

ASTRONOMY

Quadruplets in the Sky

Mars and Saturn join Castor and Pollux on February evenings. Jupiter is visible late at night on the first, and earlier at the end of the month.

By JAMES STOKLEY

► **ALTHOUGH ONLY MARS** and Saturn, the same two planets that have been decorating the evening skies all winter, are now visible at a respectable hour, a third planet which is brighter than either comes up a little later in the night. This is Jupiter, and about Feb. 1 it appears a little to the south of the east point around midnight. It is in the constellation of Virgo, the virgin, and is close to Spica, brightest star in the figure. At the end of February it will rise about 10:00 p. m.

Mars and Saturn are close together in the constellation of Gemini, the twins, and with Castor and Pollux, the brightest stars, make it temporarily quadruplets. For recent months both of these planets have been moving in a "retrograde" or backward direction. That is, their path through the sky among the stars has been toward the west, because the earth has overtaken them, producing the same effect observed when an automobile overtakes a horse and carriage: to people in the auto, the other vehicle seems to be going in the opposite direction. On Feb. 21, however, Mars is stationary in the sky, and after that it will move toward the east once more, on the 19th of March passing Saturn, which will itself stand still and start to move eastwards a day later.

Sirius Is Brightest

The positions of the February evening stars and planets are shown on the accompanying maps, which are drawn for about 10:00 p. m., your local time, at the beginning of the month, and an hour earlier on the 15th. Most brilliant object shown is the Star Sirius, in Canis Major, the great dog. This star is brighter even than Mars or Saturn. It is not quite as bright as Jupiter, though when that planet appears it will look fainter because it is so low in the sky and its brilliance is dimmed by the passage of its light through a great thickness of the earth's atmosphere.

Sirius is directly south, and above it

are a number of other prominent constellations. To the right is Orion, the warrior. Three stars in a row mark Orion's belt. Above the belt is Betelgeuse and below is Rigel. Also above the belt, though not classed as first magnitude, is Bellatrix, a star, which, like Betelgeuse, is supposed to be one of the giant's shoulders. On the old star maps where these fanciful figures were depicted around the stars was also an uplifted club, to the right of Bellatrix, which Orion is using to protect himself from the charging bull, Taurus, the constellation next above and to the right.

Aldebaran, red in color, forms the bull's eye, and the V-shaped group of stars, of which it is part (called the Hyades), his head. The two stars above Orion, towards Auriga, the charioteer, are the tips of the horns. In Auriga itself, almost overhead, is first-magnitude Capella. Gemini, the twins, are above and to the left of Orion, and this group can now easily be found because of the bright planets that it contains.

Below Gemini is Canis Minor, the lesser dog, with the star Procyon. About as high as Canis Minor, toward the east, is Leo, the lion, containing another star of the first magnitude, called Regulus.

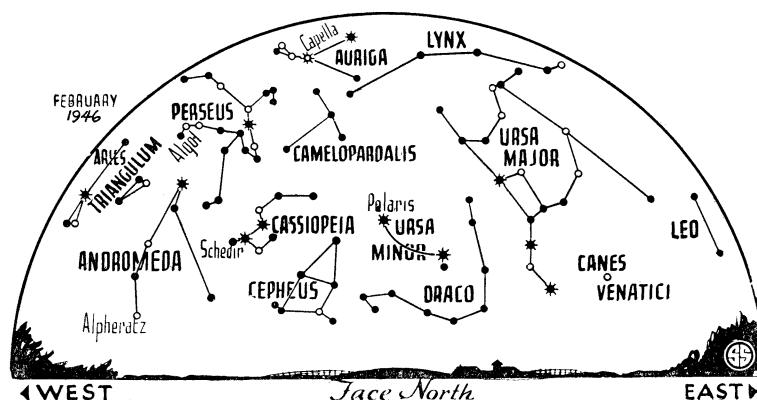
During the earlier part of February, the moon will pass through the part of the sky we have been describing. New on Feb. 1, it will appear a couple of days later in the west as a narrow crescent seen just after sunset. On Feb. 8

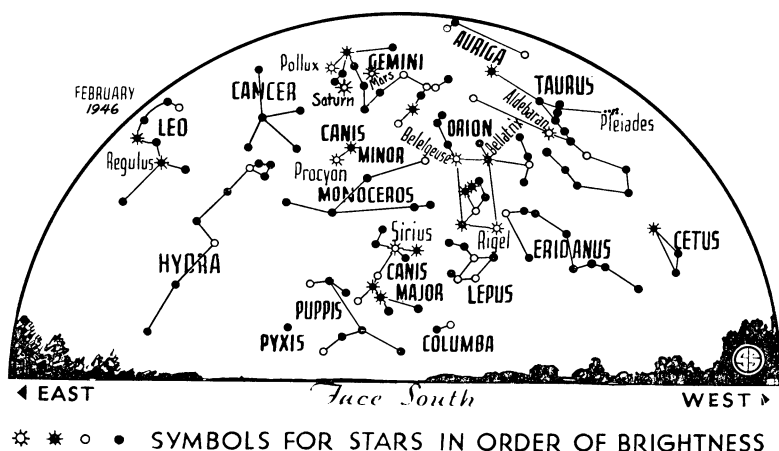
it reaches first quarter and a few days later, during the night of Feb. 12, passes Mars and then Saturn. Feb. 15 brings full moon, and on the 20th, during daylight hours for the United States, it passes Jupiter. The other naked eye planets, Mercury and Venus, are not visible in February. In fact, on Feb. 1, Venus is in line with the sun and beyond it, and on Feb. 10 Mercury is in a similar position.

