

Urban Imaging

One Clear September Night

By David Nakamoto



On September 28th 2013 7:30pm, I started an observing run from the back of my townhouse, although I was hampered not only by bright urban lights, but by the lights from my townhouse, as you can painfully see at left . . .

I only planned to image Nova Del 2013 and see how bright it was(n't), but in the process I got quite a few images, while learning to operate the equipment together. As Clyde Tombaugh noted in his excellent book "Out of the Darkness", every piece of equipment has its quirks and idiosyncrasies, which needs to be

recognized and worked around. For instance, my Orion EQ-G mount needed to communicate with the specific USB port I first plugged it into. The same was true for the camera. Starry Night Pro and the camera software occasionally crashed. There was occasional periodic error in the RA tracking, showing up about once every two minutes or so. And of course power cables and communication cables everywhere. But imaging from my

"backyard" means I wasn't far from tools, water, food, and a restroom, not to mention that it's easier to diagnose a problem when you can see your way around.



My initial target was the nova in Delphinus, but on my way there, I hopped from Alberio to an old friend, M27 or the Dumbbell nebula. It's much larger than its better known cousin the Ring Nebula and just as bright.

This is a single 30 second exposure with bias and dark frame processing, as with most of my images from that night. The field of view is 0.44° or 26 arc-minutes wide. North is up, east

is left. Not only is the G3 camera more sensitive than my previous ones, but the 10 inch Newtonian also speeds

the collection of photons over my previous telescopes. There is still a little background glow in the lower left corner due to the townhouse lights.

One thing I liked was the large field of view of the camera. I could use the camera images to center the camera on the object, even if I couldn't see the object, by centering on the star patterns as displayed by Starry Night Pro. I



simply had to keep the camera oriented so north was up and east was left. The slow motion controls for the mount were available through Starry Night Pro, which also greatly facilitated centering objects.

Then on to the nova in Delphinus, designated as Nova Del 2013. This would be my first image of this object, a 10-second exposure to prevent overexposing the stars.

The arrow points to the nova. As you can see, it has faded quite a bit from its peak of magnitude 4.5 back in mid August. The bright member of the triple star in the upper right corner is Hipparchus 100536, an 8th mag star, so

the nova is now around 8th mag. The Nova also appears to be slightly reddish.

I learned that short hops worked the best with computerized mounts, and that one should take care to center the object, then resync the mount to it, in order to maintain accuracy during star hops. This will bring at least part of the star field for the next object into the field of view of the camera, about 26 arc-minutes wide.



Next was a nearby globular cluster M-71, then on to another globular, NGC-6779 in Lyra, shown at left. As will become readily apparent, not all globulars are alike, a rule that applies to all classes of deep sky objects.

Right next to this globular is NGC-6765, listed as a planetary nebula. I was curious, so I took a look. A 30 second exposure using 2x binning caught the planetary, barely. The image seemed to show a small, bi-lobed object with an even fainter elliptical outer region, but it's not for display.

I then jumped to Deneb, because from there several planetary nebula are a short jump away.

NGC-7027 was captured with a 30-second exposure and 1x1 binning, but it was very small, and other than a bluish cast, showed no details.

At left is NGC-6826, known as the Blinking Planetary, was initially overexposed and showed no detail, but I remembered that this object had details that could be seen despite its small size, so I took a 5-second exposure, and succeeded ! It looks like a blue Saturn with a circular haze. However, despite the resemblance, this is NOT the planetary known as the Saturn nebula. That's a different object, NGC 7009 in Capricorn.



NGC-6341 is better known as M92, in Hercules, shining at 6.4 mag. It is compact and bright, and would be better known if M13, the Great Hercules Globular, wasn't so close by, stealing much of the spotlight from all other objects in Hercules. Another 30 second exposure.





NGC-6229 is another globular in Hercules. Although fainter than either M13 or M92 (mag 9.4) it is very compact with a star-like or stellar core common with many of the brighter globular clusters.

If you've noticed that a lot of images are of globular clusters, there's a good reason for it. They are ideal objects for the urban astronomer because many are relatively bright, usually very compact and easy to spot, and can be partially resolved into stars.



