

The Night Sky of Summer

By Bob Riddle

The warm, moonlit nights of summer entice children of all ages to wander outside and enjoy the evening. Although students may look at this as a chance to stay up late, astronomers see it as a prime opportunity to stargaze, free from winter's chill and the unpredictable weather of spring and fall.

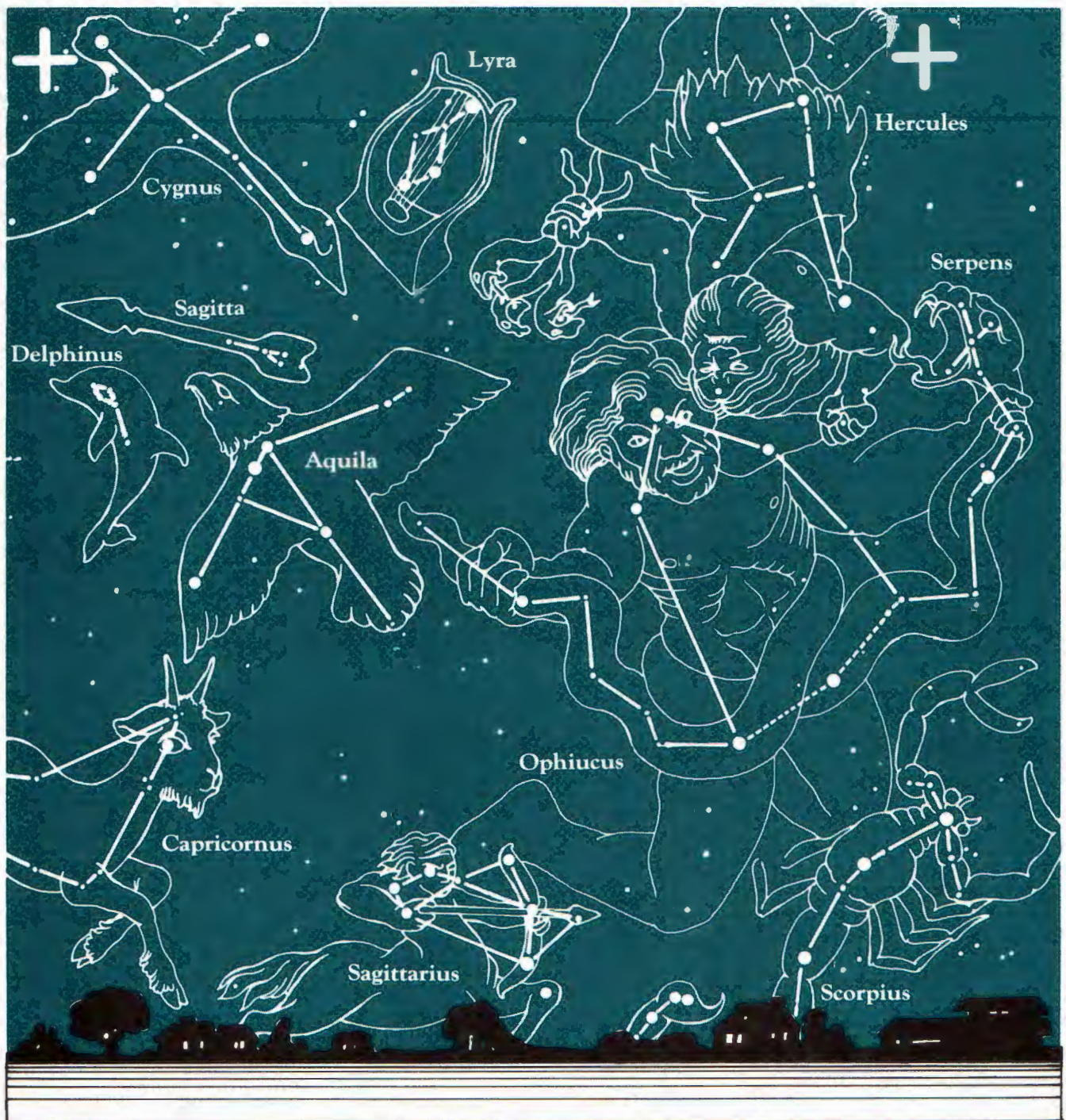
Before students leave for summer vacation, remind them that the night sky offers year-round entertainment and education. Equipped with binoculars or even an inexpensive telescope, you and your students can easily become acquainted with the constellations and stars. The accompanying star map shows the constellations as they appear when you are facing south-to-southeast at about 9 pm during July and August. To use the map, face this direction (outside of course!), determine from the map the position of the object in the sky, and then locate it in the sky. Note the two cross-marks, one near Hercules and the other near Cygnus. These represent the zenith, or the point in the sky that is directly overhead.



