

ASTRONOMY

Mars Only Planet Now Visible

Three first magnitude stars are conspicuous in the south during May evenings. Mars is nearly 100,000,000 miles farther away than at Christmas, James Stokley reports.

➤ ALTHOUGH THE EVENING skies of May are devoid of brilliant planets, a number of bright stars are visible, as shown on the accompanying maps. These depict the skies as they look about 10:00 p.m., your own kind of standard time, at the beginning of May, an hour earlier at the middle of the month and two hours earlier at the end. (Add one hour for daylight saving time.)

The only planet indicated is Mars, halfway up in the west, in the constellation of Cancer, the crab. Last Christmas Mars approached to within 56,000,000 miles of earth. In the first half of May it will be about a hundred million miles farther, so it has faded greatly. It is now about equal to a bright star of the second magnitude.

Conspicuous among the stars now visible in the evening are three shining in the south, all of first magnitude. High in the southwest, in Leo, the lion, is Regulus, which is at the end of the handle (directed downward) of a smaller figure known as the sickle. The blade of the sickle is supposed to mark the lion's head, as he was depicted on the old star maps. To the left is a second magnitude star called Denebola, which marks the end of the tail.

Beginning under Denebola and extending toward the east is a group of stars that form the constellation of Virgo, the virgin. Among them is first magnitude Spica. And above the left-hand end of this group you will find Bootes, the herdsman, with brilliant Arcturus, also first magnitude.

Antares Now Low in Sky

Close to the horizon, in the southeast, part of Scorpius, the scorpion, is shown. In it is the star Antares, which is usually also of first magnitude. Here, however, it is so low in the sky that its light has to pass through a great thickness of the earth's atmosphere. Thus it is shown with the third magnitude symbol. By July, however, it will be higher in the southern sky, and the whole constellation will be seen to better advantage.

Turning to the west, a few of the typical winter constellations, appearing for the last time, are visible. In the constellation of Gemini, the twins, you find Pollux (first magnitude) and Castor (second). To the left is Canis Minor, the lesser dog with Procyon; while Capella is to the right, in Auriga, the charioteer.

In the northeast shines bright Vega, in Lyra, the lyre. Below it is Cygnus, the swan, only part of which is visible. But in this part is the star Deneb, another bright orb that is dimmed by reason of low altitude. These groups will climb higher into the sky, and become more prominent, during summer evenings.

The "big dipper," which is part of Ursa Major, the great bear, is now in its best evening position of the year—high in the north. Below, in the direction indicated by the pointers (two stars in the dipper's bowl) is Polaris, the pole star, which we always see in the north. It is part of the little dipper and this in turn is part of Ursa Minor, the lesser bear.

About midnight in May, two more planets rise in the east. First comes Saturn, which is about equal to a first magnitude star; then Jupiter, which is about twelve times as bright. Both are in Capricornus, the sea-goat.

Mercury on May 1 will be behind the sun, but by the 31st it will have swung to its farthest east of the sun. Then it will set about an hour and three quarters after sunset. For a few days, around this time, you may be able to see it low in the west, before the sky becomes entirely dark.

In May Venus rises about one and one-half to two hours before sunrise, so you can see it in the morning twilight. On the 16th, a few days before the Soviet space probe is expected to pass close by it, the planet will have greatest brilliance. Then it will be at minus 4.2 on the astronomical magnitude scale. This will be about 7.6 times brighter than Jupiter. Venus will be

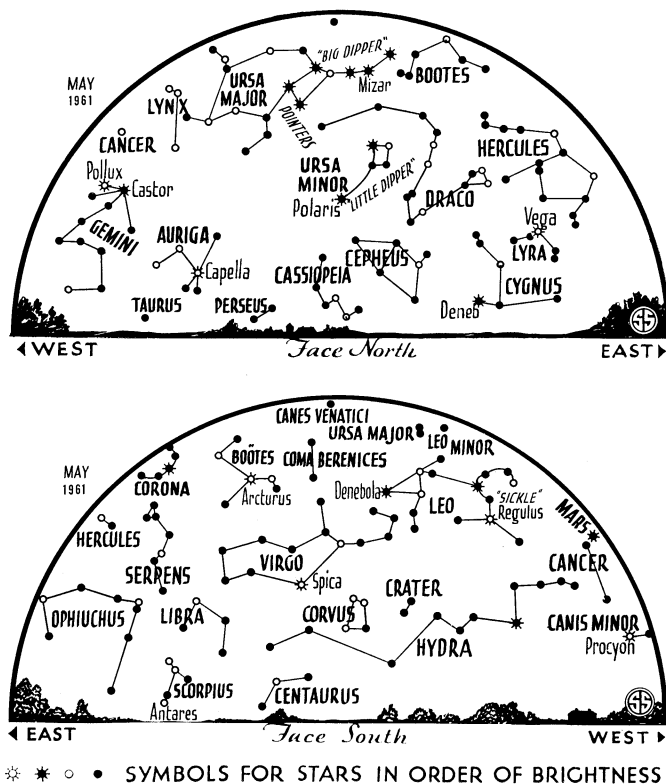
so bright that you can even see it in the sky after the sun has risen.

