

## ASTRONOMY

# Mars Closest in Years

Red planet will be only 35,120,000 miles away at midnight on Sept. 6, Eastern Standard Time. Astronomers train telescopes on Mars in hopes of solving some of planet's puzzles.

By JAMES STOKLEY

► THE LONG-AWAITED VISIT of Mars to the earth is now here. The red planet now shines brilliantly in the southeastern evening sky.

At midnight on Sept. 6, E.S.T., its distance will be only 35,120,000 miles—closer than it has come since 1924. Not until 1971 will it come even nearly as close.

Such an approach of Mars occurs when the planet is at opposition, i.e., when it is in a part of the sky directly opposite the sun. Consequently, in September it will be rising in the east as the sun is setting in the west, and thus will remain visible throughout the night.

Mars is now in the constellation of Aquarius, the water carrier, and its position is shown on the accompanying maps. These depict the sky as it appears about 10:00 p.m., your own kind of standard time, at the first of September, an hour earlier at the middle of the month, and two hours earlier at the end. (Add one hour for daylight saving time).

## Mars Easy to Identify

The magnitude of Mars, on the scale used by the astronomer, is minus 2.6 far brighter than any other object seen in the evening, with the exception of the moon. This, and its red color, make it easy to identify.

Earlier in the evening, however, another planet can be seen. This is Saturn, which is in the constellation of Libra, the scales, a group that sets before the times for which the maps are drawn.

Just as soon as darkness has fallen, Saturn can be seen in the southwestern sky—of magnitude 0.8. This is equal to a first magnitude star, but is only about a twenty-fifth as bright as Mars.

Saturn and Mars are the only planets visible in the September evening skies. The other bodies shown are stars which, like the sun, shine with their own light.

The planets, on the other hand, are visible because of the sunlight they reflect to us. Also the planets are much closer. They are members of our own family of orbs which revolve about the sun.

The brightest star now visible is Vega, in Lyra, the lyre, high in the west, and nearly twice as bright as Saturn. Below it, to the left, is Aquila, the eagle, in which Altair shines. And practically overhead is Cygnus, the swan, of which Deneb is the brightest star.

Three other stars shown are of the first

magnitude, but all are quite low, so their brightness is dimmed on account of the greater thickness of the earth's atmosphere through which their light has to pass in reaching us. One is Capella, in Auriga, the charioteer, which is near the northeastern horizon. During winter months this star climbs high overhead.

Low in the south is Piscis Austrinus, the southern fish, with the star called Fomalhaut. This is a group in the far southern part of the sky, now almost as high as it ever rises for us.

Low in the northwest we find Arcturus, in Bootes, the bear-driver, which shone high in the south in evenings of May and June, but is now about to disappear for a while.

## Venus Also Visible

The planet Venus, so brilliant in the evening a few months ago, is now prominent in the east for several hours before sunrise. It is even brighter than Mars. Of the other naked-eye planets, both Mercury and Jupiter are now nearly in line with the sun, and above the horizon only during daylight hours, when they cannot be seen.

Even though Mars is now making the closest approach in 32 years and is being observed with some of the world's greatest telescopes, it is still not possible to see it as well as we can view the moon through a good pair of binoculars.

Despite this handicap, intensive studies made over the years have revealed many facts about it. This year, with newer instruments and improved techniques, some of the remaining puzzles may be solved.

Chief features of the planet, seen through a good-sized telescope, is the white areas around its poles. At present the south pole

of Mars is turned to our view, and it is the southern hemisphere which we can observe best.

Spring began there on May 4 (by our calendar) and summer comes on Sept. 27. During this time the southern polar cap has been receding, but it seldom disappears completely. The one around the north Martian pole, which we can see at other times, never disappears.

While these caps are undoubtedly frozen water, they are not deep fields of snow and ice, like those around the poles of the earth. Rather do they seem to be very thin deposits of frost.

## Polar Caps Evaporate

They do not actually melt, but evaporate. Even solid ice can pass directly into the vapor phase, without first turning to water, and wet clothes (on earth) will dry on the line even in winter, with the temperatures continually below freezing.

