ASTRONOMY

# Jupiter Appears in Sky

**Mars remains in view, and Sirius is the brightest of the stars. In early February it may be possible to see Mercury just before sunrise.**

## By JAMES STOKLEY

➤ JUPITER now returns to the evening sky, for in February this largest planet appears low in the east about nine o'clock, and is visible the rest of the night, in the constellation of Virgo, the virgin. Its position is shown on the accompanying maps, depicting the sky as it looks about 10:00 p.m. (by your own kind of standard time) on the first of February, an hour earlier in the middle and two hours earlier at the end.

However, this is not the only planet indicated, for Mars remains in view, over toward the west, in Aries, the ram, as bright as an average first magnitude star. Mars is about a sixteenth of the brightness of Jupiter, now of magnitude minus two on the scale of celestial brilliance.

Of the stars, the brightest is Sirius, the dog star, which is part of Canis Major, the great dog, seen in the south. Above this group and toward the right, one finds Orion, the warrier, with Betelguese above the row of three stars that form the belt, while Rigel shines a little lower. Still higher and farther to the right we come to Aldebaran, in Taurus, the bull.

Almost directly overhead is the figure of Auriga, with Capella, and going southward we see the twins, Gemini, with Pollux as the brightest star. The lesser dog—Canis Minor—is below this group and marked by another first magnitude star, called Procyon.

### Bright Array of Stars

These stars, Capella, Pollux, Aldebaran, Rigel, Sirius and Procyon, which surround Betelguese in an irregular hexagon, are a striking array of brilliant stars. In fact, there is no other area of the sky of similar size which contains so many, and on February evenings they are seen at their best, high in the south. This is why one thinks of the evening sky of late winter as being so copiously sprinkled with stars.

Still another first magnitude orb may be seen outside this array. This is Regulus, in the constellation of Leo, the Lion, which is visible toward the east and just above Jupiter. Like Aries, Gemini and Taurus, as well as the fainter constellation of Cancer, the crab, Leo is one of the 12 constellations of the zodiac through which the planets, the sun and the moon all seem to move.

This does not mean, however, that planets can only be seen in these 12 groups, a fact which is evident later on February nights. For about 3:00 a.m. Saturn comes into view, low in the east, and is seen against the background of distant stars forming the figure called Ophiuchus, or the serpent-bearer. Despite this, the group is not considered as one of the famous 12.

There are two other planets which sometimes are visible to the unaided eye, namely Mercury and Venus. The latter is now too nearly in line with the sun to be observed, for it is hidden in the solar glare. However, in the first few days of February it may be possible to get a glimpse of Mercury if one looks very low in the southeast just before sunrise. On Feb. 2 it reaches greatest western elongation, its farthest west from the sun on this particular trip around that body, and comes up ahead of the sun (but not very much ahead)! But if you fail to see it this time, don't worry, for you will have a much better chance to see it in the evening, toward the west, in the middle of April, when it will follow the sun across the sky.

### Stellar Magnitude System

Frequently in these articles, as above, it is necessary to mention the brightnesses of stars, and this is done in terms of stellar magnitude which is the way that the astronomer measures them. Perhaps this is a little puzzling to one unfamiliar with the system particularly when negative magnitudes are used. For example, in February Jupiter is minus two in magnitude.

It all began in ancient Greece with an astronomer named Hipparchus, who made a catalogue of stars, and classified them into six grades of brightness which he called magnitudes. Those of the sixth were just barely visible (for there were no telescopes in those days) while some 20 of the brightest were grouped under the first magnitude.

