

ASTRONOMY

# Mars Passes Saturn

On January 10 this planet will be only 59,463,000 miles away from the earth and will shine brilliantly in the constellation of Gemini, the twins.

By JAMES STOKLEY

▶ ALTHOUGH the Second World War is now happily over, the planet Mars, identified by ancient superstitions with the God of War, makes a visit to earth this month. It is not a particularly close one, but on Jan. 10 this planet will be a mere 59,463,000 miles away, and will shine brilliantly, as it does through the month, in the constellation of Gemini, the twins, high in the eastern evening sky.

Then Mars will be just south of the bright star Pollux, one of the twins, and south of Mars will appear another planet, Saturn. At the beginning of the month Mars will be to the east of Saturn but on Jan. 22 will pass his sluggish brother, as both planets are now moving in a westerly direction.

These planets are shown on the accompanying maps, along with the January evening stars, as they will be seen about 10:00 p. m. at the beginning of the month and at 8:00 p. m. on Jan. 31.

Just below and to the right of the triple group formed by Pollux, Saturn and Mars is the first magnitude star Procyon, in Canis Minor, the lesser dog. Still lower and farther to the right is Canis Major, the greater dog, with Sirius, the brightest star of the night sky. Of course Sirius is exceeded in brilliance by some of the planets, but they shine by reflected sunlight, not by their own luminosity as do the stars.

## Many Stars

Above and to the right of Sirius is Orion, the warrior, one of the most conspicuous of all constellations, with the three stars in a row which form the belt. Above the belt is Betelgeuse and below is Rigel, both stars classed in the first magnitude. Continuing still farther to the right and upwards, we come to Taurus, the bull, with brilliant, ruddy Aldebaran to mark his eye. And when we continue northwards from Taurus we come next to Auriga, the charioteer, with another first magnitude star, Capella. Thus Pollux, Procyon, Sirius, Rigel, Aldebaran and Capella form a brilliant

ring of stars, with Betelgeuse near the center and, at present, their grandeur augmented by the presence of Mars and Saturn.

Though there are other first-magnitude stars in the sky, they are not in a position to be seen at their best. There is Regulus, in Leo, the lion, low in the east; and Deneb, in Cygnus, the swan, low in the northwest. This rises higher later in the evening, and then another planet appears, for Jupiter, near Spica, in Virgo, the virgin, rises around midnight.

## Mars Is Closer

Last year, even when the planet Mars was in the evening sky, it was hard to see because of its great distance as it stood on the farther side of the sun. But now earth and Mars are both in the same direction, and we make a close approach to each other, on Jan. 10. This approach occurs when Mars is almost at its greatest distance from the sun, and the earth nearly at its closest, so the two planets are much farther apart than they can be under the most favorable positions. In 1924, for instance, Mars was only about 35,000,000 miles away. These differences arise from the fact that the orbits of Mars and earth are not concentric circles, but ellipses. Just now the planets are in widely separated parts of their paths.

Close to Mars in the sky is the planet Saturn, which also is making an ap-

proach to the earth, although it is far beyond Mars. On Jan. 13 Saturn is closest, at a distance of 750,477,000 miles. Thus, like its brother, it is somewhat brighter than usual, and the two planets can now be watched in the midst of an interesting dance step.

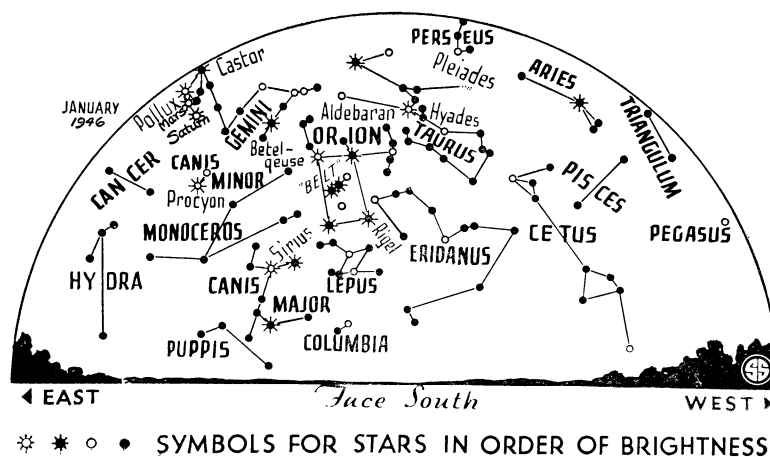
## Planets Retrograde

The general motion of the planets through the sky from day to day is west to east, the same as for the sun and moon. However, at certain times of year, as the earth overtakes its brethren moving in larger orbits, they seem to retrograde, or to move from east to west. The effect is exactly the same as that observed when you are in an express train, and go by a freight. Even though the latter is going the same direction as you, it seems to be traveling the other way, because you are observing it from a moving platform.

## Saturn "Stands Still"

Last Nov. 6 the earth and Saturn reached such a position that Saturn seemed to stand still in the sky, and then turn around for its retrograde movement. Mars did the same thing on Dec. 5. Thus, although Mars had passed Saturn, while both were moving easterly, on Oct. 26, they are now coming together again, and Mars will pass Saturn on Jan. 22. On Feb. 22 Mars turns around and resumes its easterly movement, while Saturn does the same on March 20. Just before that, however, on March 18, Mars will pass Saturn for the third time.