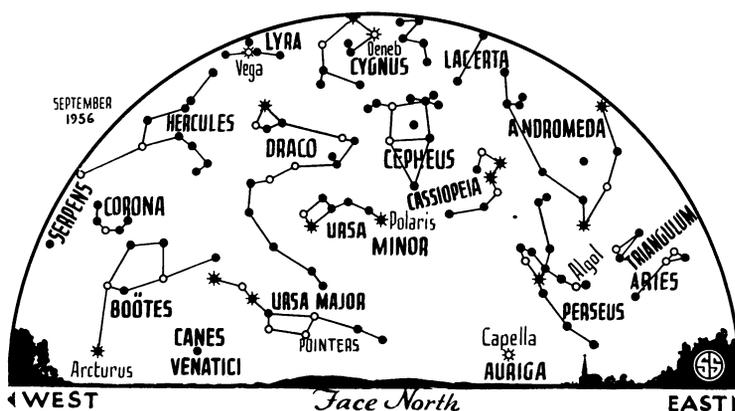
Something like three-quarters of the surface of Mars is covered with areas that are reddish or yellowish in color. These are thought to be mainly deserts.

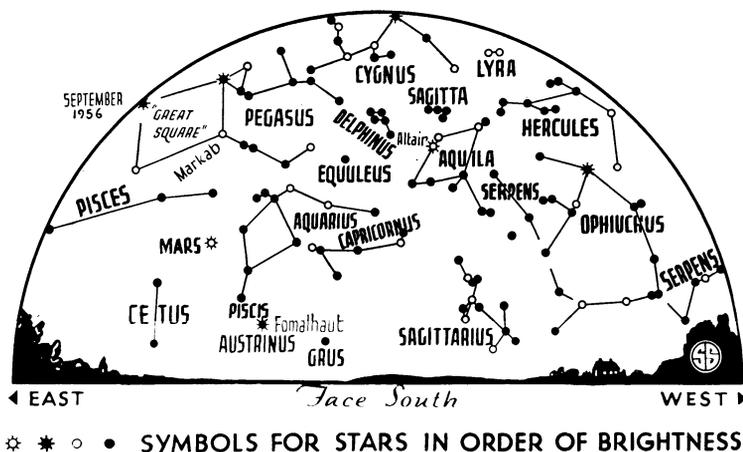
The red areas may be of a mineral like some of those known on earth, consisting largely of iron oxide—that is, iron "rust." But about a fifth of the surface is dark, and these areas change color with the advancing Martian seasons.

Since they show greenish hues, it is believed that these are areas of vegetation—however, they could hardly be forests like those on earth, or even grassy plains, because of the rigorous conditions that exist there.

With an instrument called a thermocouple, attached to a large telescope, temperatures have been measured on the surface of Mars.

Although determinations made by different observers vary somewhat, it has been estimated, by W. W. Coblentz, for example, that it may get above 86 degrees Fahrenheit at noon, when closest to the sun, and that





on the dark side it may drop as low as 150 below zero. The mean temperature would be in the neighborhood of 10 degrees, as compared with about 60 on the earth.

Mars has an atmosphere, although at the surface it is only about an eleventh as dense as the earth's at sea level, that is, about the same density as ours would be at an altitude of 11 miles. It contains little if any oxygen, certainly less than one percent of the proportion that we enjoy.

There is about twice as much carbon dioxide as we have, and perhaps nitrogen as well. Clouds sometimes appear in the Martian air. They are of several kinds: white clouds, probably similar to cirrus clouds on earth, which consist of ice crystals; a peculiar bluish cloud, believed to consist of much finer ice crystals; and others that are yellow in color—perhaps sand or dust storms.

### Lichens Might Exist

One kind of vegetation known on earth might be able to exist under Martian conditions, namely, the lichens. Actually there are two different plants—algae and fungi living together, in "symbiosis," the biologist calls it. They share the labor; the fungus protects from cold and holds moisture, while the algae build up organic substances and supply oxygen to the system.

On our planet they grow where no other plant can survive, on rocks in the Himalayas as high as 16,000 feet, for example. So it might be that lichens, or some comparable form of vegetation, make up the greenish areas on Mars.

Higher life, especially animal life, seems very unlikely. The chief evidence for any such, in the past, was the so-called canals. These were discovered, when Mars made a close approach in 1877, by an Italian astronomer named Schiaparelli.

