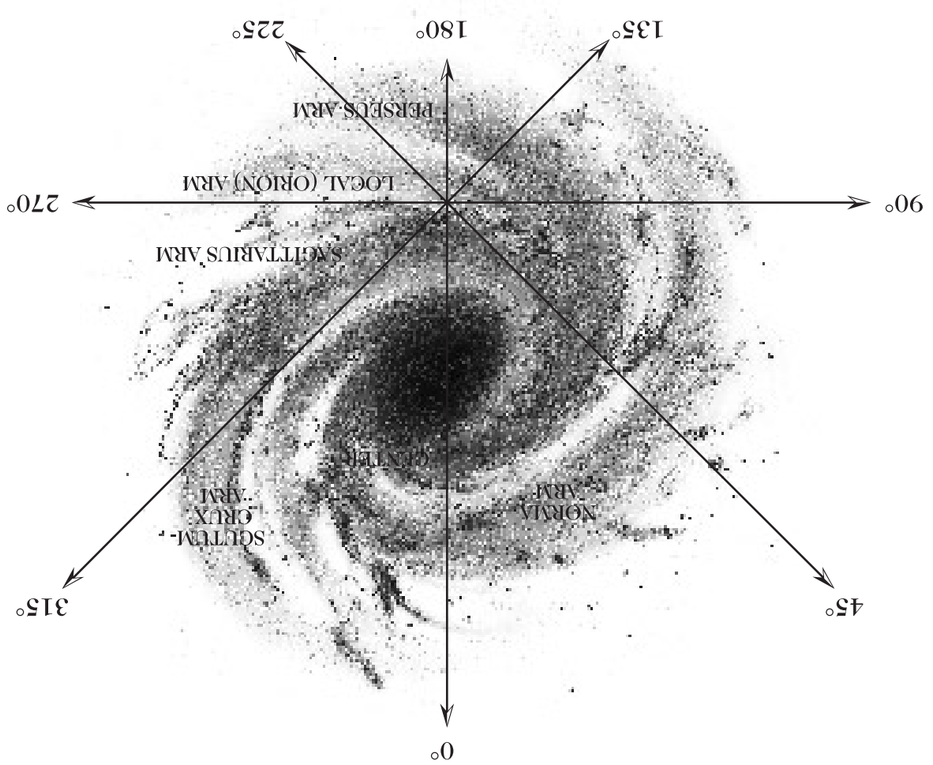
THE MILKY WAY GALAXY

A GUIDE

Digital Sky LLC



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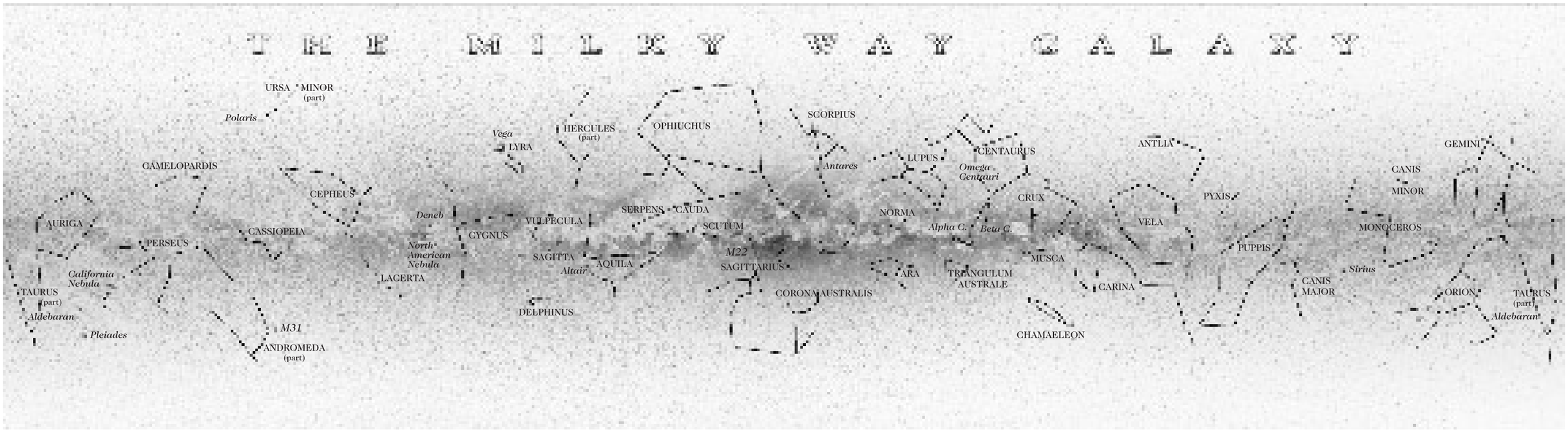
ABOUT THE PHOTO

