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Blog

First Midnight

Posted by admin on August 9, 2014



Star charts depict South Bend's first midnight on May 22, 1865. Circling the north star Polaris, the constellation Draco stares at us with its bright eye [Eltanin](#). Light that left that star 150 or so years ago is just now reaching our eyes. Over that same 150 years, by day observers have been tracking the cycles of sunspots.

[South Bend, IN, celebrates](#) the city's sesquicentennial in 2015. These illustrations depict South Bend's first midnight, which is the inspiration for a crosswalk painting downtown.

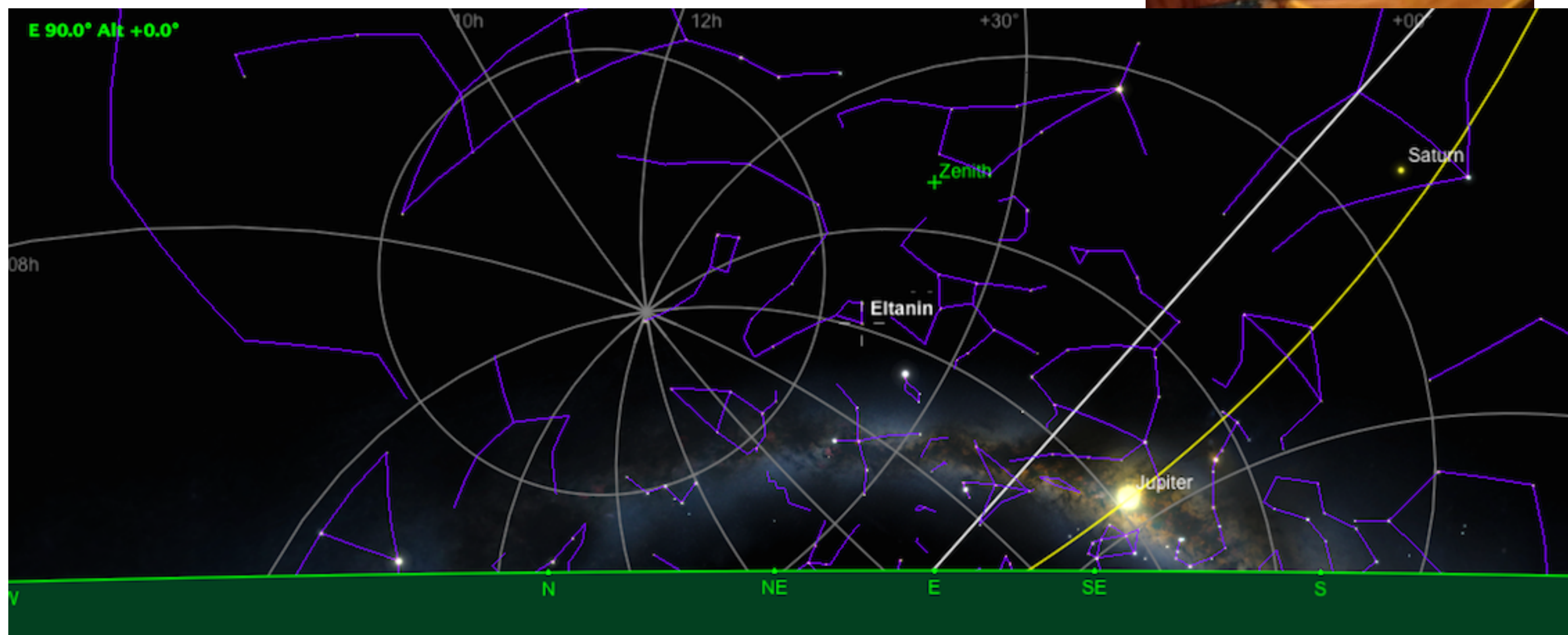
Images by SkySafari Plus software.

A Walk Across Time

Artist Christopher Stackowicz of [cstack studios](#) is working with the City of South Bend for more creative infrastructure. Painting crosswalks downtown is a citizen action project that will celebrate South Bend's history and future alike during its 150th anniversary. The first round of crosswalk painting is slated for Friday, August 15, 2014, [weather](#) permitting.

The star charts here suggest what a resident of South Bend would have seen that first midnight, a Monday night in May 1865.