He saw what seemed to be a network of straight lines crossing the planet, and called them "canali," which is Italian for "channels." However, the word was translated into English as "canals," and that is what they are now generally called.

Doubtless this mistranslation has had a lot to do with the idea that they are some

sort of artificial structure, since "canal," unlike "channel," connotes a waterway made by man. But a famous astronomer, Percival Lowell, who founded the Lowell Observatory at Flagstaff, Ariz., where some of the most important studies of Mars have been made, did propose a theory that they form a complicated network of actual canals, dug by intelligent beings to carry water supplies around an arid planet.

### Few Believe Man-Made

Very few authorities hold to this theory now, and the nature of the canals is still a puzzle that has not been solved. Some think they are merely illusions, for under some conditions, when not seen very clearly, irregular chance markings may look as if they formed straight lines. Others believe that something is there, although they do not know what.

Perhaps, as one astronomer, Dr. Robert S. Richardson of the Mt. Wilson Observatory, has suggested, when we find out some

### MEDICINE

## Throw-Away Kidneys

► THE LATEST THING in life-saving artificial kidneys will be a throw-away job in a tin can with garden hose connection.

It was designed by Dr. Willem J. Kolff, the "father" of artificial kidneys, who made his first model secretly during the Nazi occupation of Holland. Working with him on the newest model were Drs. Bruno Watschinger and Victor Vertes at the Cleveland Clinic Foundation in Ohio.

Artificial kidneys, some of them large and costly, are used to "wash" the blood of patients suffering kidney failure. Poisons usually eliminated by the kidneys are removed by running the blood through a dialyzer.

The new canned artificial kidney consists of a stationary coil or cellulose tubing separated by Fiberglas screens. Layers of screen and tubing are sewed in large rolls and coiled around a 10-ounce fruit can.

day just what they actually are we will be disappointed. They may turn out to be something of which we already have some general knowledge, and we will wonder why nobody ever thought of that.

A full explanation may not come until interplanetary exploration has made it possible to go to Mars and see what the canals really are.

On the other hand, at some earlier stage of space travel we may be able to establish an observatory above the earth's atmosphere, where astronomers can use enormously powerful telescopes without the difficulties now encountered as we try to look from the bottom of the earth's ocean of air. And then, on some future close approach of Mars, the puzzle may be solved.

### Celestial Time Table for September

SEPT.	EST	
1	7:29 a.m.	Moon passes Venus.
2	11:00 p.m.	Moon nearest, 224,300 miles distant.
4	11:00 a.m.	Jupiter on opposite side of sun.
	1:57 p.m.	New moon.
6	12:00 mid-night	Mars nearest, distance 35,120,000 miles.
10	2:01 a.m.	Moon passes Saturn.
	5:00 p.m.	Earth between Mars and sun.
11	7:13 p.m.	Moon in first quarter.
14	12:00 p.m.	Moon farthest, distance 251,700 miles.
19	9:02 a.m.	Moon passes Mars.
	10:19 p.m.	Full moon (Harvest Moon—for several nights about this date rises at nearly same hour).
22	8:36 p.m.	Sun directly over equator, beginning of autumn.
26	8:00 a.m.	Mercury between sun and earth.
27	6:25 a.m.	Moon in last quarter.
30	8:51 p.m.	Moon passes Venus.
	9:00 p.m.	Moon nearest, distance 227,400 miles.

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

Science News Letter, August 25, 1956

This is set into a larger can with the garden hose connection for the rinsing fluid at the bottom. The larger can is sealed for shipping and can be opened when needed with an ordinary can opener.

After use, this whole unit can be thrown away, thus eliminating the usual cleaning, sterilizing and setting up which takes much time. Pumps for the blood and rinsing fluid and a tank are still needed. The initial investment need not be more than \$800, Dr. Kolff and associates state.

The dialyzing tin can unit complete with tubing for connection with patient will be mass produced by Baxter Laboratories, Morton Grove, Ill.

The new disposable artificial kidney and results of its use in several cases are reported in the *Journal of the American Medical Association* (Aug. 11).

Science News Letter, August 25, 1956