

ASTRONOMY

Mars Begins Its Approach

Four first magnitude stars, Vega, Deneb, Fomalhaut and Capella are also visible on November evenings. The famous meteor shower occurs on the 15th.

By JAMES STOKLEY

► STILL approaching closer to earth, and at the same time increasing in brightness, the planet Mars comes into easy view during the month of November. It does not show on the accompanying maps, as they depict the appearance of the heavens at 10 p.m., standard time, on Nov. 1 and 8 p.m. at the end of the month. On Nov. 1 Mars does not rise until about 10:30, when it appears in the northeast in the constellation of Cancer, the crab, just under that of Gemini, the twins, which does appear on the maps in the northeast. In this figure another planet, Saturn, is shown, but it is about three-fourths the brightness of Mars.

Looking among the stars—those distant suns which unlike the planets shine with their own light—we see a familiar group reappearing in the east. This is Orion, the warrior, which is so conspicuous on winter evenings. Three stars in a vertical row form the belt of the warrior, who is now on his back. North of the belt is the bright star Betelgeuse, south of it is Rigel. Directly above Orion is Taurus, the bull, in which the bright red star Aldebaran is conspicuous.

High in the south is the familiar "great square," three stars of which are in Pegasus, the winged horse, and a fourth, Alpheratz, in the upper left corner, in Andromeda, the chained princess. None of these stars are of the first magnitude, but they are all easily located.

First Magnitude Stars

Three stars that actually are classed as first magnitude can be seen in the west, led by Vega, in Lyra, the lyre. Above this and a little to the left is the northern cross, in a vertical position, which is really part of Cygnus, the swan. The bright star Deneb is at the top of the cross. Farther to the left, about as high as Vega, is the third of these first magnitude stars, Altair, in Aquila, the eagle.

Low in the south is still another first magnitude star, Fomalhaut, which is so

near the horizon that it does not appear as bright as some that are higher though fainter. The light from a star that is low in the heavens has to pass through a greater thickness of the earth's atmosphere than one that is nearer the zenith.

Last of the stars of first magnitude is Capella, in Auriga, the charioteer, in the east above Gemini. About half way between Auriga and Lyra is the pole star, Polaris, part of Ursa Minor, the lesser bear. Ursa Major, the great bear, of which the great dipper is part, is low in the north, in its poorest position of the year. High in the north, however, in its best position, is Cassiopeia, the queen, with the principal stars arranged to form a letter M.

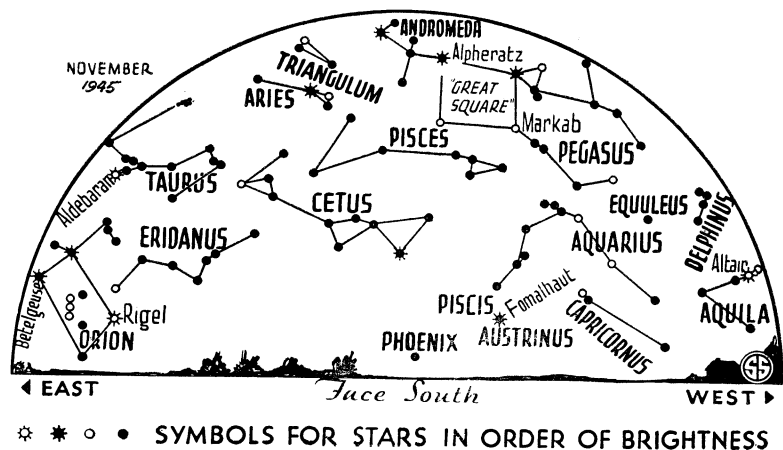
As for the other planets, not already mentioned, Mercury is very briefly in the evening sky about Nov. 17, but it is so low, and sets before the sky is very dark, that it will be hard to locate. Venus is in the constellation of Virgo, the virgin, and rises in the east about two hours before the sun. Jupiter is also in Virgo, farther west, and rises about three hours before sunrise.

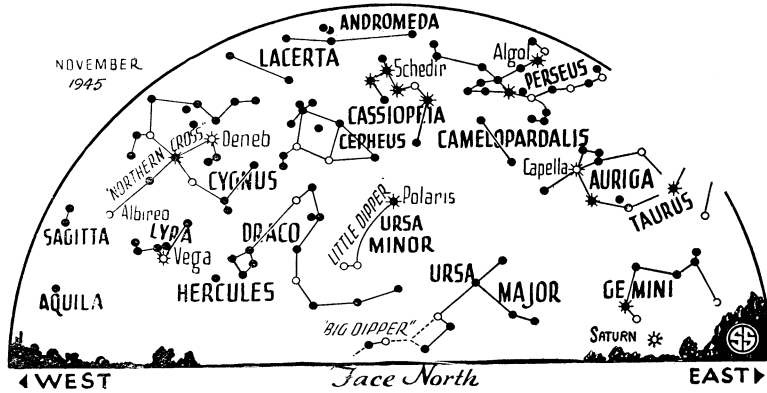
When, in the next few months, Mars reaches a brightness of magnitude minus 1.2, brighter than any night-time star except Sirius, the most brilliant of all, it will be hard to realize that during the early part of 1945 this same planet was

down nearly to the second magnitude, but that is the case. The reason for this great change in brightness, of nearly four and a half times, is found in its changing distance. The earth's average distance from the sun is about 93,000,000 miles, and that of Mars, next planet out, is 141,500,000 miles. When the earth and Mars are in opposition, or both in the same direction from the sun, they are near together, while at times when Mars is in the same direction as the sun is from us, as it was at the end of 1944, it is very far away.