This image was prepared from eight frames taken with a large-format camera. The focal length was 90mm on 4" x 5" film, which yields a field of about 55 by 70 degrees. This is similar to the eye's view, and about the same field as a 24mm lens on 35mm film. Focal length is equivalent to magnification, so the camera shows more detail than the eye. The film was scanned and then combined and edited digitally. The resulting file was two gigabytes, reduced to one Gb for this image. Four frames, centered on 90, 135, 180, and 225 degrees respectively, were taken from Mt. Locke, in Fort Davis, Texas. Frames for 270, 315, zero, and 45 degrees were taken from Broken Hill, New South Wales, Australia. The camera was oriented perpendicularly to the galactic plane for each shot to minimize distortion. Kodak 400MC film was used in Texas, and Portra 400NC was used in Australia. Exposures were 80 minutes at f/10 on hypersensitized film, developed on site.



Our galaxy is a slowly swirling whirlpool of 200 billion stars, spread across 80,000 light-years. From our position 25,000 light-years away from the center the galaxy surrounds us and appears as a band across the sky, known as the Milky Way. Equally important as the visible stars are gas and dust. Found mostly in the central plane, dark lanes of dust clouds can be seen mottling the bright wash of stars. Together, the stars, gas, and dust weigh as much as a trillion Suns. The dust blocks our view of distant parts of the galaxy, but a bright area just below the center is a window that allows us to see all the way to the central halo of older, more yellow stars. The true center lies past the dark areas that split the central bulge. The spiral arms are where most star-forming activity is taking place. Glowing red clouds of excited hydrogen mark the presence of young, hot, giant stars. Although most stars are like our Sun or dimmer, they are outshone by the giant and supergiant stars at large distances. All the stars of our constellations are relatively nearby, and only a few are modest stars like the Sun. Many of them are of a similar age, dating from a starbirth episode beginning 30 million years ago. The dinosaurs would have seen different constellations.

Some highlights for stargazers are easily visible in or near the Milky Way. At left and low, at about galactic longitude 180 the bright star Aldebaran marks the eye of the bull, Taurus. Nearby are the Pleiades, a cluster of stars below the plane and a little farther in from the edge. They glow blue because the brightest stars in the cluster are blue-white giants. The cluster is in a thin dust cloud that shines blue with reflected light, and is called a reflection nebula. Just above the Pleiades is a red emission nebula (nicknamed the California Nebula), so called because hot stars nearby are energizing the hydrogen to glow somewhat like a neon light. Here, film shows what the eye misses: we see mostly blue-green at night. Moving further right along the center line we find concentrations of stars, or clusters, and more emission nebulae. Well above the plane, at about galactic longitude 120, is Polaris, the North Star. Directly below the plane is our sister galaxy M31, or the Andromeda galaxy, at a distance of roughly two million light years. Next we come to a rich area in the constellation Cygnus. An emission nebula next to the bright star Deneb, along the center line, is known as the North American Nebula, because its shape reminds one of the continent. Above and a little right is Vega, one of the three stars of the summer triangle, the others being Deneb, and Altair, seen just below the center line in Aquila, at about galactic longitude 50. Now we are nearing the middle of the image, and looking toward the center of the galaxy. Huge dust clouds block our view but add depth and texture to it. More clusters and emission nebulae mark the central plane, and in Sagittarius, below and a little left of center is a star that appears fuzzy. This is actually a globular cluster, M22. As a group these clusters are interesting to astronomers because they appear very old, and are not confined to the plane of the galaxy. Instead the globular clusters form a halo around the galactic disk. Since they are tight concentrations of thousands of stars, they delight stargazers.

The constellations Sagittarius and Scorpius stand on both sides of the galaxy center. At the head of Scorpius, above the central bulge, is Antares, a bright star embedded in a reflection nebula. Since Antares is a red-orange giant the nebula shines red-orange. Blue reflection nebulae surround nearby blue stars. Moving to the right of center we are looking at the southern Milky Way, not visible from the northern hemisphere. The two bright stars along the center line, at galactic longitude 310, are Alpha and Beta Centauri. The former is actually a pair of Sun-like stars in close orbit around each other. In orbit around that pair is a red dwarf star known as Proxima Centauri and our closest neighbor at 4.24 light-years. Above Alpha and Beta and out of the plane is the huge globular cluster Omega Centauri. It looks like a star and can be seen without a telescope, but the image shows a fringe of faint stars around it. Farther right are more emission nebulae, including a large area of glowing red hydrogen at longitude 280-260, named for its discoverer, Colin Gum. Now we are returning to the familiar constellations of the northern sky, and we find the brightest star, Sirius, located a little below the plane at galactic longitude 230. Next to it is Orion, with its well known belt and sword, both of which contain nebulae in the act of forming stars. At far right is Aldebaran, and we have come full circle.