There is still another body that is close this month, for on Jan. 2 the earth will be at perihelion, when it is nearest the



## Do You Know?

*Aluminum clothespins* may soon replace the familiar pin of wood.

Approximately 10,000 derivatives of *sugar* have been made by chemists.

*Vitamin P* is able to increase the concentration of calcium in the blood.

*Onions* in storage keep best in darkness and dryness, and in a temperature slightly above freezing.

The thickness of the *skull* ranges from less than one-eighth of an inch to almost half an inch.

If *castor bean* growing can be adapted to American mechanized farm harvesting, it can become a permanent and profitable crop in the United States.

*Narcotic plants* or stimulants have been used since ancient days for purposes of exhilaration, intoxication or in tribal ceremonies.

The American *potato* crop this year will be about 433,000,000 bushels; this is 15% above the average of the past 10 years, and the second largest crop ever grown.

*Flax* was the only outstanding important crop of 1945 in France; the production surpassed prewar averages, which means good news for French textile mills.

*Sulfur* played an important part in winning the war, during which over 15,000,000 tons were mined in the United States to supply all domestic needs and much of the needs of the Allies.

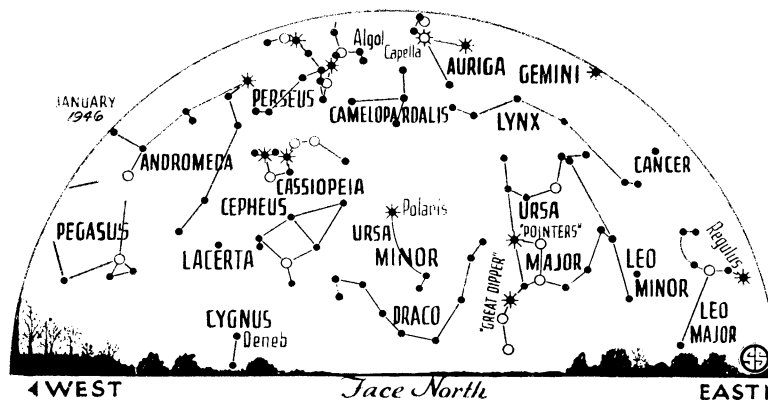
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sun for the entire year. The distance then will be 91,455,000 miles, or about 3,000,000 miles closer than it will be in July. This is often a surprise to people who think we should be warmer when the sun is nearest. Actually, of course, it is the height of the sun in our sky that determines how much heat we get from it. Now, even at noon, it is so low that its rays are spread thinly over the ground. In July, by way of contrast, the noon-day sun comes well overhead, and its rays of light and heat, falling more nearly vertically, are much more concentrated.

### Celestial Time Table for January

Jan.	EST	
2	1:00 p. m.	Sun nearest, distance 91,455,000 miles
3	7:30 a. m.	New moon Partial eclipse of sun, visible from South Pacific Ocean and Antarctica
10	2:00 a. m.	Mars nearest distance 59,463,000 miles
12	3:27 p. m.	Moon in first quarter
13	1:00 a. m.	Saturn opposite sun
14	8:00 p. m.	Mars opposite sun
14	7:00 a. m.	Moon nearest, 227,540 miles
16	11:17 p. m.	Moon passes Saturn
17	2:02 a. m.	Moon passes Mars
	9:46 a. m.	Full moon
22	12:00 noon	Mars passes Saturn
24	5:47 a. m.	Moon passes Jupiter
	12:00 mdt.	Moon in last quarter
26	2:00 a. m.	Moon farthest, 251,320 miles

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

Science News Letter, December 29, 1945

#### OPTICS

## Optics Imitates Nature

➤ ONCE MORE science finds it profitable to imitate nature. The latest instance is the use of multiple lens systems similar to the eye of a fly to produce optical spectral patterns for comparison with the X-ray spectral patterns found in examination of the structure of crystals. When the spatial arrangement of the lens in the artificial fly's eye is similar to the projection of the crystal structure on a plane, the optical spectra have the same arrangement as the X-ray images.

An improved technique for constructing such "eyes" is described by Prof. W. L. Bragg and A. R. Stokes of the Cavendish Laboratory, Cambridge, (*Nature*). Previously, the grid of lenses had been made by using pinholes in a square array, with 40 pinholes to the centimeter. This produced fuzzy images and suffered from the further difficulty that the pinholes were liable to be blocked by specks of dust. The new method is to replace the pinholes by small lenses embossed on the surface of a sheet of transparent plastic and to cover the rest of the sheet with a paper mask. The

minute lenses (0.06 centimeter in diameter, 0.5 centimeter in focal length) are produced by pressing a steel sphere into a soft copper block, and then casting or pressing the plastic on the block. The resulting images are sharper and more uniform in intensity than those given by the pinhole method.

The new method makes possible a rapid comparison of various geometrical arrangements for the structure of a given crystal. Previously, the determination of crystal structure from X-ray photographs required long and tedious calculations. Now a first approximation to the structure can quickly be obtained by a trial-and-error process of constructing a series of gratings with different geometrical arrangements. It should prove a valuable tool in speeding up routine X-ray determinations of crystal structure.

Science News Letter, December 29, 1945

Some *spiders* do not spin webs to catch their prey; they lie in ambush and pounce upon passing insects and grubs.