JULY STARS

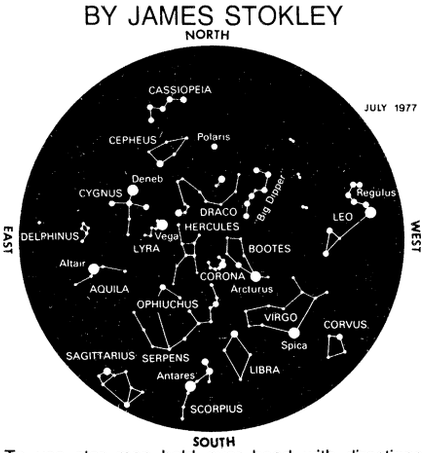
BY JAMES STOKLEY

July this year will be a good month for getting acquainted with the summer stars since no planet is well-placed for evening observation. You might get a glimpse of Saturn, as it will set in the northwest just as twilight is ending, about two hours after sunset. It will equal a first-magnitude star, so you may be able to pick it up when it is higher, a little earlier, even though there will then still be some light in the sky. On the first it will be in the constellation Cancer but about the middle of the month its easterly movement will take it next door into Leo. It will become difficult to see, and on July 31 will set only about half an hour after the sun.

Mercury also will be low in the west at dusk all month—an "evening star," setting so early, not more than an hour after the sun, that you probably won't be able to find it. On the 19th, however, Mercury, considerably brighter, will pass just north of Saturn. If you're lucky and clouds do not interfere, you may be able to see the two planets close together near the northwestern horizon.

Six brilliant (first-magnitude) stars are prominent on July evenings. Brightest is Arcturus, high in the west in Boötes. Just to the east of that group is a little semicircle of five faint stars called Corona Borealis. Farthest east come the large constellation of Hercules, and then Lyra, with brilliant Vega, only slightly fainter than Arcturus.

A little lower stands Cygnus, with the subgroup known as the Northern Cross, which is lying on its side. At the top of the cross, toward the north, is first-magnitude Deneb. Aquila is south of Cygnus, with Altair its brightest star. Vega, Altair and Deneb form the "summer triangle," which stands overhead on summer evenings in northern parts of the world.



To use star map hold over head with directions oriented as indicated.

July 5	4:00 am EDT	Earth farthest from sun
8	12:39 am	Moon in last quarter
11	7:00 am	Moon south of Mars
12	4:00 am	Moon farthest from earth
	5:00 am	Moon south of Venus
13	3:00 pm	Moon south of Jupiter
16	4:37 am	New Moon
18	5:00 am	Moon south of Saturn
19	9:00 pm	Mercury north of Saturn
23	3:38 pm	Moon in first quarter
27	10:00 pm	Moon nearest
30	2:00 am	Venus south of Jupiter
	6:52 am	Full Moon

Virgo is low in the southwest and that's where you'll see Spica. Farther toward the south is faint Libra and still farther, Scorpius, location of the red-star Antares. The name means "rival of Mars," probably given because both star and planet have a reddish hue. Scorpius is now as high as it ever gets in the U.S., and it's unfortunate that we can't see it to better advantage. Really, it's one of the finest constellations in the sky, a close rival to Orion of the winter evenings, generally considered finest of all. People at 40° south latitude, in the central parts of Argentina and Chile, now see it directly overhead in the evening and can appreciate its splendor. They can see many more stars than we can in the United States.

Extending eastward from Antares is a line of stars that curls around into a hook, much like the tail of a scorpion.

As for the other three naked-eye planets, Mars rises in the east July 1 about 2:30 a.m., EDT, in Taurus. It's followed about half an hour later (2½ hours before sunrise) by Venus, which is dazzlingly brilliant—about a hundred times brighter than Mars. On the first, Jupiter comes up more than an hour and a half after Venus. Although only about a seventh as bright as Venus, it is very prominent. The way these two planets come together will be interesting to watch in the last days of the month. Venus passes south of Jupiter on the night of the 29th. Before sunrise the next morning the two brilliant bodies, so close together, will be a spectacular sight in the eastern sky. □

Super lightning detected by satellite

A system of satellites has detected lightning bolts 100 times more intense than any observed before. Although the Vela satellites witnessed this phenomenon worldwide, they revealed the most vigorous activity occurred above the northeast Pacific Ocean off the east coast of Japan.

From the thousands of lightning signals received by Vela's silicon photodiodes, Bobby N. Turman of Patrick Air Force Base identified about 1 per cent of them as "superbolts." One of these releases up to 10 trillion watts of visible energy in about $^1/_{1000}$ second. (A home coffee maker uses about 1,000 watts of electricity.)

The power of a superbolt far exceeds even the record-setting bolts previously observed by earthbound scientists. These have recorded peak lightning discharges with outputs of a "trifling" 100 billion watts.

The Vela satellites are spaced along a common orbit (110,000 kilometers radius), so almost any portion of earth's surface is always being scrutinized by one, and often two, of them. The sentries were launched beginning a decade ago to monitor nuclear explosions and international compliance with the test ban treaty.

Winter storms over Japan, associated with a disproportionate share of the superbolts observed globally, have long been known for their anomalously intense lightning flashes. These are thought to occur between positively charged regions and the ground. This is in contrast to bolts derived from negatively charged regions, as in a typical summer storm, or from upper level cloud to cloud discharges.

The winter mechanism, if also responsible for superbolts, is consistent with other Vela data. About 80 percent of the superbolts occurring while two satellites looked on were seen individually by only one of them. Turman speculates in the June 20 JOURNAL OF GEOPHYSICAL RESEARCH that if superbolts are indeed produced from cloud to ground, an upper portion of storm cloud would frequently interpose itself between the lightning activity and overlooking satellite, preventing some of Vela's optical sensors from witnessing the event.

Superbolts are rare, occurring about five times out of every 10 million. □

Marine geologist Heezen dies

Marine geologist Bruce C. Heezen died of a heart attack at sea south of Iceland June 21 while studying the Reykjanes Ridge, part of the Mid-Atlantic Ridge, whose globe-girdling extent he and his late colleague Maurice Ewing discovered in 1959. Heezen, 53, had devoted his career to charting and explaining features of the ocean bottom. Over the years he and Marie Tharp had produced a series of spectacular maps of the world's ocean floors. In 1972 he used evidence from deepsea drilling to show that the northernmost part of the Pacific Ocean floor had once been at the equator, having migrated via seafloor spreading 2,000 miles northwestward to the Aleutians in 125 million years. Only last month, Heezen was honored by the American Geophysical Union for his life's work of "original contributions to the basic knowledge of the earth's crust." Memorial services were held last week at the Lamont-Doherty Geological Observatory, where Heezen had spent his entire scientific career. □