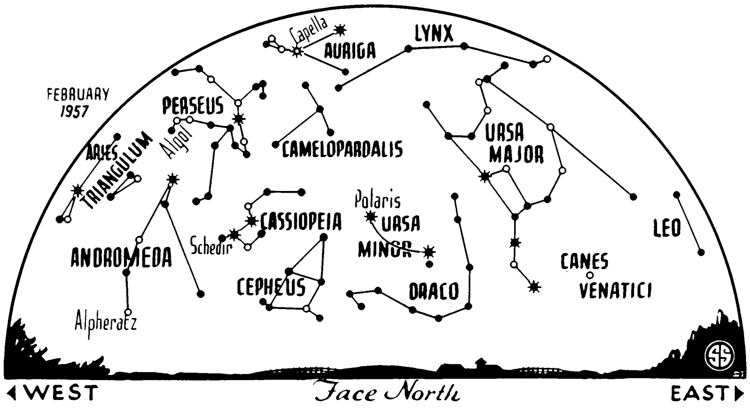
When the telescope came into use in the 17th century, stars many times fainter were detected, and the rough system of Hipparchus was extended to include them by going to higher and higher magnitudes. However, there was no general agreement and various astronomers would classify faint stars under considerably different numbers.

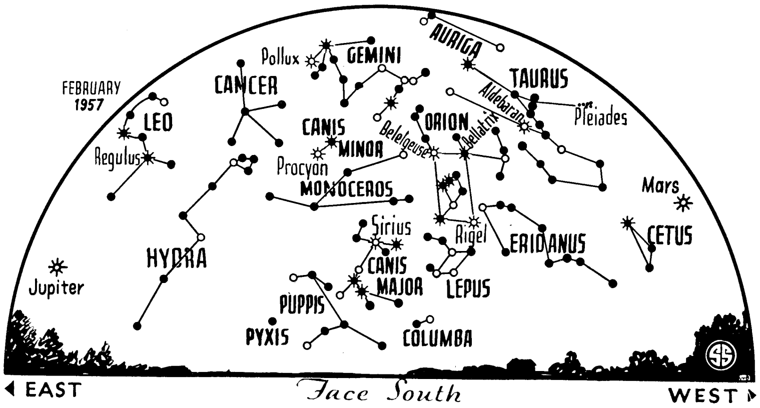
### Precise Basis for System

About a century ago the system was put on a precise basis. It had been found that a first magnitude star was about a hundred times as bright as one of the sixth. Then, in 1854, an astronomer named Pogson, at Oxford University in England, proposed a new concept. Since a difference of five magnitudes (between one and six) was a hundred, the ratio between any magnitude and the next, he suggested, should be taken as 2.512. Then the average first magnitude star would be 2.512 times as bright as the average of the second magnitude. He chose this number because when you multiply it by itself, then multiply the product by itself, and then again and again and again, a total of five times, the result is 100.

Some stars, on this new scientific scale, were even brighter than first magnitude, so it had to be extended downward to zero and on through minus one, minus two, etc. That is, a star 2.512 times as bright as the first would be zero magnitude and one 2.512 times as bright as that would be minus one. Venus sometimes reaches the minus fourth magnitude, when it is a hundred times as bright as an average star of the first magnitude. The system even takes care of the sun which has a magnitude of minus 26.7 since it is more than a hundred thousand million times as bright as a first magnitude star.

Going in the other direction the world's largest telescope, the 200-inch reflector at Mt. Palomar, can photograph stars at least as faint as the 22nd magnitude. The average first magnitude star is about a billion times as bright as one of these!






☼ ✱ ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

### Celestial Time Table for February

| Feb. | EST | |
|---|---|---|
| 2 | 2:00 p.m. | Mercury farthest west of sun visible for a few days about now low in southeast before sunrise. |
| | 7:49 p.m. | Algol (variable star in Perseus) at minimum brightness. |
| 6 | 6:05 p.m. | Moon passes Mars. |
| 7 | 6:23 p.m. | Moon at first quarter. |
| 14 | 6:00 a.m. | Moon nearest, distance 221,500 miles. |
| | 11:38 a.m. | Full moon. |
| 16 | 10:02 p.m. | Moon passes Jupiter. |
| 17 | 10:00 p.m. | Pluto (most distant planet) at conjunction; distance 3,118,000,000 miles. |
| 20 | 12:45 a.m. | Algol at minimum. |
| 21 | 7:18 a.m. | Moon in last quarter. |
| 22 | 4:16 a.m. | Moon passes Saturn. |
| | 9:34 p.m. | Algol at minimum. |
| 25 | 6:23 p.m. | Algol at minimum. |
| 27 | 10:00 a.m. | Moon farthest, distance 252,600 miles. |

