

ASTRONOMY

Mars Comes Near

Visible Low in the Southeastern Sky Just After Dark Is the Ruddy Planet, Nearer Now Than Since 1924

By JAMES STOKLEY

LOOK to the southeastern sky this evening after it is quite dark. Down near the horizon, if it is clear, you will see a brilliant red orb, more brilliant than any star that is visible. This is the planet Mars, which is making the closest approach to the earth since 1924. On July 27 it will be at a distance of 36,030,000 miles which, astronomically speaking, is right next door.

But another planet is also visible in July, though much harder to find, and not nearly as brilliant as Mars. Low in the west just after sunset, for a day or two about July 14, Mercury will be on view. As it sets about an hour after the sun, before the sky is completely dark, it is necessary to look for it in the twilight.

Planets are bodies similar to the earth, revolving about the sun, shining by the sunlight they reflect. The other objects we see overhead at night, except the moon, are stars. These are distant suns, millions of times farther away than ours, and hence far less brilliant. They have the same position that they had this month last year, and as they will in July, 1940. On the map is shown their aspect as at 10:00 p. m., standard time, on the first of the month.

Easy To Find

Probably Antares is one of the easiest stars to find, for it is directly south, and to the right of Mars, standing in the constellation of Scorpius, the scorpion, whose hook-like tail curves around to the left. But even brighter than Antares is Vega, of Lyra, the lyre, which is to the east, almost overhead, and the most brilliant star now seen. Below Lyra is Cygnus, the swan, otherwise called the "northern cross." The cross is on its side, and Deneb, the brightest star of the group, is to the left. A little below and to the right of the other end of the cross is Altair, in Aquila, the eagle. These three—Vega, Deneb and Altair—form a large triangle in the eastern sky which is a good figure to know if you want to be able to find your way among the constellations.

All the stars mentioned are of the first magnitude, the astronomers' brightest class. Two others of this brilliance are also now in the sky, and they can easily be located from the familiar great dipper, which hangs to the northwest. The pointers, now the two lowermost stars of the dipper, are well known as guides to the pole star, or Polaris, but this is of the second magnitude. However, if one imagines the curve of the dipper's handle extended to the southwest, it leads to Arcturus in Bootes, and then to Spica, in Virgo, the virgin, the two referred to above.

Others Later

Later in the night other stars and planets can be seen. A little before midnight Jupiter comes into the sky, in the southwest, not far from the place we saw Mars a couple of hours before, and nearly as bright. It stands in the constellation of Pisces, the fishes. And soon after midnight, Saturn, considerably fainter, in the group of Aries, the ram, shines in the same general direction. The planet Venus is now in Gemini, the twins, but rises so soon before sunrise that it can hardly be found.

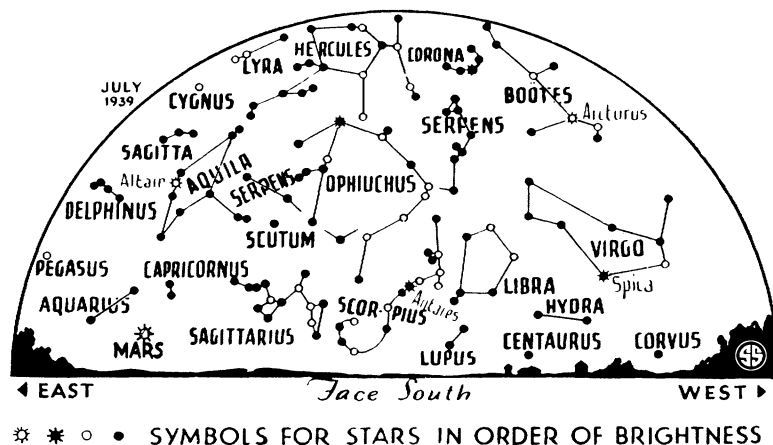
If men from Mars had intended to invade the earth, this is the month they would have done it, not last October. Then Mars and the earth were several times farther apart than they are now, and the journey would have been far more hazardous. The distance between

our two planets varies enormously. When we are on opposite sides of the sun, we are separated by some 234,000,000 miles. On the average, when we are both in the same direction from the sun, we are nearly 49,000,000 miles apart. But the path of Mars is not nearly as circular as ours. The earth never varies more than about 1,500,000 miles from the sun, or in of 93,000,000 miles. Mars, on the other hand, has a very elliptical orbit. It can be as close to the sun as 128,500,000 miles, or as far as 154,500,000 miles. Thus, when Mars is in the same direction as the earth from the sun, or in "opposition," as it is called, we can be nearly 63,000,000 miles apart. But if the opposition happens to occur when Mars is nearest the sun, as it did in 1924, that planet is only 34,600,000 miles away from the earth.

Not For Years

This year conditions are not as good as they were then. As a matter of fact, the 1924 approach will not be repeated for centuries. But this year brings the best since then. On July 1, Mars is 40,800,000 miles away. On July 27 we are closest, with 36,030,000 miles. By August 1, Mars will have receded to 36,100,000 miles, and will continue drawing away until next year, when it will start approaching again. In 1941 will come the next opposition, which will be as favorable as the present one, but not until 15 years later will another one come that will be as good.

