

Mountain Skies

July and August 1999

After months of brilliance in the early evening sky, Venus plunges toward the western horizon throughout July. On her way, though, the evening star of early summer will dazzle us one last time in a gathering with the waxing crescent moon and Regulus. On July 15, the three bright objects will be 20° above due west as the sun sets at about 8:45 p.m. Both Venus and the moon should be easily visible, but it may take a while for Regulus to appear in the darkening sky. By 9:30 all three should be visible, but they'll be only 10° above the horizon by then.

The moon will be a mere three days past new, so it will be a thin sunlight crescent above, or north, of Venus. At this position, the near side of the moon faces an Earth almost fully illuminated by the sun. Earth's albedo, the fraction of light it reflects, is 0.37 compared to the Moon's 0.12, and Earth is 3.6 times larger in the moon's sky than the moon

is in Earth's; hence the "dark" side of the moon is bathed in the sunlight reflected from Earth. This can be seen as the faint earthshine on the moon beyond the sunlit crescent.

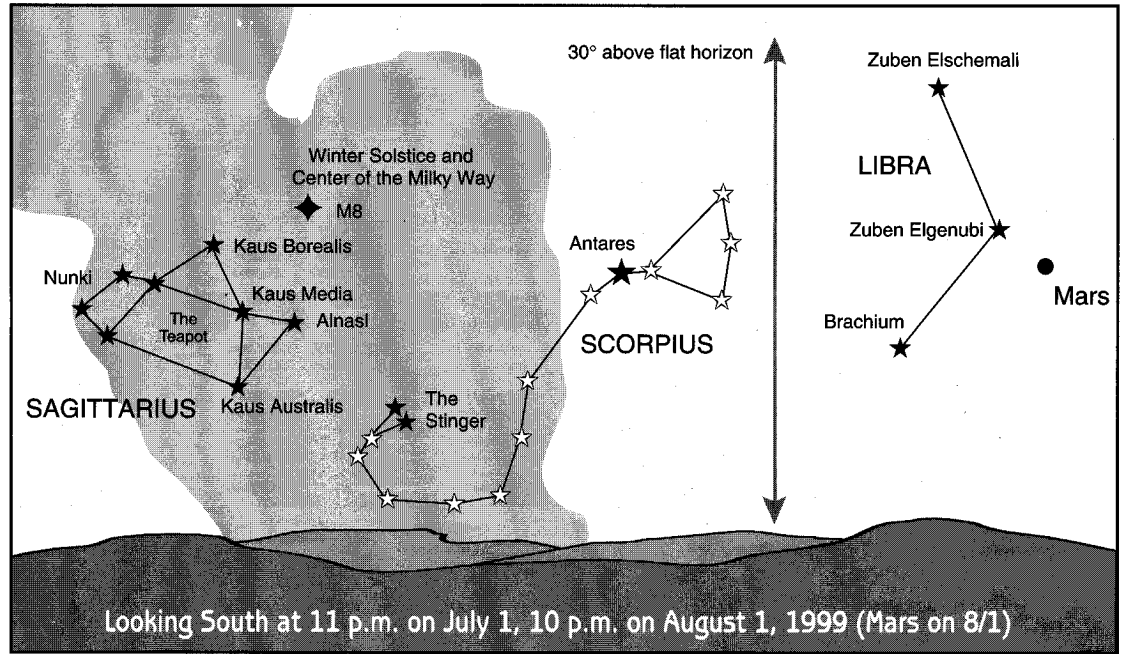
Earthshine

Galileo observed the earthshine and noticed that it was brighter for the wan-

ing crescent before dawn when the light was being reflected from Earth to the east of him than it was for the waxing crescent visible after sunset by the light reflected from west of him. Since the continents reflect more light than do the oceans, he concluded that the Asian continent to his east must be quite extensive, whereas there must be more ocean to his west. Later travelers and explorers would prove his deduction true.

Mars will fade from its brilliance of June as it continues to move eastward from Spica. Its motion coupled with the lengthening of the evenings will keep it hovering above the southwest horizon at sunset much as Venus hovered through June. On August 8 it will pass 2° south of Zuben Elgenubi and will move into the constellation of Scorpius as September begins.

The starry skies of July are some of the best of the year as the center of the Milky Way galaxy appears above the southern horizon filled with nebulae and star clusters that seem to glitter in rhythm with the singing of bugs and frogs on warm, moonless



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nights. The diagram shows the view to the south in late evening.

The Scorpion and the Archer

Two large, bright constellations dominate the sky. Scorpius, the scorpion with its bright red star Antares (an-TARE-eez), used to include two stars of Libra as its claws: Zuben Elschemali (the northern claw) and Zuben Elgenubi (the southern claw). The tail of the scorpion loops into the bright regions of the central Milky Way and ends with two bright stars known as the stinger, or, in Mexico, the eyes of the Virgin.

From the latitudes of New York state, the lowest loop of the scorpion's tail can easily be lost in the haze near the horizon, but I have managed to see the entire tail from Rt. 73 near the Adirondak Loj turnoff. Legend has it that Apollo sent the scorpion to kill Orion in order to protect the virginity of his sister Artimus. Both the Hunter and the Scorpion were then placed in the sky, but on opposite sides, with the scorpion pursuing Orion around the celestial sphere forever.

Just west of Scorpius is Sagittarius, the archer. The asterism of the teapot, however, stands out much more than the archer! Once the teapot is located, the three stars forming the right side

of the pot and the top of the lid can be seen as the bow of the archer. Their names, Kaus Borealis, Media and Australis (koss bo-ree-ALL-iss, MEE-dee-a, and oss-TRALE-iss) are the northern, middle and southern bow stars. Alnasl (al NAZE-'l) marks the tip of the arrow, and Nunki (NUN-key) marks the archer's shoulder.

There are many "deep sky" objects in both Sagittarius and Scorpius. These are the "fuzzy blobs" that turn out to be galaxies, star clusters and clouds of glowing gas when observed with large telescopes. The Hubble Space Telescope public images page <opposite.stsci.edu/pubinfo/pictures.html> or the Students for the Exploration and Development of Space <seeds.lpl.arizona.edu/billa/twn/top.html> are great places to view spectacular images and read the latest theories about these objects.

Deep Space M8

One particular deep space object, M8, marks an important place in the sky for the seasons and the galaxy. Above the spout of the teapot, in a position that makes an elongated diamond out of the spout, the fuzzy blob M8 can be seen with the unaided eye on a dark night. With binoculars, M8 looks like a small cluster of stars. With a telescope,

a wispy gaseous nebula can be discerned. The star cluster is actually NGC 6530 (for New General Catalog number 6530, see <www.seeds.org/messier/extra/ngc/n6530.html>), a young group of stars that formed out of the material of M8, the Lagoon Nebula (see <www.seeds.org/messier/m/m008.html> and <opposite.stsci.edu/pubinfo/pr/96/38.html>) that is still in the midst of star formation.

Close to M8, at the position of the cross in the diagram, is the winter solstice, the southernmost position of the sun on its annual path through the constellations of the Zodiac. It will be in this position at 2:45 a.m. Eastern Standard Time on December 22, 1999. At almost the same position is the line of sight to the center of the Milky Way galaxy. The center is about 30,000 light years away (a light year is about six trillion miles) and seems to harbor a supermassive black hole with a mass on the order of five million times that of the sun. It is currently thought that most galaxies have such black holes in their centers. It is the disk of stars orbiting this central condensation that forms the glittering Milky Way that will dazzle our skies through July and August and into the fall.

—Aileen O'Donoghue

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