Mountain Skies

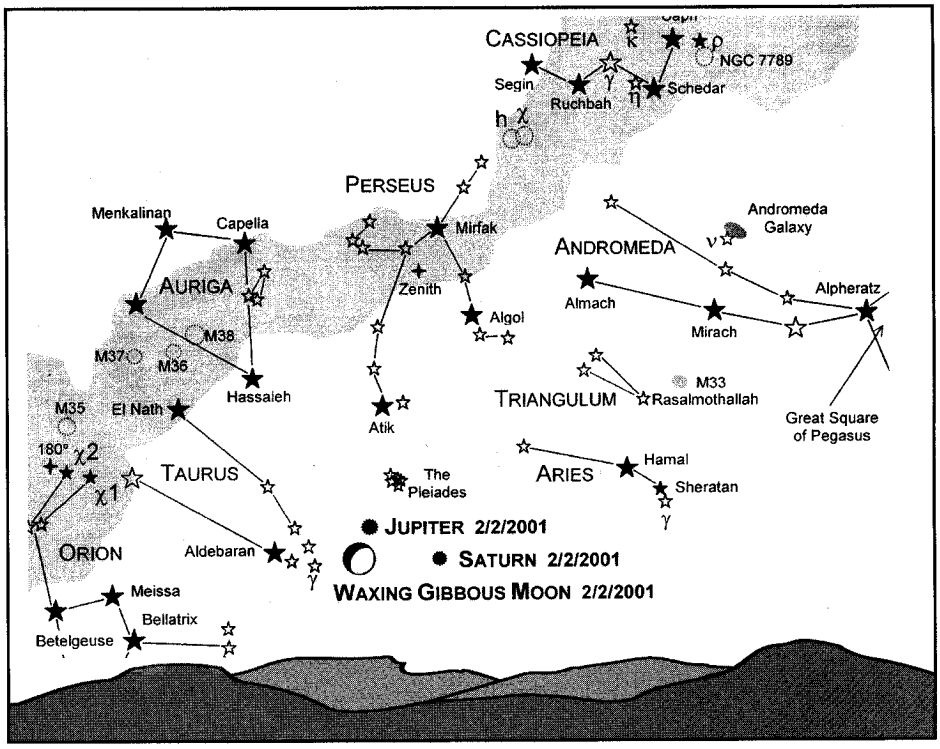
January and February, 2001

As the first dawn of January brightens the sky, the appearance of Antares, brightest star in Scorpius and southern beacon of July evenings (cf. Mountain Skies July/August 1999), is a sign of the turning of the seasons. It rises two hours before the sun, but is only about 5° above the SE horizon on January 1. Due to Earth's motion about the sun, it will rise four minutes earlier each day. By February 28 it will rise at 2 a.m., and be high in the southern sky by dawn.

The other red presence in the morning sky gave Antares its name, "the rival of Ares," which is Mars, the god of war, in Greek mythology. Mars is 35° NW (above and right) of Antares in January and will close to 6° NW by the end of February.

Darkness falls early on the first day of the new millennium as the sun sets at 4:30 p.m. Setting close to its southernmost point, at 7:55 on the face of the clock where 12 is north and 6 is south, the sun will slowly start moving to rise and set farther north each day as the hours of daylight lengthen. On January 1, there are almost nine hours between sunrise and sunset. By February, there are almost 10 hours of daylight and almost 11 hours by February's end.

As the sun sets early on January 1, though, there is compensation for the early darkness. The crescent moon hangs 40° above the southern horizon, a mere 5° SE (down and to the left) of the vernal equinox, where the sun will be on the first day of spring, when the hours of daylight will have lengthened to 12 and the sun will rise and set due east and due west.



Venus is high (30°) above the southwestern sky at that first sunset. It will move northward and rise higher above the sunset horizon to February 22 when it will be at an altitude of almost 40° as the sky darkens and be at its greatest brilliancy. Then it will plunge quickly into the horizon as it moves between the Earth and sun on its orbit.

The first star to appear in the western sky on January first, is Fomalhaut (FOAM-a-lot) in Pisces Austrinus. It's 20° (about the width of spread fingers held at arm's length) southeast (below and left) of Venus as it appears in the darkening sky.

In the southeastern sky, the first "star" to appear out of the darkening sky is not a star at all, but the giant planet Jupiter. It lies just 8° northeast (below and left) of the ringed world, Saturn, and both shine brightly against a spectacular field of bright stars in Taurus, Auriga, and Orion, as shown in the diagram.