- Gas giants Jupiter and Saturn
- Circumpolar stars
- [Eltanin](#), the eye of Draco
- The Milky Way
- Dark skies



First Midnight Charts

- [2015-banner.png - 276.38 KB](#)
- [no_constellations.png - 175.15 KB](#)
- [mag4.png - 187.96 KB](#)
- [mag3.png - 161.54 KB](#)
- [mag2.png - 150.06 KB](#)
- [mag1.png - 146.89 KB](#)
- [just_stars.png - 117.55 KB](#)
- [crosswalk_elements-larger.png - 170.40 KB](#)
- [constellations_no_grid.png - 132.39 KB](#)
- [constellations_with_names.png - 126.42 KB](#)
- [constellations_bright_intensity100.png - 163.45 KB](#)
- [constellation_names_included.png - 222.14 KB](#)
- [Az90_Alt0.png - 190.32 KB](#)
- [1865_mag4_constellations_grid.jpg - 386.32 KB](#)
- [1865-chart-draco-outlined.png - 1,223.80 KB](#)
- [1865-chart.png - 837.36 KB](#)
- [1865_Saturn_tilt.png - 71.31 KB](#)
- [1865_Jupiter_moons.png - 62.68 KB](#)

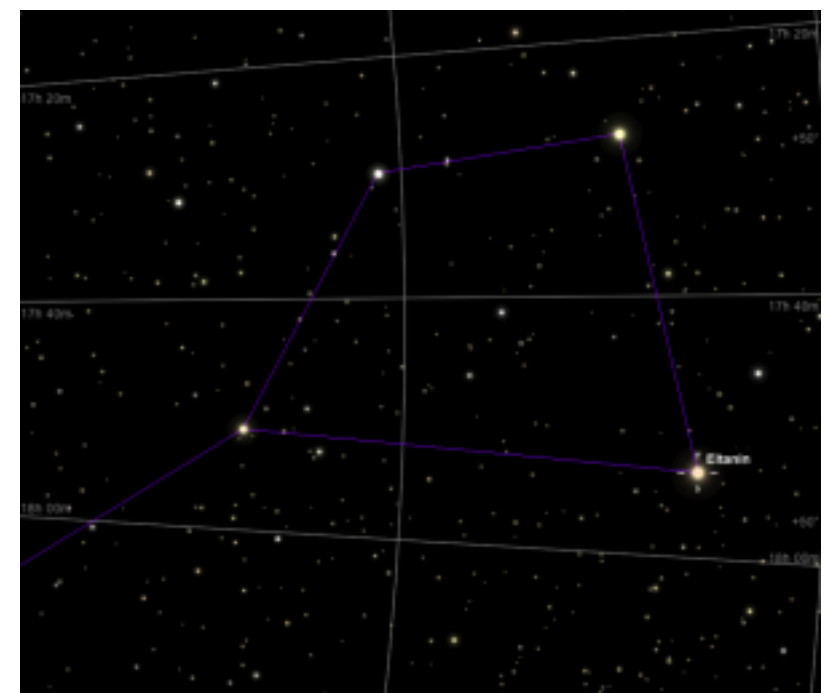
- [1865-south-3planets-Eltanin.png - 359.04 KB](#)
- [1865-north-Eltanin.png - 359.77 KB](#)
- [1865-north-alt41.png - 596.82 KB](#)
- [1865-ecliptic-wide.png - 838.59 KB](#)
- [1865-ecliptic-sanstext.png - 667.15 KB](#)
- [1865-alt-az-wide.png - 861.12 KB](#)

Eltanin, the Birthday Star

South Bend, Indiana, was incorporated 150 years ago. Around that time, photons of light left Eltanin, [the brightest star in the constellation Draco](#). The serpent-like dragon, shown in an [1865 illustrated star chart](#), encircles the north star, Polaris, while straddling the Big and Little Dippers. Eltanin is the [eye of the dragon](#). The photons of light that left that distant star on the day South Bend was incorporated are arriving about now. Traveling at 186,000 miles *per second*, that birthday star's light is just now striking our eyes.

Dr. Jim Kaler, professor emeritus of astronomy at University of Illinois, writes a [definitive description of Eltanin](#), reprinted with permission:

