

ASTRONOMY

February Evening Skies

Mars With Its "Canal" Markings and Giant Jupiter are The Only Planets Visible in the Evenings This Month

By JAMES STOKLEY

TO MANY people the most familiar planet, except, of course, the earth itself, is Mars. Not because it is so brilliant, for Venus frequently surpasses it in brightness. Nor is it because of the fact that it is closest to us. Again, Venus approaches closer still. Mars is well known because of the great speculation that it has engendered. The "canals" of Mars—who has not heard of them?

This month Mars is well placed for viewing. High in the eastern sky this evening, if it is clear, Mars can be seen. Its steady planetary light distinguishes it from the neighborly stars, but its ruddy color affords the chief means of identification. Above it and even brighter, can be seen Jupiter, another member of the planetary family, but there should be no trouble in telling it from Mars.

To the naked eye, Mars does not seem especially striking, and to the layman, usually, the first view through a telescope is rather disappointing. But with a fairly large telescope, details are seen which can only occasionally and then very poorly, be glimpsed with a smaller instrument. Even with a large telescope these details are not at all clear. With such an instrument, Mars is seen scarcely better than is the moon with the naked eye. But these markings have been the cause of the vast amount of speculation concerning this interesting planet. They are the so-called "canals."

It is now nearly a half century since the Italian astronomer, Schiaparelli, first observed these markings with what was, even then, a rather small telescope. To them he gave the name "canali." When his writings were translated into English, they were rendered "canals," instead of "channels," which would have been more correct. This mistranslation has been the cause of much of the interest in Mars, for "canal" connotes an artificial origin, while a channel may or may not be the work of man.

The late Prof. Percival Lowell,

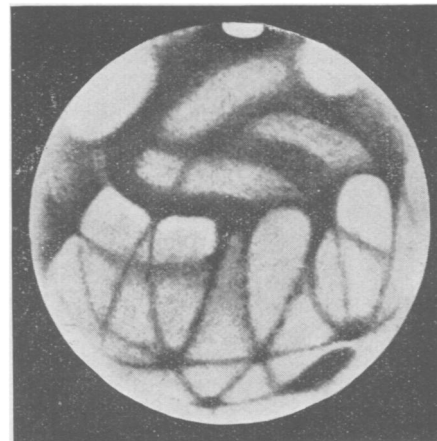
founder of the Lowell Observatory, in Arizona, did much to popularize Mars, for it was he who took the so-called canals as evidence for the existence there of intelligent life. Prof. Lowell was probably the greatest of the modern planetary observers. He was famous for his researches even before the discovery of the trans-Neptunian planet, Pluto, close to the place he predicted, was announced last year. Also, the observatory he founded is without doubt the chief center of planetary research.

But Prof. Lowell had private means. His observatory was entirely his own, and he was not liable to be called to account by any higher authority. Therefore he went, perhaps, a little farther than any other astronomer of the time would care to go. They would be content to make their observations and publish them, but would be very cautious about speculating as to their meaning.

"Wildest Speculation"

Prof. Lowell, however, indulged in what many thought to be the wildest speculation. In his books he tells us that he observed these markings for years, and that they went straight across the face of the planet, along that shortest distance between two points on a sphere—a great circle. This, he argued, would probably not be the case if they were natural; but if an intelligent being were planning a series of water courses on such a planet, he would follow just such courses. He supported this by other arguments, and thus built up an elaborate and ingenious theory. It is still a cause of controversy, but whether true or not, one can have nothing but admiration for its author. And though few astronomers, with the exception of Prof. Lowell's own successors at his observatory, are willing to accept it fully, recent years have seen a tendency towards accepting some of the parts of it.

For instance, it was stated, and on good authority, for many years, that the "canals" were mere optical illusions. The eye has a tendency, it was said, to connect together promiscuous points and marks, to form lines. But as other



"CANALS" OF MARS

As drawn by an astronomer who was a staunch believer in the canal theory.

observers saw them, and later, as they were photographed rather indistinctly, those who had completely opposed Lowell began to admit that there might be something of the kind on Mars. Today, it seems to be the consensus of opinion among astronomers that there are some kind of long, straight marks covering the surface of the planet. But whether they are the detailed network of fine lines that Lowell described, is more in question. And as for their affording evidence of the existence of intelligent life on Mars, few are willing to express their belief in this theory. And one present-day authority still holds out against them. Dr. E. M. Antoniadi, of the Meudon Observatory in France, and the leading European planetary observer, wrote a book on the planet which was published only a few months ago. One chapter in it is entitled, "The Illusion of Canals". In it he states: "No one has ever seen a true canal on Mars."