The waxing gibbous moon makes an appearance in this beautiful field on January 5 near Saturn, and January 6 near Jupiter. On the 8th, the full moon will occur at 3:24 p.m., in the midst of a total lunar eclipse . . . unfortunately, the Adirondack region is on the side of the Earth facing away from the moon when the eclipse occurs. If your travel plans include Africa or Asia, though, you're in luck.

The waxing gibbous moon's appear-

ance between the two planets on February 2 will mark Candlemas, or Groundhog Day, and indicate six more weeks of winter if it's visible . . . but North Country astronomers always hope for clear skies, even if they do require a parka and battery-heated socks! Take heart in the fact that Candlemas is the cross-quarter day, the half-way point between the winter solstice and the spring equinox.

The path of the planets is just south of the Milky Way in this part of the sky. The disk of our own spiral galaxy, a "Frisbee" of a few hundred billion stars, stretches about 100,000 light years (ly) from side to side. The sun and its attendant planets is ⅔ of the way out from the center, on the edge of the Orion-Cygnus arm.

Stretching away to the northwest, the Milky Way's presence provides interest and glitter to the winter sky. In Auriga, there is a line of three clusters worth searching for with binoculars. M37 is the brightest of the three and closest to M35. It is around 4,000 ly distant, contains upwards of 500 stars and is about 300 million years old. M36 is younger (25 million years) and fainter, though at a similar distance. Nearly on the line between θ Aurigae and Hassaleh, M38 formed about 220 million years ago, and contains about 100 stars. Some observers have described the stars as being arranged in an X or π shape.

Continuing along the Milky Way past Perseus, look for H and χ (Chi) Persei (PER-see-eye is how this is most often pronounced, though PER-see-ee is also heard). These two large star clusters are easily found in a dark sky with the unaided eye. They are among the very youngest clusters known. They harbor many large, bright, hot stars much like those in the belt of Orion, and are at a distance of 7,000 light years. On the other side of the W in Cassiopeia is another, older, fainter cluster, NGC 7789 with over 1,000 stars that should be visible with binoculars. Just north of NGC 7789 is another remarkable star, ρ (Rho Cassiopeiae). Though fairly faint in our sky, it blazes almost two million times brighter than the sun. But this is a cooler star so it has to be larger, 2,600 times larger than our own star, to be so luminous. If it were placed where the sun is, the outer layers of the star would be beyond the orbit of Saturn! But at its distance of 13,047 ly, it's just another faint star at the edge of the galaxy.

As well as giant stars and clusters of stars, there are double stars that can be quite beautiful when viewed through binoculars or a small telescope. In Cassiopeia, η (eta Cassiopeiae) has components of gold and purple, or yellow and red, depending on the sky conditions and instrument. These stars are a true binary, with both stars orbiting a common center of mass. Another beautiful binary star is γ Ari (Gamma Ariteis), the curved toe of the "hockey stick" of Aries.

On the way from Cassiopeia to Aries, swing through Andromeda for a peek at the Great Galaxy that is in the same binocular field of view as ν (Nu Andromedae, new an-DROM-e-day). This is visible with the naked eye as a fuzzy light smudge and is made a bit brighter of a smudge with binoculars. When showing this to chilly students who are hard to impress with such sights (and far more entertained by looking at the moon), I point out that this fuzzy blob is the light of the combined fires of a few hundred billion stars that has traveled for two million years across intergalactic space to land on the retinas of their eyes. It's an awesome thought.

At γ Ari, swing back to the east to enjoy the Pleiades and Hyades star clusters. These are the most prominent star clusters in the sky. The Pleaides have been known since ancient times and have references in the Bible (along with Orion) and Homer's *Odyssey*. There are a few hundred stars at a distance of 380 ly in the Pleiades. The cluster is thought to be about 100 million years old.

The Hyades form the V representing the nose of the bull in Taurus. This is the closest cluster of stars at a mere 151 ly. It is 660 million years old and thus more dispersed than the Pleiades, as well as appearing more dispersed simply because it's closer.

Aldebaran, the bright red star in the midst of the Hyades, is not a part of the cluster. Its red color indicates that it is much older than the Hyades stars (it is nearing the end of its life) and at a distance of 65 ly, it is less than half way to the cluster.

After all this scanning of the "deep sky," as the fuzzy blob objects are called, don't forget to have another look at Saturn and Jupiter. In the period of even a couple of hours, the motion of Jupiter's moons, which started Galileo on his road to trouble with the pope, should be fairly obvious and a sight to enjoy. —*Aileen O'Donoghue*