

One Good Target

With Some Other Sights Worth Seeing
While You're in the Neighborhood

December

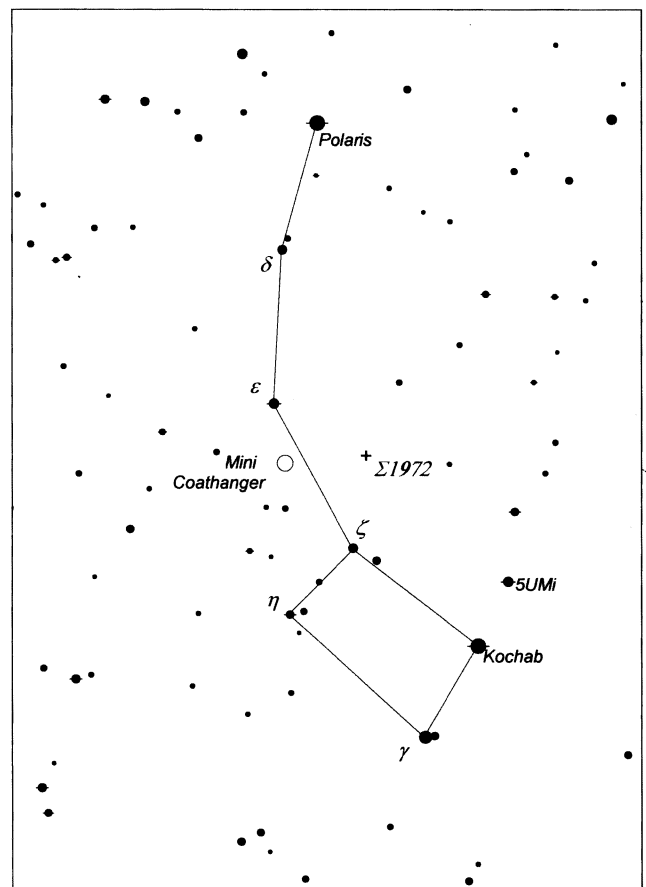
At the Still Point of the Turning Sky:

Polaris, a few of its neighbors, and the echo of a delightful asterism

The most reliable star in the sky, Polaris beams down on us from almost exactly the same spot all night, every night, year after year – and it's there all day as well, although we can't see it in the daylight sky. Those of us with equatorial mounts use Polaris, or at least a rough approximation of its position, to keep our mounts tracking and our targets in the eyepiece for more than a few minutes at a time. For perfectionists and astrophotographers, the alignment on the north celestial pole is much more critical and therefore must be much more accurate, but it's still Polaris that leads us to the spot at which we aim. But Polaris and the area near it is more than a convenient marker for the location of the north celestial pole: there are some targets here worth pursuing. This month, we'll hunt a few of them down.

The obvious starting point for our expedition is **Polaris** itself, a yellow-white supergiant Cepheid variable whose magnitude varies only slightly, hovering around mag 2.0 over its four-day period. It's the brightest and closest Cepheid to us. It's also an excellent example of a brightness-contrast double, with a mag 9.0 companion just 18 arcseconds away from the primary star. Splitting Polaris doesn't take lots of magnification or a large aperture – a 4 inch scope at 50 to 75x is plenty – but it does require you to look carefully to find the vanishingly dim secondary star just beyond the glare of the primary, which is over 600 times as bright. The primary was long described as a spectroscopic binary, but in 2006 the Hubble Space Telescope "saw" the close dwarf companion, known as Polaris Ab, just 0.2 arcseconds from the primary star.