With space probes revealing more and more about the solar system and its members, astronomers are looking forward to finding answers to some of the puzzles concerning Mars. Unlike Venus, which is constantly covered with clouds, the surface of Mars can be seen. Astronomers have tended, quite naturally, to interpret what they saw in terms of what they knew to occur on earth.

When they observed white areas to appear around the poles of Mars during the winter, and to vanish when summer came, they assumed they were deposits of ice and snow. The green areas that appeared nearer the Martian equator in spring, only to turn brown in autumn, were interpreted as areas of some sort of vegetation. That is the way vegetation of earth would look from Venus, for example.

Astronomers have seen yellow clouds over Mars, occasionally hiding the surface completely. These, it was thought, were sand and dust storms, blown up by strong winds.

But there are objections to these ideas. The atmosphere of Mars seems to be very thin, a little more dense than that of the earth above Mt. Everest. Air so thin could hardly hold so much dust, or sand. And studies of the light of Mars, analyzed through the spectroscope, have failed to reveal the presence of either water vapor or oxygen in the atmosphere. Both substances



* * • • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

would have to be there, if there is ice and snow, or vegetation.

In a report to the Astronomical Society of the Pacific, three astronomers of the Georgetown University Observatory, Washington, D. C., Drs. C. C. and H. K. Kiess, and S. Karrer, suggest a new interpretation of the Martian features. They attribute the effects to oxides of nitrogen—combinations of that element with oxygen.

Originally, perhaps, the atmosphere did contain oxygen and water vapor, along with nitrogen, in a composition much like our atmosphere. But the water has all been decomposed by the action of light, or has entered into combination with minerals on the surface. The oxygen combined chemically with other surface elements, as well as with nitrogen in the atmosphere. Thus would have formed the oxides of nitrogen, of which there are a number.

Several of these, the scientists propose, could exist in the atmosphere of Mars. One of these is nitrogen tetroxide, made of molecules consisting of two atoms of nitrogen and four of oxygen (N₂O₄).

When it becomes cold enough around the poles, according to their theory, the nitrogen tetroxide would deposit on the ground in solid form, in which it is chalky-white. As the temperature rises, it sublimates, that is, it goes directly to a gaseous phase without becoming a liquid. Then as the gaseous nitrogen tetroxide, probably combined with nitrogen dioxide (NO₂), moves towards the other pole, it changes the color of mineral deposits along the way, producing the blues and greens that are observed. Later these would revert back to their former brownish hues.

"From our viewpoint," the Georgetown scientists report, "the yellow clouds are masses of nitrogen dioxide (NO₂) gas of greater than normal concentration, formed whenever local or area-wide warming occurs on the surface or in the lower atmosphere of the planet. The transparent nitrogen tetroxide will dissociate into the dioxide with its characteristic yellow color. Color saturation will depend on the concentration of the NO₂ molecules. When the temperature falls, the NO₂ molecules will again recombine to form N₂O₄ gas, and the yellow veil will disappear."

If such an explanation is correct, they point out, "it will be necessary to abandon all ideas of Mars as an abode of life." The mixture of nitrogen dioxide and tetroxide, they note, "in small amounts is noxious to plants, and in larger amounts to animals. Near our urban centers, it is one of the pollutants causing damage to vegetation."

Celestial Time Table for May

May	EST	
1	6:00 p.m.	Mercury behind sun
6	7:00 a.m.	Moon passes Saturn
	7:00 p.m.	Moon nearest, distance 229,600 miles
11	11:00 a.m.	Moon passes Venus
14	11:55 a.m.	New moon
15	5:00 p.m.	Moon passes Mercury
16	3:00 p.m.	Venus at greatest brilliancy
20	1:00 p.m.	Moon passes Mars
22	11:19 a.m.	Moon in first quarter
29	11:38 p.m.	Full moon
31	11:00 p.m.	Mercury farthest east of sun

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

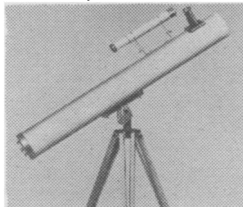
• Science News Letter, 79:250 April 22, 1961

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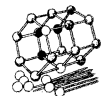
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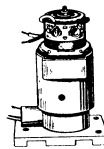
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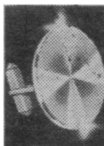
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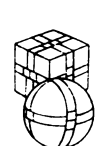
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