low that it will barely be possible to see it. Venus and Jupiter both pass behind the sun during the month, and consequently will not be visible.

On Nov. 8 Mars will be closest to the earth, at a distance of 45,310,000 miles.

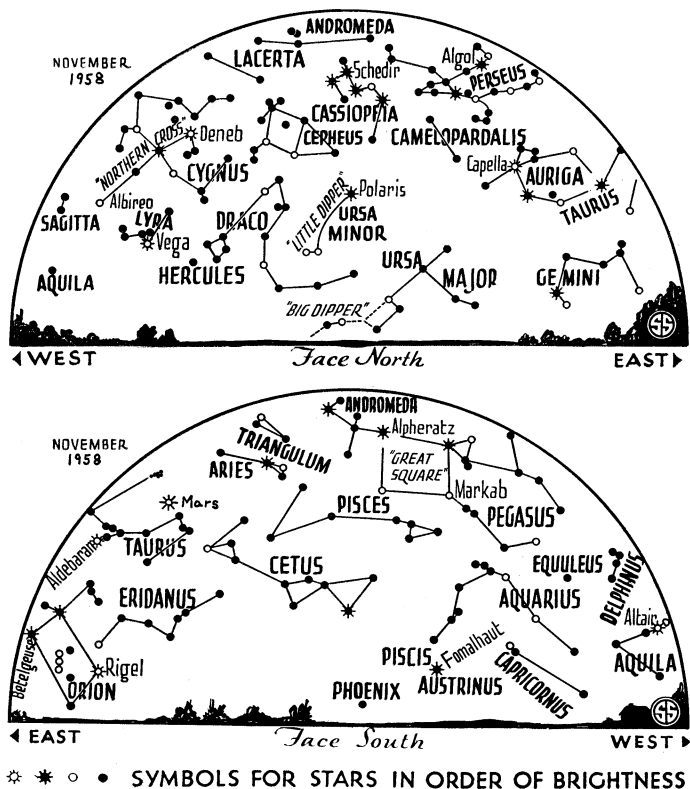
This will be about ten million miles farther away than it came on Sept. 11, 1956, but that was one of the closest approaches of the century. Mars goes around the sun once in 687 days, while the earth takes only 365 days for a similar trip. Thus at intervals of 780 days, nearly two years and two months, we catch up to Mars. Both Mars and earth are then in the same direction from the sun. In other words, as we see it from our planet, Mars and the sun are in opposite directions in the sky, and we say that the planet is in opposition, which it reaches on Nov. 16.

## Mars in Opposition

At such times Mars is much nearer than for many months before or after, when it may be even farther than the sun. If both the orbits of Mars and the earth were precisely circular, they would be the same distance apart at every opposition. Actually, the orbits are elliptical, and that of Mars is pulled out into a considerably longer ellipse than the earth's.

The place where the two orbits are nearest is at the position the earth occupies on Aug. 28. If the opposition occurs on that date, Mars is at its closest possible distance, about 34,600,000 miles. On the other hand, if an opposition occurs in early March, Mars is still some 60,000,000 miles away.

Thus we had a very close approach of Mars two years ago. Seventeen years before that, on July 23, 1939, it was also



quite favorable, at a distance of 36,171,000 miles. Its present approach is not as good as that, but it is still better than average and at many observatories astronomers are taking advantage of it.

Unfortunately, the 1956 observations were hampered considerably by bad weather on Mars. For several weeks, at the critical period in August and September, much of the planet was obscured by a yellowish cloud formation. However, intensive work at a number of observatories in many parts of the world yielded important results, and many of these are being checked further this fall.

### Life on Mars

One of the most interesting was the work of Dr. William M. Sinton of Lowell Observatory, Flagstaff, Ariz., who found new evidence for some sort of life. (See p. 265.)

The molecules of which living organisms are made contain carbon and hydrogen, in a combination that causes certain wavelengths to be absorbed in the infrared rays which they reflect. Using a spectroscope, Dr. Sinton measured the intensity of various infrared waves reflected from Mars, and found a reduction at approximately the same wavelength. Only organic molecules are known to cause this absorption. This seems to be good evidence of some kind of life, perhaps primitive plants, similar to lichens on earth.

Since the effect was a very slight one, Dr. Sinton has been anxious to try again, with better equipment. Now he is making new observations, with improved apparatus, attached to the largest telescope in the world, the 200-inch Hale telescope at the Palomar Observatory in California. If his results are verified it will be a most important step in research.

### Celestial Time Table for November

4	9:19 a.m.	Moon in last quarter.
	8:00 p.m.	Jupiter on opposite side of sun from earth.
7	2:23 a.m.	Algol (variable star) in Perseus at minimum.
8	8:00 a.m.	Mars nearest, distance 45,310,000 miles.
9	11:12 p.m.	Algol at minimum.
10	9:00 a.m.	Moon nearest, distance 222,300 miles.
11	1:34 a.m.	New moon.
12	8:00 p.m.	Algol at minimum.
13	10:32 a.m.	Moon passes Saturn.
16	early a.m.	Meteor showers visible radiating from constellation of Leo.
	9:00 a.m.	Mars in opposition to sun.
17	11:59 p.m.	Moon in first quarter.
20	2:00 p.m.	Mercury farthest east of sun.
22	midnight	Moon farthest, distance 252,200 miles.
25	1:40 a.m.	Moon passes Mars.
26	5:16 a.m.	Full moon.
30	12:54 a.m.	Algol at minimum.

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

Science News Letter, October 25, 1958

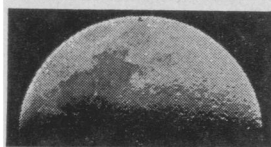
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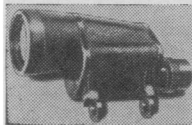
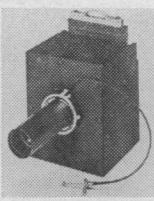
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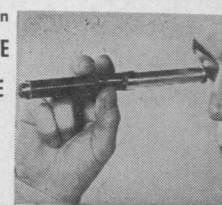
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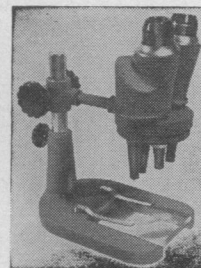
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