

Sky heralds approach of summer

by James Stokley

Now that summer is approaching, the evening skies reflect the season.

Only a few stars that were prominent on winter evenings remain visible and the summer groups begin to appear. These are shown on the accompanying maps, which depict the sky of May 1, about 11:00 p.m., local daylight saving time. It looks about the same an hour earlier at the middle of the month, and two hours earlier at the end.

Jupiter, high in the southwest in the constellation of Leo, the lion, is conspicuous. It stands close to the star Regulus, at the end of the handle of the Sickle.

Regulus, a first magnitude star, is among the brightest in the sky. However, it is only about a sixteenth as bright as Jupiter.

Vega, toward the northeast in Lyra, the lyre, is the brightest star. In coming months it will become much more prominent. On summer evenings, from much of the United States, it shines directly overhead.

Below Lyra appears part of Cygnus, the swan. Here stands Deneb, also first magnitude, but its low altitude causes considerable dimming. Antares, in Scorpius, the scorpion, which is low in the southeast, is similarly dimmed.

Left of Leo and lower, you will see Virgo, the virgin. The brightest star is Spica. Above Virgo's left-hand end is

the herdsman, Bootes, with Arcturus.

The surviving winter groups are in the northwest. There you see Gemini, the twins, with Pollux (first magnitude). Second magnitude Castor is nearby. Lower and to the right is Auriga, the charioteer, with Capella. To the left of the twins (southern map) is Procyon, in Canis Minor, the little dog.

For the second time this year we have a good opportunity to see the innermost of the sun's family of planets: Mercury. On the 23rd it is farthest east of the sun, as it was at the end of January. This is called "greatest eastern elongation." Then it remains in the western sky for a short time after sunset and can be seen near the horizon at dusk. It sets before the sky is entirely dark, so it is gone by the times for which the maps are prepared.

Mars is too close to the sun to be visible. Venus and Saturn appear low in the east before sunrise. Venus is many times brighter than Saturn.

Because Mercury never gets far from the sun in the sky, many people have never seen it. At eastern elongation, as it is this month, it's visible at dusk. When west of the sun it appears low in the east at dawn. Evening appearances are best in the spring, and morning ones in the fall.

Astronomers also have difficulties observing it through their telescopes. Jupi-

ter, for example, is much easier: it can be seen high in the sky for much of the night. That may explain why, for many years, Mercury's rotation period (its day) was wrongly listed.

Astronomical books published before 1965 state that Mercury revolves on its axis once every 88 days. This was based on observations during the 1880's by Giovanni Schiaparelli, an Italian astronomer. He noticed some faint markings on Mercury and that they

CELESTIAL TIMETABLE FOR MAY

May	EDT	
5	1:55 p.m.	Moon in first quarter
6	8:00 a.m.	Moon north of Jupiter
12	9:05 a.m.	Full moon
	1:00 p.m.	Moon nearest, 221,800 miles distant
19	1:45 a.m.	Moon at last quarter
23	11:00 a.m.	Moon north of Saturn
	9:00 p.m.	Mercury farthest east of sun; visible for a few days low in west just after sunset
26	8:00 a.m.	Moon farthest, distance 252,600 miles
27	3:30 a.m.	New moon



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seemed to appear every 88 days—or at least in multiples of that figure.

At best these markings were hard to observe, but he concluded that an 88-day rotation period would account for their regular appearances. This is the same as the planet's "year" (the period in which it revolves around the sun). In that case, Mercury would always keep the same hemisphere toward the sun, as the moon does toward the earth.

One great astronomical advance of recent years has been the application of radar techniques. Radar was a wartime development for determining the distance and direction of ships and airplanes. A brief pulse of radio waves, sent out in a narrow beam, echoes back when it hits such a target. Electronic circuits measure the brief time the echo takes to return—in millionths of a second. The speed of the waves is known (186,000 miles per second), so this gives the target's distance. Its direction is given by the direction the radar antenna is pointed.

Similar techniques are now used on the planets which are so distant that the return of the echo may take minutes. The character of the echo reveals whether the planet is rotating, and if so, how fast.

The world's largest radio telescope is a dish-shaped antenna 1,000 feet in diameter, suspended between some hills near Arecibo, Puerto Rico. Mercury, like the other planets, passes overhead; then it can be studied by radar. Such observations, in 1965, showed that it rotates on its axis every 58.6 days. Its rotation, as seen from the north, is counterclockwise. So is its revolution around the sun.

Schiaparelli's mistake seems to have been due to a curious relationship between the planet's rotation period and the time required for a revolution around the sun.

Suppose an observer could be on Mercury when the sun is directly overhead. You might think that it would be overhead again just 58.6 earth days later. But no! In this time the planet has moved about two-thirds of its orbit around the sun. Our observer is facing the same direction in space that he faced 58.6 days earlier—but he's not yet facing the sun. Not until 176 days have passed will this happen. That will be just two revolutions around the sun, for 176 is twice 88. In that time, Mercury will turn three times on its axis.

The markings that Schiaparelli observed with such great difficulty were seen best when they were toward the sun. Apparently he didn't notice that they appeared only at alternate 88-day periods. Perhaps he assumed that, on other occasions when he thought he should have seen them, observing conditions simply weren't good enough.

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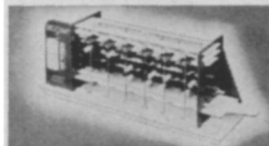
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