Naturally, this summer will see many observatories turning their telescopes on



☼ * ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

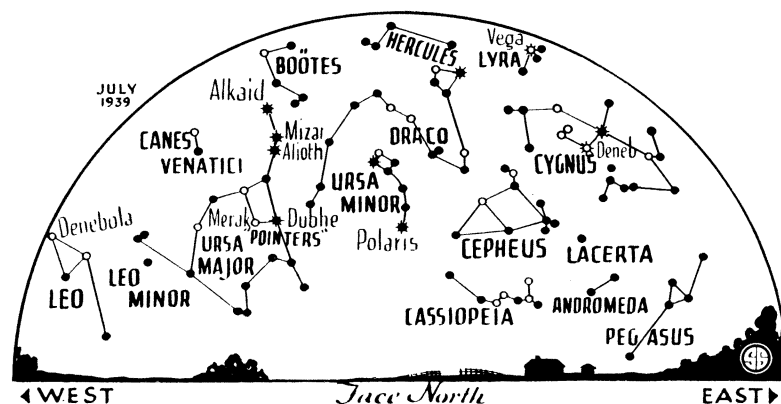
Mars, trying to solve some of its problems. Especially will this be true at the Lowell Observatory, in Flagstaff, Arizona, which has long specialized in planetary studies. Perhaps more will be learned about the elusive markings called "canals." These are peculiar lines that seem to cross the planet's surface, and which are real canals, according to the theory propounded by the late Prof. Percival Lowell. He believed that a race of superintelligent Martians, finding their water supply becoming exhausted, built this elaborate network to bring water from the melting ice of the poles to warmer parts of the planet. Today very few astronomers hold to this idea. Indeed, some think that the so-called canals are only optical illusions, that there are no such markings there at all.

Observations, made this year may help settle the controversy. If not, perhaps the opposition of 1941 will, for then the new 200-inch telescope of the California Institute of Technology will be in operation. Many reliable and expert observers have reported seeing the markings, but no entirely convincing photographs of them have been made. This is because the air, through which we must look at the planet, is continually in motion. The experienced observer occasionally gets momentary glimpses of fine detail, but the photograph, requiring an exposure of several seconds, is blurred.

The 200-inch telescope will gather about five times as much light as the largest telescope now existing, which means that shorter exposures can be given. Hence, the astronomers hope that the new instrument will allow them to photograph everything they can see, in the case of fairly bright objects, like the moon and the planets. If this hope is justified, the year 1941 may see one of the long standing problems of astronomy solved.

Celestial Time Table for July

Saturday, July 1, 11:16 a. m., Full moon. **Monday, July 3,** 5:56 p. m., Moon passes Mars. **Wednesday, July 5,** 9:00 a. m., moon farthest away, at 252,000 miles; 3:00 p. m., earth nearest sun for 1939, 94,452,000 miles distant. **Sunday, July 9,** 12:58 a. m., moon passes Jupiter; 2:49 p. m., moon at last quarter. **Monday, July 10,** 6:58 p. m., moon passes Saturn. **Thursday, July 13,** 2:00 p. m., Mercury farthest east of sun, visible in west at evening twilight. **Sunday, July 16,** 4:03 p. m., new moon; 11:12 p. m. to midnight, all four bright moons of Jupiter invisible, one in front of planet, another behind it, and two in its shadow. Jupiter only visible at this time in eastern part of the country. **Monday, July 17,** 6:00 p. m., moon nearest earth, 223,200 miles away. **Tuesday, July 18,** 1:35 p. m., moon passes Mercury **Saturday,**



July 22, 7:45 p. m., Spica hidden by moon—visible in N. E. United States. **Sunday, July 23,** 3:00 a. m., Mars in opposition; 6:34 a. m., moon in first quarter. **Thursday, July 27,** 4:00 p. m., Mars nearest earth—distance 36,030,000 miles. **Friday, July 28,**

early morning. Meteors of delta Aquarid shower visible. **Sunday, July 30,** 11:13 a. m., moon passes Mars. **Monday, July 31,** 1:37 a. m., full moon. (Eastern standard time throughout)

Science News Letter, June 21, 1939

ENGINEERING

"Liquid Coal" Claimed to Be More Economical Than Gas

Specially Prepared Coal Ground to 300 Mesh Was Suspended in Gasoline or Oil to Run Motor After Start

FORESHADOWING a time when man's immense coal resources, which far outstrip other sources of power available at present, may be put to work in the automobile in place of gasoline, a stock car changed only in one minor respect made a first demonstration run on a new fuel, "liquid coal."

Made of finely pulverized coal suspended in an oil "carrier," the new fuel, whose development has attracted the attention of scientists and engineers during the last twenty years, has enabled the car, an eight-cylinder 1939 sedan, to accelerate up to 35 miles an hour within a block.

Applied to a standard automobile by Dr. Francis W. Godwin, director of the coal research division of the Armour Institute of Technology's research foundation, the fuel is more economical than gasoline although the cost per gallon is about the same, because it contains far more energy.

Neither the carburetor nor the ignition system of the car was changed in any way. One fine-screened filter was removed from the fuel system to accommodate the colloidal fuel, Dr. Godwin said.

(Because coal itself is essentially inconvenient to handle and bulky, sci-

tists have been trying to devise a workable "liquid coal" such as this for many years. Thus far, however, it was stated in Washington, all such fuels have been impossible to use economically in an internal combustion engine because of the ash which coal leaves and which causes great wear and tear on the moving parts of the engine. It is not known whether the new development has overcome this difficulty.)

"Three different types of liquid coal have been successfully used in the tests on the stock model automobile," Dr. Godwin said. The first was a suspension of a specially prepared coal ground to 300 mesh in a mixture of gasoline, fuel oil and lubricating oil. The second was a similar suspension of the coal in a Diesel oil. The third test was made with a very light oil. In each case, the liquid coal was chemically stabilized to hold the coal in suspension.

The demonstration car was started on gasoline. The liquid coal was fed to the motor from an auxiliary tank after the motor had reached "driving heat."

The fuel can be marketed for about ten cents a gallon, Dr. Godwin declared. He foresees its most immediate automotive usefulness in the Diesel field.

Science News Letter, June 24, 1939