Then I noticed that some of the great square of Pegasus was just visible above my roofline, and I remembered that NGC-7331 and Stephan's Quintet are off the northwest corner of the square, so after syncing up with the star at that corner (Scheat), I proceeded from there. NGC-7331 is a spiral, and spirals are notorious for having relatively bright cores and very faint spiral arms, but I set the camera for 30 seconds and 2x2 binning to increase the sensitivity, and was surprised to see this.

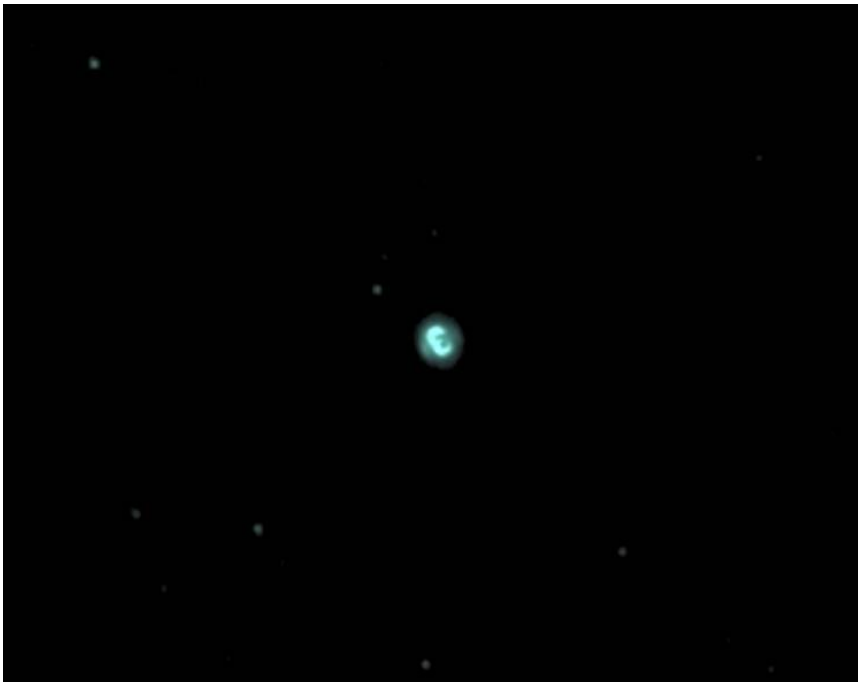
Unfortunately, the glow from my townhouse affected the image and made processing of it nearly impossible. NGC-7331 is tilted slightly open to us, much like M31

the Andromeda galaxy. The bright central core is plainly visible, but to the right of the core there appears to be a dark dust lane and a faint spiral arm. Also, to my surprise at least two other galaxies are visible; can you spot them?



Then, just because I couldn't resist, I tracked down and imaged Stephan's Quintet, took a 60 second image using 2x2 binning, and saw this. There are four galaxies crowded together just up and to the left of center. One of them is actually two interacting galaxies, hence "quintet". The quintet has the designations NGC 7317, 7318a & b, 7319, and 7320. The glow in the left bottom corner is due to the lights from my townhouse, leaking in from the front of the tube !

It was nearly midnight, and I decided to go for one more object before calling it quits. NGC-7662 is known as the



Blue Snowball planetary, and it was nearby, so I decided to take a look. This is a 2x enlargement of the original to show details in this small object. Again, as for the Blinking Planetary, I used only a 5-second exposure to get detail within the interior of the nebula. But is that a letter "E" at the center? The bluish color of this and the Blinking Planetary are probably due to the emission of Oxygen III due to the high excitation of the gases of the nebula due to the nova explosion that created the object in the first place. These planetaries are probably not the result of a supernova explosion, because a central star is quite visible, probably a

white dwarf. Supernovas usually leave no visible star-like remnant in their centers; neither a neutron star or a black hole is visible in amateur telescopes from urban skies, or any professional one that I can recall. The flashing of the Crab nebula neutron star is due to beams of radiation from several thousand miles above and away from the star, not directly from the star itself.