ELTANIN (Gamma Draconis). Because it was the pole star during a time of ancient Egypt, Thuban is the most famed star of Draco, the Dragon, and justly received Bayer's Alpha designation even though at bright fourth magnitude it is hardly the constellation's brightest star. That honor goes to bright second magnitude (2.23) Eltanin in the Dragon's head, which nevertheless was called Gamma even though notably brighter (by half a magnitude) than the other bright star of the head, Rastaban, which became Beta. The star's importance, however, is seen in its name, which stands for the whole constellation, from Arabic meaning "the serpent." The star is prominent for several other reasons as well. It is the closest bright star to the "winter" side of the "solstitial colure," the circle in the sky that passes through the poles and winter and summer solstices, the star lying almost exactly 75 degrees north of the winter solstice in Sagittarius. Eltanin's high northerly position also takes it nearly through the zenith, the point overhead, as seen from London, causing it to acquire the now obscure name "zenith star." As a result the star was heavily studied. In attempting to find stellar parallax, the annual shift in stellar position caused by the shifting position of the orbiting Earth (from which we get stellar distance), in 1728 James Bradley discovered in "aberration of starlight," which is caused by the velocity of the moving Earth relative to the speed of the light coming from the star. The discovery once and for all proved that Copernicus was right and that the Earth truly does move around the central Sun. Eltanin is also moving toward us, and will make a close pass at a distance of 28 light years 1.5 million years from now, when it will be the brightest star in the sky and will rival our current Sirius. Physically, Eltanin is a cool (4000 Kelvin) class K (K5) orange giant shining from 148 light years away with a luminosity 600 times that of the Sun, its only marked characteristic a slightly low iron abundance. Calculations from the temperature and luminosity as well as from the measured angular diameter agree that the star is 50 times the solar diameter, a bit over half the size of Mercury's orbit. As a giant it is dying, its days of core hydrogen fusion long over. Beginning life as a star with a mass about 1.7 times that of the Sun, it is now probably slowly increasing in brightness as it prepares to fire its internal helium.



Bruce McClure of EarthSky notes in [Eltanin and Rastaban are the Dragon's eyes](#) another observation of Eltanin:

Why does Thuban have the Alpha designation in Draco? It's because Thuban is a former pole star!

*Yet the mathematical wizard Jean Meeus (page 363 of *Mathematical Astronomy Morsels V*) calls Eltanin the "Queen of the Poles" because this star will be the north pole star in the year 92020 and then the south pole star in the year 2083470!*

Solar Cycles

Monthly Averaged Sunspot Numbers ([graph](#)) convey the regular yet variable solar cycle. Observers have recorded solar activity since before South Bend was incorporated in 1865.

Events

Significant solar events have been recorded in the past.

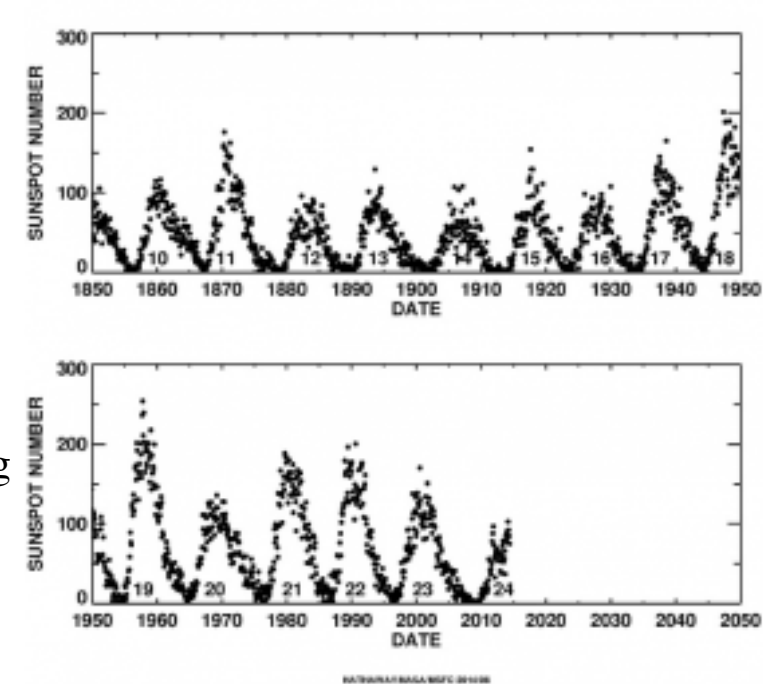
- [Maunder Minimum \(~1645-1715\)](#)
- [Carrington Event \(1859\)](#)
- [Solar Superstorm \(2012\)](#)

What will the next 150 years--or much less--bring?

