

ASTRONOMY

Mars Still Brightens

As Mars becomes brighter in the October evening sky, astronomers prepare to study the total eclipse of the sun on Oct. 12.

By JAMES STOKLEY

► **STEADILY DRAWING** closer to earth, the red planet Mars is becoming brighter than any star, or any other planet, visible in the evening sky. At a distance of 63,000,000 miles on Oct. 1, it will be only 52,700,000 miles from us on the 31st. It will then be approaching its minimum distance of 45,310,000 miles, which it reaches on Nov. 8.

Mars rises in the east about 8:00 p.m., your own kind of standard time (add one hour for daylight saving) at the beginning of October, or about two hours after sunset. It is then in the constellation of Taurus, the bull, which can be seen low in the east.

Its position is shown on the accompanying maps. These picture the sky as it appears around 10:00 p.m., your own kind of standard time, Oct. 1, an hour earlier on the 15th and two hours earlier at the end of the month. Expressed in the scale used by astronomers, its brightness increases during October from minus 1.2 to minus 1.8, which is an increase of 75%. It is now about ten times as bright as the first magnitude star Aldebaran, which is below Mars, also in Taurus. Another star of this magnitude, and even brighter, is Capella, in Auriga, the charioteer, which is just to the left of Taurus.

Vega Now Brightest

Brightest star of the October evenings, however, is Vega, in Lyra, the lyre, high in the northwest. Directly above it is Cygnus, the swan, in which Deneb is the lucida, the most brilliant star. Altair, also of the first magnitude, appears to the left of Lyra, in Aquila, the eagle.

A little earlier in the evening than the times for which the maps are prepared, you can see another planet, Saturn. It is in Ophiuchus, part of which is shown, in the west. Saturn sets, at the beginning of October, about 9:30.

The other naked eye planets are not easily visible in October. Mercury is too nearly in the same direction as the sun. The same is true of Jupiter, which was shining so brightly in the southwest a month or two ago.

Venus has been shining very brightly in the morning sky, just before sunrise. At the first of October it will appear above the eastern horizon about an hour ahead of the sun, and may be glimpsed if you have a clear view in that direction. By the end of the month, however, it will rise only a few minutes before sunrise, and will not be visible.

As the moon goes through its phases dur-

ing October, it will reach the new phase on Columbus Day, Oct. 12, at 3:52 p.m., EST. Whenever the moon is new it is nearly in the same direction as the sun, which is why we cannot then see it. The moon is illuminated only by sunlight, and then the half on which the sun is shining is turned away from us.

Ordinarily at new moon, however, that body does not come squarely between sun and earth; rather it goes a little north or south of the line joining the two bodies. But occasionally the moon does pass directly between them. Then its shadow may fall on some part of the earth, and from the region the shadow covers, the sun is hidden from view. That is, there is a total eclipse of the sun.

Such an event will happen on Columbus Day, Oct. 12. The eclipse will not be visible in the United States or any part of North America, but many scientists from various nations have migrated temporarily to some small islands in the South Pacific where it can be observed.

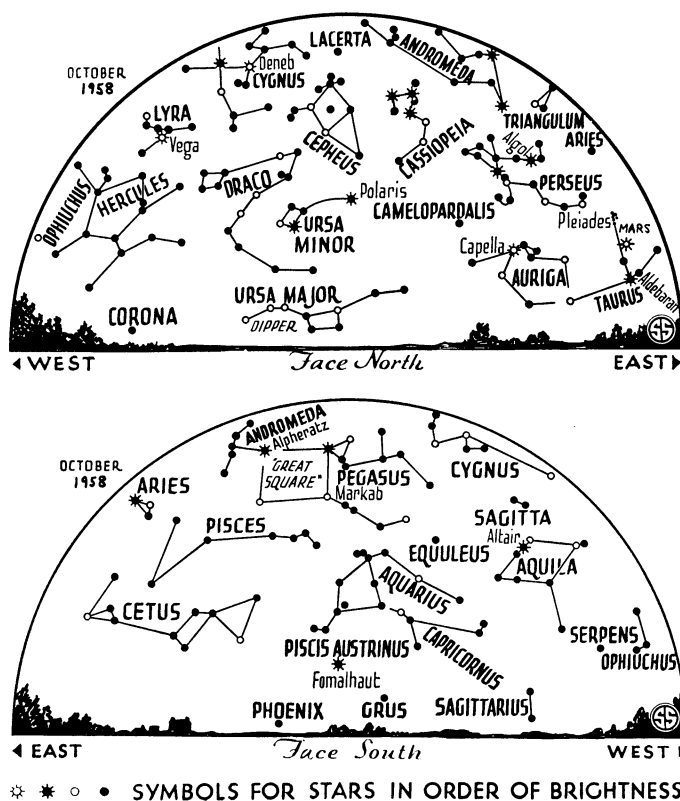
At 1:20 p.m., Eastern Standard Time, from a point in the Pacific near the Marshall Islands, which are about half way between Hawaii and New Guinea, the sun will be just rising. An observer at that place, looking carefully, would see a tiny

