ASTRONOMY

Mercury Makes Brief Visit

Tiny Planet, Rarely Seen, Will Be Low in the West Just After Sunset For a Few Days Near the Middle of the Month

By JAMES STOKLEY

TWO planets may be seen during the first summer month of this year, in addition to the stars that decorate the June evening skies. One is brilliant Jupiter, which has been with us for several months and which can be seen high in the south just after sunset. The other is a less commonly observed object, tiny Mercury, which revolves around the sun in an orbit so small that it can never get to any part of the sky far from the sun.

During the night of June 13 Mercury will be farthest east of the sun, and will remain above the western horizon for about an hour and three quarters after sunset; so on this evening, and one or two others before and after, you may be able to get a glimpse of it in the western twilight. On June 13 it will be close to the crescent moon, just about two days past new, and this may help you locate it.

Saturn, the famous ringed planet, rises about midnight at the beginning of the month and two hours earlier at the end, while Venus appears in the east about two hours before sunrise. Of these planets, Jupiter is the only one shown on the accompanying maps, which depict the heavens as seen about 10:00 p m.. eastern standard time (11:00 p. m. daylight saving time) on June 1, 9:00 p. m. (10:00 p. m.) on June 15, and 8:00 p. m. (9:00 p. m.) on June 30.

Vega, in the constellation of Lyra, the lyre, is the most brilliant star to be seen these June evenings. It shines high in the eastern sky. Below it and to the north is Cygnus, the swan, sometimes called the northern cross. The cross is lying on its side. At the northern end of the constellation is the star Deneb which marks the tail of the swan. Albireo, considerably fainter, indicates the bird's head and is just below Vega. Still lower and directly east is Altair, in the constellation of Aquila, the the eagle. Jupiter at present is in the constellation of Virgo, and just below it is the star Spica which is a part of that group. Still higher and even brighter is the brilliant Arcturus. In the southeast a brilliant reddish star can be seen. This is Antares, the heart of Scorpius, the scorpion.

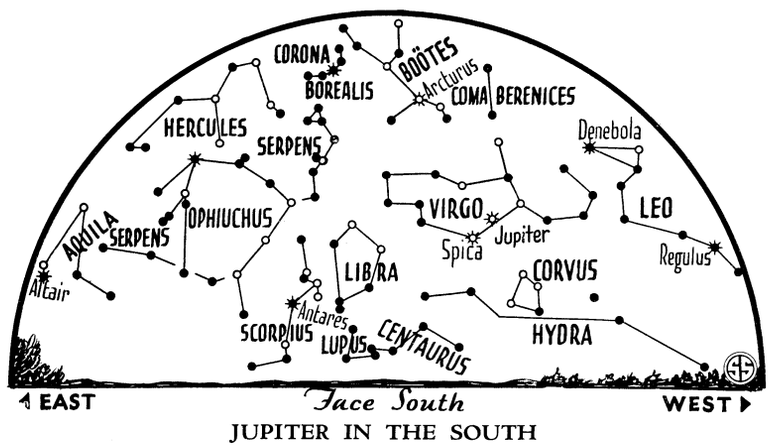
To the right of Virgo in the western sky shines Leo, the lion, with two easily identified groups of stars. Farther west is the "Sickle" with the first magnitude Regulus at the end of the handle. The blade curves northward and then down to the west point of the horizon. To the south of the sickle is a well defined right triangle of stars of which the brightest star, which is also nearest to Virgo, marks the tail of the lion and is named Denebola. Castor and Pollux, the twins, are low in the northwest, so low in fact that it may be rather hard to find them. Pollux, farther west, is the more brilliant. Still lower and farther north is Capella, in Auriga, the charioteer.

The familiar Great Dipper forming part of Ursa Major, the greater bear, shines high in the northern sky, the handle of the dipper curving around towards the south. The two pointers at the side of the bowl opposite the handle are almost horizontal. A line drawn from them to the right brings you to Polaris, the pole star. Low in the north, under the pole star, is the W-shaped constellation of Cassiopeia. These last mentioned constellations are called "circumpolar" because they are closer to the pole, about which the entire sky seems to turn, than to the horizon, so they can never set below it. Ursa Major and Cassiopeia can be seen in the northern sky any clear night during the year, but sometimes one is above and sometimes the other.

Among the supremely important dates in the history of human thought is 1543. That was the year in which the great work of the Polish astronomer, Nicolaus Copernicus, "De Revolutionibus," was first published. In it the author called attention anew to the old Greek theory that the earth was a planet revolving around the sun along with a number of similar bodies. Until then the generally accepted belief was that the earth was the center of the universe.

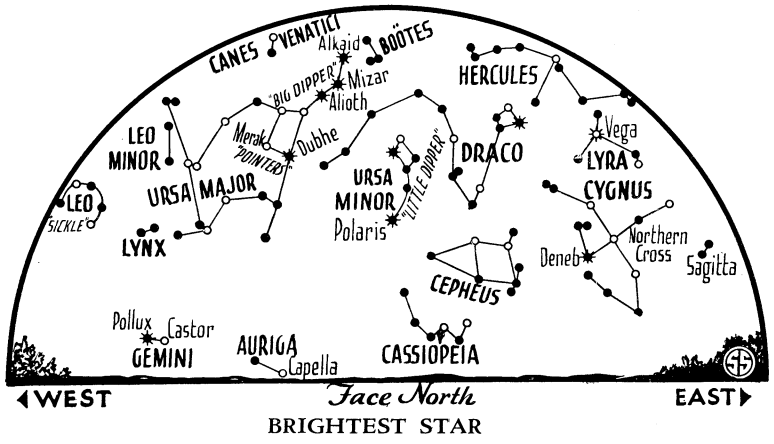
If you watch the motion of the bright planet Jupiter in these June evening skies, you can see one effect of this motion and see how much easier it is to explain than if we still thought that the earth was fixed. Jupiter, of course, is a planet, and moves among the stars. During the last few months it has been travelling westward and passed the bright star Spica which shines below it. But during the first week or so of June this motion will become less and less and on the 11th the planet will appear to be stationary. But after that date it will start its motion once more, this time towards the east.