On Jan. 1, 1945, Mars was just moving to the west of the sun, and then was about 2½ times as far as the sun, making its distance about 225,000,000 miles. But this year it has been drawing in, and getting more brilliant, so that on Nov. 1 it is at exactly the sun's distance. By the end of November it will have moved in to about 74,000,000 miles. Next January, when it is closest, it will be only 59,200,000 miles distant, and then it will start withdrawing again. During the rest of the autumn and early winter, it will be coming into a better and better position in the evening, and as it brightens it will be interesting to watch.

Its approach in January, however, will not be a particularly close one, as Mars may approach within about 34,000,000 miles of the earth. The reason for the great difference in the distance to which Mars can approach is found in the eccentricity (or departure from a true circle) of the orbit of Mars. At the places where the two orbits are closest, they are only 34,000,000 miles apart, so





when the opposition occurs at this position, that is the separation of the planets. The opposition next January will occur when they are in parts of their orbits that are very far apart.

On the evening of Nov. 23, when the moon rises, people in the western part of the country will see Mars just above it. But in the east, people watching the moon rise, will not see Mars at all. For there, at that time, Mars will be hidden, or occulted, behind the moon. In Europe it will be possible to see Mars before its immersion, or covering, by the moon, but even in the eastern part of the United States this occurs before moonrise. At Washington the planet will reappear from the moon's limb at 9:29 p.m., E.S.T. Throughout the east the reappearance will be at a time not very different from this. In western Massachusetts, for example, the reappearance, or emersion, will occur at 9:32 p.m. Farther west, of course, the planet will be uncovered before the moon rises at all, so people there will only be able to see the moon and planet unusually close together.

Meteor Showers

November brings one of the most famous of meteor showers, the one in which the "shooting stars" seem to radiate from the constellation of Leo. This shower is therefore called that of the Leonids. About the night of Nov. 15, the earth will pass through this swarm of cosmic dust, which moves in a vast orbit around the sun, and on that night there will be more meteors visible than ordinarily. However, conditions will not be especially favorable, because the moon will be nearly full and shining brightly most of the night. Consequently its glare will hide many of the Leonids. With any meteor shower, more can be seen after midnight than before, because then we are on the forward

side of the earth and meet them coming, while during the evening those that appear must catch up to us. So if you are watching for meteors on the night of the 15th, you will have to stay up late to see them at their most numerous.

Celestial Time Table for November

NOV.	EST	
2	7:19 a. m.	Moon passes Jupiter
	2:51 p. m.	Moon passes Venus
3	10:44 p. m.	Algol (variable star in Perseus) at minimum
4	11:00 a. m.	Moon farthest, distance 252,700 miles
	6:11 p. m.	New moon
6	7:32 p. m.	Algol at minimum
12	6:34 p. m.	Moon in first quarter
15	Early a. m.	Leonid meteors
17	3:00 p. m.	Mercury farthest east of sun
18	9:00 p. m.	Moon nearest, distance 221,900 miles
19	10:13 a. m.	Full moon
21	3:37 a. m.	Algol at minimum
23	8:06 a. m.	Moon passes Saturn
	10:20 p. m.	Moon passes Mars
24	12:26 a. m.	Algol at minimum
26	8:28 a. m.	Moon in last quarter
	9:15 p. m.	Algol at minimum
29	6:04 p. m.	Algol at minimum
30	12:25 a. m.	Moon passes Jupiter

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

Science News Letter, October 27, 1945

ORDNANCE

Japs Got Greater Tonnage Of Incendiary Bombs

➤ THE JAPS were on the receiving end of a greater weight of air-borne American incendiary bombs than the Germans, although the actual number of such bombs dropped on the Japs was less than the number unleashed in the sky over Germany. This is because a new type of bomb, known to soldiers as the "goop," came into action relatively late in the war. This bomb is much heavier than those used previously, and also much more destructive.

The "goop" is a pyrogel bomb, containing napalm, or thickened oil, as an ingredient. Over 88,000 tons of various napalm type bombs were dropped in the Pacific area, while about 42,000 tons were

used in the European area. These are figures just released by the Chemical Warfare Service.

Approximately 50,000,000 Chemical Warfare Service incendiary bombs were dropped from the air in the late war. Of this number, more than 28,000,000 fell on Axis targets in the European and Mediterranean theaters, and more than 19,000,000 on Japanese installations. The fire tonnage in the Pacific area was 122,000, against 120,000 tons in Europe.

The most used individual bomb in number and tonnage was the M50 four-pound magnesium firestick, dropped in clusters. More than 37,000,000, or 92,000 tons, of these were unleashed on all theaters.

Science News Letter, October 27, 1945

GENERAL SCIENCE

Competition Announced for Five \$1500 Scholarships

➤ FIVE \$1500 science scholarships at the University of Rochester, open to students in nearly 3,000 high schools and preparatory schools, are announced by the University and by the Bausch and Lomb Optical Company, sponsors of the scholarships. This is the third year of the competition.

The scholarships will be awarded next spring, after a competition among students who have become eligible through the winning of honorary award medals offered by Bausch and Lomb. Winners are brought here for final tests and interviews, and are entertained for two days with all expenses paid.

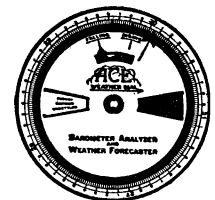
Science News Letter, October 27, 1945

Of the 7,306,000 troops shipped overseas in the past four years, 4,687,850 departed from East Coast ports, 2,451,000 from the West Coast, and 167,000 from Gulf Coast ports.

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