nick in the upper edge of the solar disc. This would be the moon, as the eclipse was just beginning. However, from this position he never would see the sun completely hidden.

The total eclipse will be visible along a path more than a hundred miles wide, starting at a point on the equator, north of the Solomon Islands. Here, at 2:17 p.m., EST, the sun would just be rising totally eclipsed. The tip of the moon's shadow, which is shaped like a cone, would just be touching earth. From there it sweeps in a southeasterly direction, tracing out the path of totality, until it leaves the earth, near San Luis, in the interior of Argentina.

There are a number of small islands in this path, and it is to these that the astronomers have traveled, since the most satisfactory eclipse observations require solid ground under the instruments. Five expeditions have gone from the United States to the Danger Islands, a group formed by a coral atoll at 10 degrees 55 minutes south latitude and 165 degrees 50 minutes west longitude. Their observations are part of the International Geophysical Year, the great project to study the earth and its surroundings, in which virtually all the nations of the earth are cooperating.

A naval vessel, the USS Thomaston, which is an LSD (landing ship dock, a kind of floating drydock), reached the eclipse site early in September. Since the entrance to the lagoon is not large enough to permit a ship of this size to enter, and the water offshore is too deep for an anchorage, it has



been slowly cruising back and forth two or three miles out, in the open ocean. The ship is provided with a helicopter, to carry the scientists back and forth, as well as equipment, for the members of the expedition will generally live on board. From there, the sun will be hidden for more than four minutes.

In addition to Americans, Russian astronomers are also ready to observe the eclipse, from another location. Japanese astronomers from Tokyo Observatory will make their eclipse observations from Suwarrow Island, which is about 200 miles southeast of the Danger group. Somewhat farther east is Tahiti which, however, is not in the path of totality, so Tahitians will see only a large partial eclipse.

Study the Corona

Although it is no longer necessary, as it was a few years ago, to wait for a total eclipse to observe the sun's outermost layer, the corona, this region can only be seen and photographed in its greatest detail and extent at such a time. Thus, many of the observations will be to record the corona, which changes in step with the 11-year cycle of solar activity.

Other studies will be made of the solar atmosphere, which is at the rim of the bright disc as we ordinarily see it. Just at the beginning, and end, of a total eclipse, part of this layer can be observed by itself, as the rest of the sun is covered. This will be done with the aid of spectroscopes which analyze its light and yield many valuable data.

Of course, such observations require a clear sky, and the New Zealand Weather Bureau has estimated that the chances of clear weather at eclipse time are 60%. But possible clouds will not affect the six Nike-Asp two-stage rockets that will be fired to a height of 150 miles; two before, two during and two after totality. These will be sent aloft from the Thomaston, and will make records of short ultraviolet rays and X-rays from the sun, radiations that do not reach the ground. Radio observations will also be made, to determine changes in the high atmosphere as it is momentarily in the moon's shadow.

Celestial Time Table for October

OCT. EST

2	1:23 p.m.	Moon passes Mars.
5	8:20 p.m.	Moon in last quarter.
12	3:52 p.m.	New moon; total eclipse visible in South Pacific.
	9:00 p.m.	Moon nearest; distance 221,900 miles.
16	8:12 p.m.	Moon passes Saturn.
19	9:07 a.m.	Moon in first quarter.
20	early a.m.	Meteors visible radiating from constellation Orion.
26	7:00 p.m.	Moon farthest; distance 252,500 miles.
27	10:41 a.m.	Full moon, Hunter's moon.
29	2:14 p.m.	Moon passes Mars.
31	early a.m.	Meteors visible radiating from Taurus.

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

Science News Letter, September 27, 1958

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