ASTRONOMY

Venus and Mars Now Prominent

Venus and Mars are the brightest planets in December. Mars is bright because it approaches earth. Venus, Saturn and Jupiter set early in the evening, James Stokley reports.

➤ LOOK TOWARD the western sky these evenings, soon after the sun has gone below the horizon. Long before it is dark, and other stars and planets have appeared, you will see Venus shining brilliantly in the southwest.

Because it sets in early December about three hours after the sun, Venus is not shown on the accompanying maps. (These give the appearance of the skies about ten p.m., your own kind of standard time at the beginning of December; an hour earlier at the middle of the month and two hours earlier at the end.) Its approximate position in the closing days of the month is indicated by a letter V in a circle.

Our second bright planet, however, is visible practically all night. This is Mars, whose position is shown in the constellation of Gemini, the twins, toward the east. This is a region of many bright stars, but Mars is brighter than most of them. Its red color and steady light, so different from the twinkling stars, make it easy to identify.

Jupiter, which was so prominent in the evening sky earlier in the year, sets about an hour and a half after the sun at the beginning of December. Perhaps you can get a glimpse of it very low in the southwest soon after sunset. Saturn also is in that direction. It remains visible a little longer, setting, around the first week of December, about an hour ahead of Venus. It is considerably fainter than either Venus or Jupiter, so it is more difficult to locate.

Sirius Fainter Than Venus

Among the stars of December evenings the brightest is Sirius, part of Canis Major, the great dog, over in the southeast. It is somewhat brighter than Mars, but considerably fainter than Venus. Above Sirius shines the brilliant constellation of Orion, the warrior, in which there are two stars bright enough to rank as first magnitude on the astronomical scale of brilliance. Betelgeuse is above, Rigel below; between them are the three fainter stars in a row that form Orion's belt, as he was pictured on the old star maps.

Still higher you can see Taurus, the bull, with another first-magnitude star, Aldebaran. Toward the left stands Auriga, the charioteer, with Capella, which is about as bright. Descending from Auriga you come to Gemini, the twins, where Mars is now located. This contains two bright stars, both fainter than the planet. Pollux, the brighter, is first magnitude; Castor, the other, is second. And between Pollux and Sirius is the lesser dog, Canis Minor, with the star named Procyon.

And low in the northwest our maps show a star called Vega. This is in Lyra, the lyre, and it is also of the first magnitude. However, at present it stands so close to the horizon that it is dimmed greatly by the added thickness of air through which its light has to travel.

Mars is now so bright because it is making one of its regular approaches to earth, as it does every 780 days. On Christmas day it will be nearest—56,370,000 miles away. It came closer the last time (Nov. 16, 1958). The time before that (Sept. 10, 1956) it was still closer, its distance a little more than 35 million miles from earth. Under optimum conditions, it can approach to a minimum of 34,500,000 miles. Its next very close visit will come in early August, 1971, when it will be about 35 million miles away.

Even when closest, Mars is about 160 times as far away as the moon. A typical pair of binoculars will magnify six diameters, that is, they will apparently bring a distant object to within a sixth of its actual distance. Six times 160 is 960, and this is about the highest magnification that can be used ordinarily, even with a big telescope under good conditions. Thus Mars through a large telescope looks as close as the moon does through binoculars.