So the argument is still unsettled. Probably it will continue a subject for controversy until that distant day when planetary travel is possible, and explorers can actually go to Mars and find out. Larger telescopes will only help slightly. If there were no atmosphere, the larger telescopes became, the finer detail on Mars they could show. But unfortunately, or perhaps fortunately, we live on a planet surrounded by a layer of air which is always permeated by currents of different density which refract light in varying amounts.

Therefore, as a telescope becomes greater, the wider is the column of air through which the light has to travel to get to it. Thus, there is more opportunity for air currents to distort the image. Experienced planetary observers often find it necessary to reduce the size of their lenses by placing a diaphragm, or a dark screen with a hole in the center, over them. Consequently, it cannot be expected that the 200-inch telescope now being designed for the California Institute of Technology will answer the puzzles about Mars. The chief advantage of that huge instrument over smaller ones will be in gathering more light from objects very faint and very distant, but not requiring very great resolution of fine detail.

The other main planetary attraction of the February skies is Jupiter, shining almost overhead and even brighter than Mars. These two planets are very different. Mars is a little smaller than the earth in size, 4,216 miles in diameter as compared with ours of 7,918 miles. It revolves on its axis

once in about 24½ hours, so that its day is slightly longer than ours. It is somewhat more than one and a half times as far from the sun as the earth (141,500,000 miles as compared with 92,900,000) and makes a trip around its orbit in 687 days (a little less than a year and eleven months). It has two moons, both very small.

Jupiter, on the other hand, is the giant of the planets. So large is it that if it were a hollow shell it would be able to hold all the other planets. Its mean diameter is 86,728 miles, but its day, the time for revolution on its axis, is about 9 hours and 55 minutes. It takes nearly twelve of our years, or 4,333 days, to make one revolution in its orbit. But so huge is this orbit that it travels along at the rather respectable clip of eight miles a second. Its distance from the sun is about five and one-fifth times that of the earth, or 483,300,000 miles. In the matter of moons, it is better provided than any other planet except Saturn. Jupiter can boast, though it never does, of nine satellites.

Four of these are much brighter than the rest. These were the first objects discovered by Galileo in 1610 when he, for the first time in history, looked at the heavens through a telescope. In diameter, these four vary from 2,050 miles to 3,560 miles, so they are about as large as the planet Mercury, with its 3,009 miles. The other five are very small, so their size cannot be definitely determined. The smallest is only a few miles, and the largest may be of the order of a hundred miles. Probably there are other tiny satellites farther out that may be discovered with the larger instruments of the future.

Features of Jupiter

The chief feature of Jupiter, seen through a telescope, is its system of belts, which cross its disc. Also, the telescope shows that it has an appreciable bulge around the equator. The cause of this bulge is to be found in its rapid rotation, tending to throw the material along the equator out from the center. The earth, too, has an equatorial bulge, but not nearly so marked, because of our slower speed of rotation, and also because of our smaller size.

These are the only naked-eye planets visible this month in the evening sky. Among the stars, Orion is still the most prominent feature. Shining in the south, the three stars forming the warrior's belt afford easy means of identification. Above, is the reddish star Betelgeuse, below, Rigel, and above and to the right, Bellatrix. Capella, marking Auriga, the charioteer, is almost overhead. Sirius, the dog-star, in Canis Major, the great dog, is conspicuous in the southeast, and to its left is Procyon, in Canis Minor, the little dog, only slightly inferior in brightness. Pollux, the brighter of the twins, Gemini, is between Procyon and Capella, along with his brother, Castor.

Low in the northeast is now appearing another familiar group, the Sickle, of Leo, the lion. Regulus marks the end of the handle, at the bottom. Over in the west, the four stars, marking the "Great Square in Pegasus," is setting. The Great Dipper, with its pointers indicating the Pole star, is in the northeast, and above and to the right of the Pole star is the W-shaped group marking Cassiopeia. All of these are familiar groups, and one who wants to know the stars should be able to recognize them. Then, as you see them, night after night, they will seem like old friends.