Bend the map slightly into a curve, with the southern horizon at the bottom. This more or less approximates the curved appearance of the sky.

When looking through binoculars you may want to determine, in degrees, the field of view—the area that you see when looking through your binoculars. Constellations like Sagitta can be helpful in determin-

ing the field of view. Sagitta, at 6 degrees in length, for example, just fits in the field of view of my binoculars. Once you have determined your field of view, you can measure distances from star to star, or other celestial objects, quite accurately. Knowing the field of view is particularly useful when using more sophisticated star charts.



Art by Max Karl Winkler

SOUTHERN HORIZON

Hercules, his arrow, an eagle, and a swan

Directly overhead when facing south is one of the oldest known constellations, Hercules, the hero. Hercules was known to the ancient Greek astronomers as "the kneeling one." Other civilizations have called this constellation "the phantom" and the "man upon his knees." In recent times he is portrayed as holding a bow in his out-

stretched hand. He is on one knee to gain stability and has just shot an arrow, Sagitta, at the two flying birds, Cygnus and Aquila.

Southeast of Hercules is Aquila, the eagle. Aquila is plainly marked by its brightest star, Altair, with gamma and beta flanking it. Forming a line 5-degrees long, this trio has long been called "the family of Aquila." A faint, compact cluster of stars, M-11, can be found

southwest of Altair. Astronomers throughout the world and throughout history have seen Aquila as representing a bird. The ancient Sumerians called it Alula, meaning bird. The Hebrews knew this constellation as Nesha, meaning eagle, falcon, or vulture; to the Arabians it was Al-Okab, a black eagle.

North of Aquila flies Sagitta the arrow. This tiny constellation is

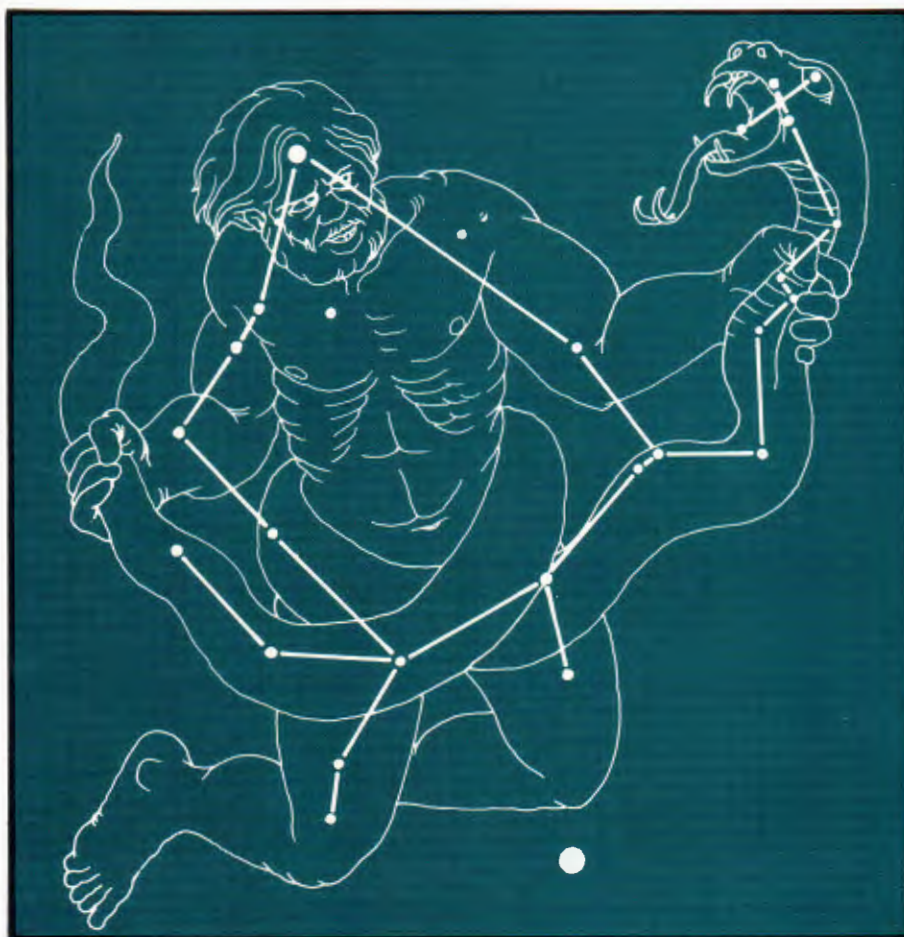
only about 6-degrees long. To locate this small and faint constellation, use binoculars and search for the two tail-feather stars of the arrow.