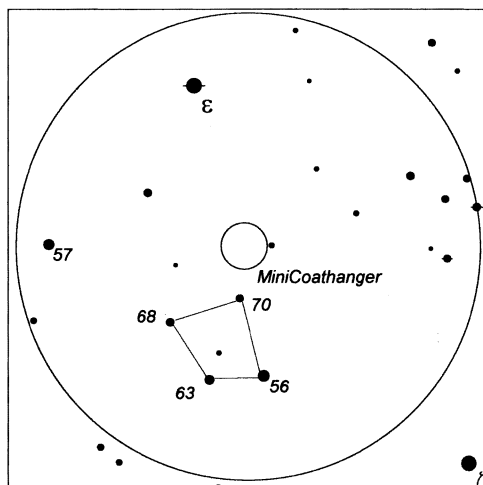
This month's targets, showing stars to mag 6.4



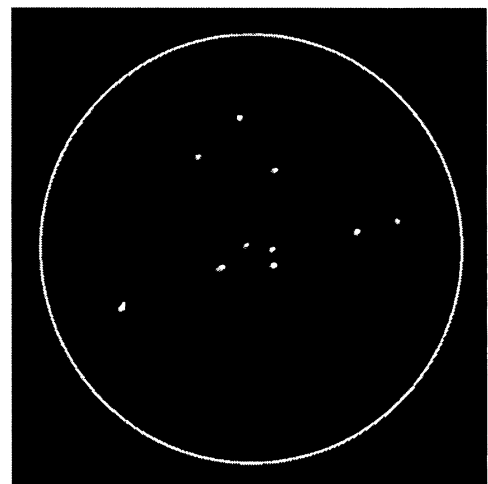
Due to precession – the wobbling movement caused by the $23\frac{1}{2}^\circ$ tilt of Earth’s axis to the plane of the ecliptic – the location of the north celestial pole wanders across a large area of sky over a period of 25,800 years. Polaris is currently the closest star to the pole, at a distance of only 40 arcminutes. Its distance from the pole will drop to 27 arcminutes in March, 2100, after which it will begin to slowly drift away, only to return to the same place in our sky 25,800 years from now. In the meantime, a series of other stars will serve as the northern pole star, including Gamma Cephei in 2,000 years, Delta Cygni in 10,000 years, and Alpha Draconis – which was the pole star when the Pyramids were built – in 21,000 years.

Traditionally found by following the “pointer” stars at the end of the **Big Dipper** in Ursa Major, Polaris anchors the handle end of the much fainter **Little Dipper** in Ursa Minor. The Little Dipper’s counterparts to the Big Dipper’s pointer stars are mag 2.1 **Kochab** (Beta [β] Ursa Minoris) and mag 3.0 **Gamma** (γ) UMi. The pair are sometimes called *The Guardians of the Pole*. While Kochab is a solitary orange giant, Gamma forms a naked eye pair with an orange mag 5.0 star 17 arcminutes away from the blue-white primary. At the other end of the Little Dipper, a mag 4.3 whitish star (**Zeta** [ζ] UMi) marks the spot where the handle joins the bowl; the remaining corner of the bowl is a white + blue + orange naked eye triangle formed by mag 5.0 **Eta** (η) UMi and two companions, mag 5.5 and 6.4.

Using Gamma and Kochab as pointer stars and proceeding another half-step brings us to **5 UMi**, a pretty yellow + plum-colored double consisting of a mag 4.3 primary separated by 59 arcseconds from a mag 9.8 secondary. Between the dipper and Polaris, forming a rough triangle with Zeta and mag 4.2 yellow giant **Epsilon** (ϵ) UMi – the next star up the handle – we find another double, **Struve** (Σ) **1972**, where a yellow mag 6.6 primary contrasts nicely with its mag 7.3 blue companion 31 arcseconds away.



Finding the Mini-Coathanger:
5° field, stars to mag 8,
selected mags noted, decimals omitted



Mini-Coathanger: eyepiece view
Credit: Houston Astronomical Society
/ Steve Goldberg (2019)

Less than 2° from Epsilon, near the corner of a distinctive half-degree trapezoid of mag 6-7 stars, is one of Ursa Minor’s hidden treasures – a group of ten mag 9 to 11 stars a half degree across, arranged in a pattern almost identical to the **Coathanger Cluster** (a/k/a Cr 399 or Brocchi’s Cluster), a summer outreach highlight in the constellation Vulpecula. It’s a reminder that nature loves to repeat patterns at different scales – a fitting point to contemplate as we wrap up our evening at the still point of the sky.

Rick Gering / December 2024