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

Science News Letter, January 26, 1957

AERONAUTICS

## Pilot's Course May Cut Private Plane Crashes

➤ A NEW KIND of pilot's course aimed at teaching private pilots to fly an airplane by instruments only in emergencies in order to cut down fatal crashes will be tested at the University of West Virginia, Morgantown, W. Va., starting next month.

Ten university students without previous pilot training will take the unusual test program. Costs will be paid by the Link Foundation, with the Civil Aeronautics Administration providing technical supervision.

Private pilots with conventional training have learned to fly solely by reference to the horizon and ground. When such pilots find themselves unexpectedly in cloud or fog, they often lose control of the aircraft because they cannot fly straight and level or make controlled turns by reference to the instrument panel.

The test course will give the ten students conventional training for a private pilot license, but will also try to teach the ability to switch readily from visual to instrument flight under emergency conditions.

The possible life-saving potential is seen in the fact that in 1955, the last year for which statistics are complete, there were 93 fatal small-plane accidents resulting from flight into bad weather.

Science News Letter, January 26, 1957

GENERAL SCIENCE

## Visit to Soviet Lands No Bar to U. S. Visa

➤ SOME EUROPEAN SCIENTISTS who hope to attend future international meetings in the United States have been shy about going to Russia and eastern European countries because they fear it may hurt their chances of a U. S. visa.

Do not be afraid, Walter M. Rudolph, assistant to the science adviser in the U. S. Department of State, counsels in a letter published in *Science* (Jan. 4). Dr. Thomas J. Killian, chief scientist of the Office of Naval Research, in view of "persisting rumors," raised the question as to whether the fears are justified.

A visit to Soviet-dominated territory in itself is no ground for refusal of a visa or a delay in its issuance, the letter says, but decision on a visa is not made until after an application is made by the foreign scientist.

Science News Letter, January 26, 1957

COSMOLOGY

## Cosmic Rays Boast Abundance of Elements

➤ THE RELATIVE abundance of the elements found in cosmic rays differs from that for matter in the universe, three Australian scientists reported in London.

The light elements, they have found, are more than 1,000 times as common in cosmic rays as in the universe. Elements heavier than neon are six times more abundant in cosmic rays.

From these figures, they calculate that this radiation has traveled for a few million years before it smashed into the earth's atmosphere. The scientists who determined the abundances are Drs. J. H. Noon, A. J. Herz and B. J. O'Brien of the F. B. S. Falkiner Nuclear Research and Adolph Basser Computing Laboratories, University of Sydney, Australia.

They report their findings in the British scientific journal, *Nature* (Jan. 12).

Their results were obtained from measuring the cosmic rays caught in photographic emulsions flown for about six hours at more than 110,000 feet above Texas in 1956.

The large proportion of elements heavier than neon indicates either that heavy nuclei are more abundant in the source regions of cosmic rays, which are still largely unknown, or that the mechanism by which they attain their great speeds strongly favors the heavy nuclei, or both.

Other scientists have suggested that supernovae, brilliant exploding stars, are a source of cosmic rays that might give the abundances the Australian scientists found. They also discovered definitely that lithium, beryllium, and boron are definitely present in the primary radiation.

Most cosmic rays are stopped high in the earth's atmosphere, reacting with atomic nuclei there to form secondary cosmic rays. To detect the primary radiation before it has reacted, scientists must expose their detecting instruments at very high altitudes.

The existence of heavy nuclei in the primary cosmic rays was first established in 1948.

Science News Letter, January 26, 1957