The apparent movement of the sun around the sky during the year is an effect of the earth's motion around the sun, so that at different times it stands against a different background of stars. This also causes the general easterly movement of the planets, though they are moving themselves, and the combination of their motions with that of the earth produces the complicated paths, sometimes westerly but mostly easterly, that they pursue.

Apparent Motion

Even more familiar is the daily motion of the whole sky from east to west, which makes the sun, and most of the other heavenly bodies, seem to rise and set as well as to travel across the sky. This again is merely an apparent motion, for it is the earth turning on its axis from west to east that causes it. Consequently, the stars seem to turn around a center in the north, which is the north celestial pole, the place where the earth's axis, if extended, would touch the sky. Polaris, the pole star, is very close to this center and so it turns in a small circle each day. Other stars, farther from it, turn in larger circles, an effect that can easily be shown by taking





a photograph at night, with the camera pointed to the northern sky, and giving an exposure of several hours.

If a person were to stand at the north pole of the earth, the north celestial pole, of course, would be directly overhead. Traveling southward (which is the only way one can travel from the north pole!) the celestial pole descends, until at the equator it stands on the horizon. Thus, the height of the north celestial pole depends on the latitude of the observer. At the equator its altitude is zero degrees, and this is the latitude of the equator. In the United States, approximately 40 degrees latitude, the celestial pole is 40 degrees above the northern horizon.

Since the stars turn in circles about the celestial pole this means that for us any star or other object, such as a comet, that is within 40 degrees of the pole will never get below the horizon. In other words, for any place on the earth, in the northern hemisphere, there is a circular area in the northern sky, of radius equal to the latitude, in which the stars never set. At the north pole of the earth, where the latitude is 90 degrees, this includes the entire sky. There no star ever rises or sets. At the equator, on the other hand, every star rises and sets.

For us, the pole star and the constellation of Ursa Minor, of which it is part; Ursa Major, the great bear, which contains the Great Dipper; Cassiopeia, the queen; Cepheus, the king and Draco, the dragon, are all circumpolar constellations—ones which never descend from the sky. Stars farther south do rise and set, and the farther south they are the shorter is the time in which they are above the southern horizon. And finally, around the south pole of

the sky, which is as far below the southern horizon as the north celestial pole is above it, there is another circle of stars which never rise. Among these are the constellations of Crux, the southern cross; Centaurus, the centaur, containing the nearest star, alpha Centauri; and much of Argo, the ship, which is the largest constellation in the sky.

Argo is so big, in fact, that it is subdivided into four parts. These are Puppis, the stern; Vela, the sails; Carina, the keel; and Pyxis, the compass. The brightest star in the whole group of figures is Canopus, part of Carina, which is far south and never rises for most of the United States. All of Pyxis comes above the horizon for latitude 40 degrees north, but only one star is bright enough to be indicated on these maps. This is alpha Pyxidis, of the fourth magnitude. Next to it is Puppis, of which a number of stars are shown, and which extends up alongside of Canis Major. This time of year is the best chance to see this group, for now it is in the evening sky. Part of Vela, just below Pyxis, gets above our horizon, but not far enough to be seen easily.

Celestial Time Table for February

Feb.	EST	
1	9:00 a. m.	Venus in line with sun on farther side
	9:56 a. m.	Moon passes Mercury
	10:38 p. m.	Moon passes Venus
	11:43 p. m.	New moon
8	11:28 p. m.	Moon in first quarter
9	5:00 a. m.	Moon nearest—distance 230,080 miles
10	9:00 p. m.	Mercury in line with sun on far side
11	3:00 p. m.	Jupiter starts westerly motion
12	9:24 p. m.	Moon passes Mars
13	4:20 a. m.	Moon passes Saturn
15	11:28 p. m.	Full moon
20	3:16 p. m.	Moon passes Jupiter
21	10:00 p. m.	Mars starts easterly motion
22	11:00 p. m.	Moon farthest—distance 251,214 miles
23	9:36 p. m.	Moon in last quarter

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

CHEMISTRY

New Glasses Contain Little or No Silica

➤ NEW KINDS of glass made without the use of the ordinary glass sands employed for centuries, may become increasingly important as further developed particularly for service in optics, photography, enamels, glasses transparent to ultraviolet rays, and in special colored glasses.

These new glasses contain little or no silica, the substance long regarded as essential in glass-making, but are made with the use of phosphates, borates or fluorides, according to Dr. Frank L. Jones of Bausch and Lomb Optical Company, who discussed non-silica glasses at a section meeting of the American Chemical Society in Terre Haute, Ind.

Phosphate, borate and fluoride glasses, he says, resemble silicate glasses in general principles of chemical constitution, but differ from them and from one another in important chemical and physical properties. The non-silica glasses have already proven their value in the photographic field. For general use in the field of optical instruments, he states, it is likely that the glasses intermediate between the older silica glasses and the new non-silica glasses will be especially valuable.

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HOME ECONOMICS

Nuts Easily Cracked When Soaked in Salt Water

➤ NUT shells, particularly those of pecans, become soft and easy to crack when soaked in salt water for a few hours. The nut meats can then be easily removed whole, agriculture extension agents in Mississippi have found.

Science News Letter, January 26, 1946

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