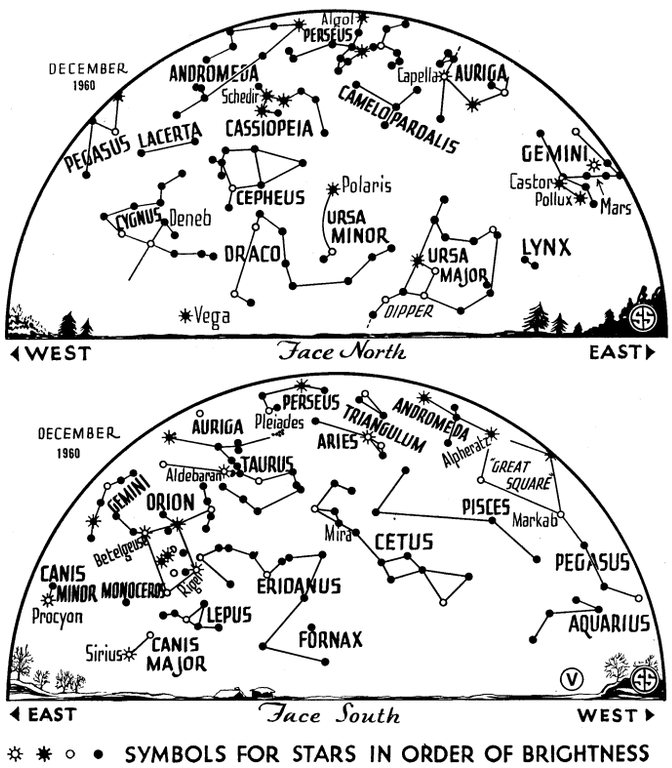
However, there are definite and permanent markings on Mars, which can be detected through even moderate-size telescopes. These dark markings cover about a third of the Martian surface, while about two-thirds is bright orange in color. This is what gives Mars its characteristic red color.

Perhaps the light regions are desert areas covered wtih sand or dust. This may contain iron oxide, or iron rust, which is red. There is very little oxygen in the present atmosphere of Mars. It may have been more abundant in the past, but now has entered into chemical combination with other elements to form oxides—that is, Mars may literally have rusted.

When Mars made a close approach in 1877, an Italian astronomer named Schiaparelli thought he could observe a network of thin dark lines covering the light regions. He called them "canali," which is Italian for "channels." Unfortunately, the word was translated into English as "canals;" this suggests an artificial origin, which "channels" does not.

Mars Canals Argued

An American astronomer named Lowell, from his private observatory in Arizona, later reported that these canals extended across the dark areas, proving that they were not bodies of water. Moreover, he argued, the canals were so straight that no natural process could have formed them; therefore they must be of artificial origin. This was the basis of his contention that Mars is inhabited by a race of highly intelligent beings.



Other astronomers, however, were unable to see the canals as Lowell did. Now it seems that they are dark patches, roughly aligned. Even under the best conditions, we cannot see them very clearly, and they seem to be joined to form the fine lines that Schiaparelli and Lowell reported.

This seems to have been confirmed in 1948 when Dr. Audouin Dollfuss, a French astronomer, was observing Mars with a large telescope at the observatory on the Pic du Midi, in the Pyrenees in southern France. This location is blessed with extraordinarily fine seeing conditions.

Under their usual conditions, probably better than the best at most observatories, he saw many "canals." But on a few occasions, he said, the seeing was not merely "good;" it was "perfect!" The lines then broke up into smaller spots and patches. Then would come a slight tremor of the atmosphere, and the spots would join together again into straight lines.

Just why such spots should be roughly aligned is a puzzle, which probably will not be solved until Mars can be observed much more closely than it can from the surface of the earth.

Celestial Time Table for December

Dec.	EST	
2	11:25 p.m.	Full moon
3	1:39 a.m.	Algol (variable star in Perseus) at minimum brightness
5	10:28 p.m.	Algol (variable star in Perseus) at minimum brightness
6	1:00 a.m.	Moon passes south of Mars
	10:00 p.m.	Moon farthest; distance 252,100 miles
8	7:17 p.m.	Algol at minimum
11	4:39 a.m.	Moon in last quarter
13	early a.m.	Meteors visible apparently emanating from constellation of Gemini
18	5:47 a.m.	New moon
19	6:00 a.m.	Moon nearest, distance 222,800 miles
	5:00 p.m.	Moon passes north of Saturn
21	10:00 a.m.	Moon passes north of Venus
	3:27 p.m.	Sun farthest south — winter solstice—winter commences in Northern Hemisphere
23	3:23 a.m.	Algol at minimum
24	9:30 p.m.	Moon in first quarter
25	1:00 a.m.	Mars nearest earth, distance 56,370,000 miles
26	12:12 a.m.	Algol at minimum
28	9:01 p.m.	Algol at minimum
30	5:00 a.m.	Mars in opposite direction from sun.

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

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Questions

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BIOLOGY—Which aspects of human cell reactions could experiments with luciferin show? p. 343.

GEOPHYSICS—What effect did the recent solar storm have on the orbital time of satellites? p. 339.

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