This behavior of Jupiter is not at all strange, but happens several times a



JUPITER IN THE SOUTH

Jupiter is still a brilliant sight in the southern sky. A more rare visitor, Mercury, is not shown on this map because it is visible for only a short time after sunset low in the west.



High in the eastern sky shines Vega, brightest star to be seen in this month of honeymoons.

year. Before the days of Copernicus it was noticed, and an elaborate mechanism had to be invented to explain it. The astronomers of those early days had noticed that all the planets seem to have a general progression eastwards among the stars, along with the sun, and they explained this by saying that each planet, as well as the sun and the moon, was attached to a vast crystal sphere, which revolved around the earth in its proper period. Each was supposed to give out a musical note as it revolved, and this caused the "music of the spheres."

Then, when the alternate backward motion of Jupiter, as well as of other planets, was noticed, they decided that the planet was not attached directly to the large crystal sphere, but to a smaller one, which, in turn, was fastened to the great one. The smaller sphere was called an epicycle. Thus the planet would be carried generally in one direction, but sometimes its motion in the epicycle would be added to that of the great sphere and it would seem to be going unusually rapidly. Again, the former motion would be in the opposite direction and the planet would move backwards. As more refined measures of the planets were made, still other irregularities were discovered and more epicycles were added, one on top of the other. Finally, as Sir Arthur Eddington once expressed it, "the music of the spheres became lost in the whir of machinery."

Such a theory seems ridiculous to us now, but it held for centuries. Even after Copernicus suggested a much simpler explanation, additional centuries were required to secure the adoption of his idea, and men were even imprisoned for believing that the earth moved.

According to our modern ideas, then, the motion of Jupiter is explained in this way. The earth is travelling eastward in its orbit around the sun, at a speed of about eighteen miles a second. Jupiter is also going eastward in its orbit, but at a speed of only about eight miles a second. When the earth and Jupiter are on the same side of the sun we go by the more slowly moving body, and it, in effect, is going backward relative to us at a speed of some ten miles a second. And a little later when we are on the opposite side of the sun, the two motions are added. As the earth begins to turn around to the opposite side of the sun, there is a brief period when the two motions just balance, and this is what happens on June 11. A very similar effect can be observed from a rapidly moving express train when it passes slower freight on the next track. Even though both are moving in the same direction, the freight train, to people on the express, seems to be going backwards.

It is also on account of the motions of the planets around the sun that Mercury, the smallest and innermost of the planets, can be so seldom seen. During June there will be the best opportunity afforded by 1934 to see this elusive little object, which Copernicus himself is said never to have viewed. Its average distance from the sun is only 35,950,000 miles, compared with 92,900,000 for the earth. It revolves around the sun at such a speed that it comes around between the sun and the earth every 116 days.

The result of this is that it swings back and forth like a pendulum, first on one side of the sun, then the other. When to the west of the sun, it comes up just before sunrise, and is a morning star; when to the east, as it is on June 14 in the early morning hours, it is visible in the west after the sun has set. The ancients noticed this but for a long time they did not realize that the planet they saw in the morning was the same as the one they saw in the evening, so they gave it two names —Mercury as an evening star and Apollo when it was seen in the morning twilight.

During June the moon is at last quarter on the 4th, new on the 11th, at first quarter on the 20th and full on the 27th. Thus moonlit evenings are on the schedule from about the 18th to the end of the month. On June 21 the moon passes Jupiter, and on that evening, as well as the evening before, the brilliant planet and the moon will be a conspicuous pair in the southern sky.

Science News Letter, June 2, 1934

SEISMOLOGY—BOTANY

Plant Life Not Harmed By California Earthquake

ALTHOUGH it left a wake of death and ruin among the works of man, the Long Beach earthquake of a year ago seemed to exempt vegetation from its ravages, Dr. H. G. MacMillan, plant pathologist of the U. S. Department of Agriculture, states as the result of a careful survey of the shaken area.

In the past, Dr. MacMillan says, similar tremors have been the cause of fertile areas being transformed into deserts, but in the present example intermittent observations during the past year have revealed no injury to plants primarily due to the earthquake.

There are a few trees, Dr. MacMillan continues, which appear to be dying from gas injury such as would be caused by gas escaping from a broken or cracked main. Trees also standing on a local fault were injured, but on growing crops there was no visible effect, either at the time of the quake or later.

Dr. MacMillan points out that earthquake damage to plants may be caused by changes in the water level, a rise in the temperature of the soil water, or by mechanical injury to the smaller roots and rootlets of plants in the shaken area.

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Scientists have proved that certain hairy-coated soy bean varieties escape being eaten by leafhoppers merely because the hoppers object to the rough coat.