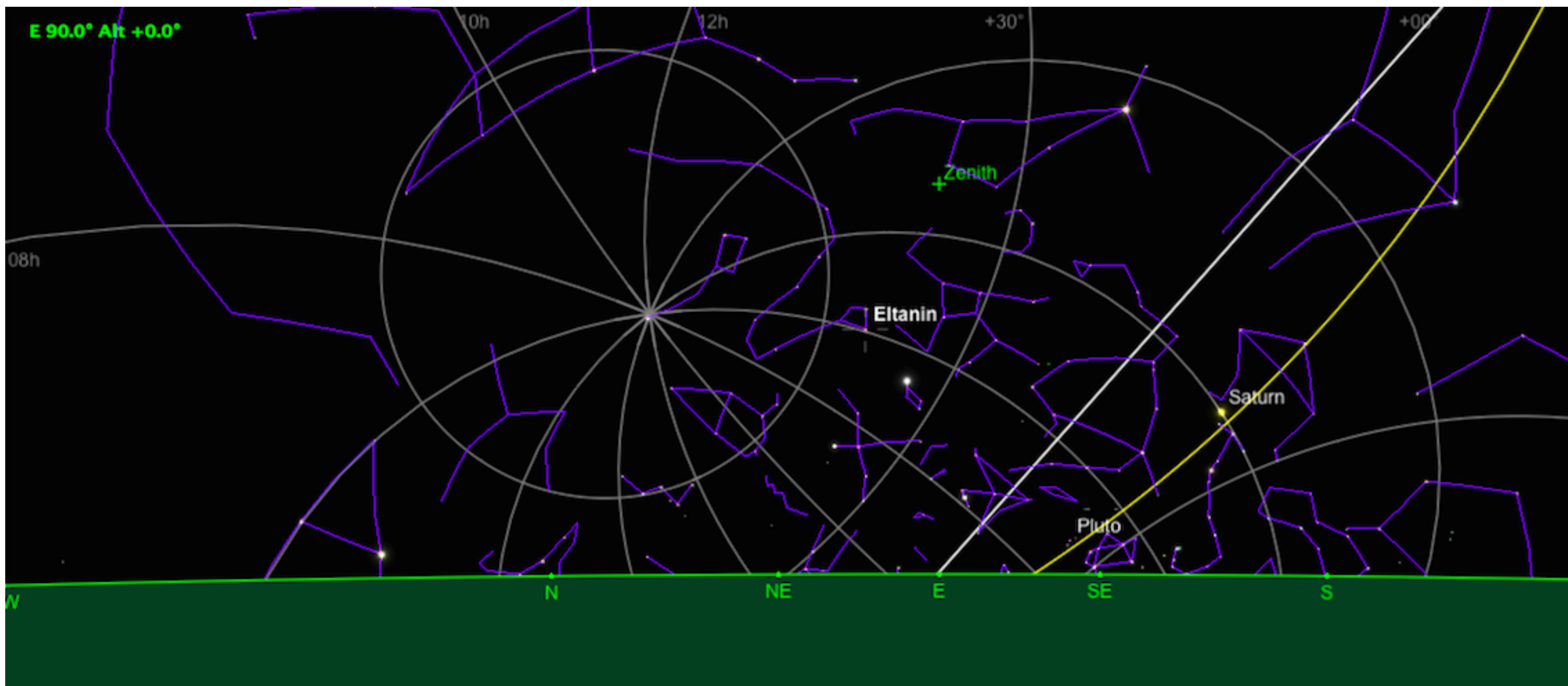
Darkness Over South Bend

How dark would the sky have been that first midnight? The moon was not a factor. An old, small, and waning crescent moon appeared so near the sun that it didn't even rise until just before the sun came up. That night sky should have been stunningly dark. The Milky Way was evident along the eastern horizon.

More recent measurements of South Bend's night sky are few. When the power downtown went out from an electrical fire, the region near the Washington Street crosswalk was without many outdoor lights. A sample reading of the night sky from parking garage rooftops is at [Power Outage Darkness](#).



[South Bend at 150](#)



See also [Walk Across Time](#) for details and images from the evening the crosswalk was painted.

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Tags

[The Learn'd Astronomer](#)

Walt Whitman, 1865

*When I heard the learn'd astronomer,
When the proofs, the figures, were ranged in columns before me,
When I was shown the charts and diagrams, to add, divide, and measure them,
When I sitting heard the astronomer where he lectured with much applause in the lecture-room,
How soon unaccountable I became tired and sick,
Till rising and gliding out I wander'd off by myself,
In the mystical moist night-air, and from time to time,
Look'd up in perfect silence at the stars.*

150 Years at Speed of Light

If an 1865 telegraph operator in newly incorporated South Bend had sent out a message at the speed of light (186,000 miles per second), it would just about now be reaching the realm of Etlanin. [Celebrate 150 years](#) of traveling at the speed of light.

Spots on the Aged Face of the Sun

(YEAR MON SSN DEV)

1864	10	33.9	16.8
1864	11	57.6	18.7
1864	12	28.6	21.7
1865	1	48.7	27.9
1865	2	39.3	23.3
1865	3	39.5	21.1
1865	4	29.4	19.2
1865	5	34.5	18.3
1865	6	33.6	18.8
1865	7	26.8	15.6
1865	8	37.8	19.2
1865	9	21.6	14.6
1865	10	17.1	15.8
1865	11	24.6	15.1
1865	12	12.8	13.7
1866	1	31.6	11.3
1866	2	38.4	26.4
1866	3	24.5	12.6

[Table](#) courtesy of NASA MSFC

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