North of Sagitta, moving away toward the eastern horizon, is the Northern Cross, or Cygnus the swan. This is a splendid area of the sky for binocular and naked-eye gazing. Due to its location along the Milky Way, it is an especially star-rich area. One object of particular interest is Albireo. This is actually a pair of stars, one blue, the other gold. They may be rather difficult to see with binoculars, but by unfocusing the binoculars to enlarge the image, the colors will be easier to see.

The giant, a serpent, and a scorpion

South of Hercules, in the region between it and Scorpius, are two constellations comprised of relatively faint stars. Ophiuchus, shaped like a tall narrow house, represents a giant man grasping a large serpent, Serpens, in both hands. Look for the "x"-shaped group of stars that mark the serpent's head.

Continuing south from Ophiuchus, and scraping the southern horizon, is Scorpius. This is a rather conspicuous constellation on clear, dark nights. According to Greek mythology, this is the scorpion that stung Orion on the heel, which eventually led to his death. As if to support this story, Orion disappears from view in the west as the scorpion rises in the east, perhaps fleeing from the attacking scorpion. Especially noticeable is the bright reddish star, Antares, marking the heart of the scorpion. **Antares is sometimes referred to as "the rival of Mars." At times of the year when Mars nears the Earth in its orbit around the Sun, the red color of these two objects is striking.**



Sagittarius and Capricornus

East of Scorpius and low in the south is the teapot-shaped constellation Sagittarius. The stars that make up the handle and top of the teapot form a figure known as the Milk Dipper. The teapot shape is quite striking, especially during the summer when the steam-like Milky Way seems to rise from the teapot. The teapot is part of a much larger constellation representing a centaur in the act of shooting an arrow.

The naked eye and binocular riches of Sagittarius are remarkable for the beautiful star clusters and nebula contained within the constellation. North of the teapot spout is M-8, better known as the Lagoon Nebula. To the naked eye, M-8 appears as a slightly elongated fuzzy patch. Binoculars reveal it as a nebula intermixed with a cluster of stars.

Coming into view over the southeast horizon is the constellation Capricornus, a figure with a goat's head and body and the tail of a fish. More familiar, perhaps, as a big cosmic grin, Capricornus (as well as Cygnus) can be better viewed when it is higher in the sky during September and throughout the rest of the year.

Star bright

High in the sky toward the southeast is the prominent star Vega. This bluish-white star's brilliance nearly overshadows the constellation to which it belongs, Lyra, the lyre. This is the location of the famous Ring Nebula, found between the two lower stars of Lyra. Unfortunately for binocular viewers, this object is too small and faint. You can see the Ring Nebula, however, with a telescope as small as the typical 60 mm department store variety.

Planetary possibilities

Adding to the pleasures of summer evening sky viewing will be opportunities for viewing several planets. Throughout June and the early part of July, the giant planet Jupiter can be seen very low in the southwest, setting shortly after the Sun. It is soon lost, however, in the setting Sun's glare and will not be visible again until August, when it will be a "morning" planet.

Throughout July and August, Saturn is located close to the eastern boundaries of Sagittarius. During July and August it rises at about sunset and sets about sunrise. On July 14, Saturn will be at opposition, that is, at a point in its orbit around the Sun where the Earth is directly between it and the Sun. Saturn is quite visible as a naked-eye or binocular object; use a telescope to see its rings.

If you can locate Saturn, then you should be able to find Uranus and perhaps even Neptune. All three planets are within the boundaries of Sagittarius and are bright enough to be seen with binoculars. Because of their great distances, they will probably look more like stars than planets. A small telescope will resolve them into disk-shapes.

At this time, the three will be arranged in a line running from east to west, with Saturn on the eastern end and Neptune in the middle. To find Uranus, locate M-22, a prominent cluster of stars at the top of teapot Sagittarius. Slowly scan toward the east for a few degrees, looking for a pale blue-green star—you have found Uranus.

Neptune, currently the farthest planet from the Sun, is located a few degrees east of Uranus. Like Uranus, it appears as a pale blue-green star.

Celestial advice

Some parting words of caution and hints for observation: I have referred to several celestial objects visible to the unaided eye or through binoculars. These objects certainly can be seen, but do not expect star clusters, planets, nebula, or galaxies to appear as they do in pictures. These pictures are usually time-exposure photographs taken

through large telescopes. In many cases, the object you are searching for is small and sometimes faint. Use your binoculars if you have them, for these will increase your observation and appreciation of the starry skies. ■

Bob Riddle is director of Project STARWALK at the Lakeview Museum Planetarium, Peoria, IL.

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