

FRASER VALLEY ASTRONOMERS SOCIETY

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Sheila and I headed south to our favorite astrophotography destination on October 12th. It was a much awaited trip that caused the summer months to drag by slowly in anticipation, as we had been to thiS fantastic high desert site of Portal, Arizona twice before. Although our first trip there was via the I-5 freeway through California, our preferred route took us through central Washington, crossing Oregon on the diagonal towards the southeast, passing through Idaho. Continuing south through Nevada at Jackpot and east into Utah at St. George. Thereafter south to Phoenix, where we stayed overnight as I had a business meeting the next day. Turning east again past Tucson, to our destination (after buying groceries in Benson) of Portal, just south of the I-10 freeway on the Arizona/New Mexico State Line.

On a previous trip to image Mars at Opposition in the fall of 2003, we discovered Jack Newton's Sky Village, a remote plot of desert being developed by our most famous Canadian Astrophotographer/Entrepreneur (see <http://www.jacknewton.com/>)

Portal is tiny. Placed in the middle of abundant natural desert fauna and flora and home to some of the darkest sky in the lower 48 states, it is also a Mecca for birders. Cooled by 4600 feet of elevation on a flat plateau on the eastern side of the Chiricahua Mountains, it is a long way from the light dome of Tucson or other unwelcome sources of light pollution.

We reserved the vacation home of Irene Kitzman of Connecticut to use for our stay. We shared our vacation hacienda with wonderful new friends, Phil and Joanne Kelly of Kokomo, Indiana for seven nights. An electrical engineer by trade, Phil is an extremely knowledgeable computer nut, birder, nature photographer, and lepidopterist (butterflies). Joanne, is every bit his equal in all areas except perhaps computers. I never thought I would learn so much about butterflies, but some fascinating and gorgeous species inhabit only small tracts of the nearby mountain range and are found no where else on earth.

My Bare Essentials Astrophotography Equipment:

My astrophotography set up was not expensive, about \$3000 plus camera. Most of us, properly motivated, could gradually accumulate a similar set up.

I bought a used Vixen GP-DX mount with "go to" capability (Sky Sensor 2000) two years ago, for \$2200 Cdn dollars. An Orion 80mm ED scope, \$500 u.s. (semi-apochromatic), a JMI Motofocus (\$140 u.s.) to fine tune focusing adjustments and a Celestron .63 focal reducer (\$100 u.s.) to gather more light quickly, was also purchased. Processing is done with Mike Unsold's excellent Image Plus (\$140 u.s.), and Jasc's Paint Shop Pro (a Christmas gift from Sheila).

My camera is a Canon 20DA (\$2149 u.s.), an SLR capable of both great daytime imaging, and very impressive long, low noise exposures on astronomical objects (a modified filter to block less Hydrogen-Alpha wave lengths and ease focusing with a live focusing screen). I also use Canon's TC-80 timer remote controller (another gift from Sheila) to pre-program a series of images and automate imaging without touching the camera. Avoiding camera shake is absolutely essential for taking images longer than a few hundredths of a second, as otherwise each twitch of the finger on the shutter would ruin hard-earned pictures.

Our Imaging Routine:

After arriving in Portal, October 17th, meeting Phil and Joanne, putting away our gear and groceries, Phil and I headed for our observing site to set up equipment, right in front of the house!

Such a treat to be able to leave most of our equipment set up night and day, rather than endure late night breakdown agony after each imaging session. I fashioned a 5-liter plastic jug filled with local rocks to hang underneath the mount to add additional stability to the mount.

Just after sunset, we did a careful polar alignment routine aligning the mounts' axes with the celestial North Pole through the built in illuminated polar alignment scope. I then performed a 3 star alignment, centering three known stars in the eyepiece, after plugging in the hand held computer controller. Time, latitude and longitude coordinates, were set before utilizing the "go to" capability of the mount.

Thereafter, a very careful "drift alignment" routine was performed to tune our polar alignment even more by watching star drift through a 12mm illuminated reticule

eyepiece near both southern and eastern horizons. Antares in Scorpius was an excellent bright southern star for azimuth adjustment, while another relatively bright star was chosen for our eastern drift alignment to ensure our declination setting was accurate. Drift alignment took some time, about 30-45 minutes, but was essential for unguided imaging of up to two and a half minutes long without noticeable star drift once complete.

Image Calibration:

Each night “dark frames” were taken to later combine and subtract from our images with the same ISO setting, temperature, and duration as our light images, drastically reducing electronic noise. It is a good idea to take these in between or just after light images are taken. Using “Median Combine” in late image processing ensures darks are averaged to smooth out results.

Sky flats were also taken to later subtract from our images removing any sign of smudges or dust in the optical system, which would otherwise display unsightly dust motes, during processing. Sky flats also allow the background to be “flattened” allowing adjustments in the image histogram to flush out more detail from stacked images. Flat frames also allow the removal of any bright spots or vignetting from your images.

Finally, focusing was accomplished by going to one of two settings on the camera, FC1 or FC2. This provides a five or ten times magnification display of a bright star on the LCD screen on the camera back, while focus is carefully tweaked with the JMI Moto-focus before being locked at the “sweet spot” prior to imaging.

Once we were set up, had taken a trial shot, and adjusted our framing ensuring our object was being recorded on the image, we sat back and enjoyed the night sky with all imaging set to automatic.

Ahhh.... The time we had been waiting for. With Sheila and Joanne exchanging jokes and laughs on the deck in front of the house, and Phil and myself having prepared all equipment for the night’s imaging run, we joined our female partners for coffee, laughs and snacks. At 50 feet away from our imaging platform, we periodically checked our equipment and listened for camera clicks.

Orionids from Portal (October 20-21st) WOW!!!!

Although the Orionid meteor shower does not enjoy the notoriety of the Perseids of August or the Leonids of November, they were spectacular and provided almost non-stop action above our heads. During the Peak of the meteor shower, in one ten hour night, Sheila and Joanne counted 432 meteors! Such a one night count would likely never occur in the light polluted skies near our home in the Fraser Valley. One screaming meteor shot south to north for a full ten seconds, lighting up our otherwise jet black sky, noted with glee by the screams and hoots of us all.

Our Targets:

Sculptor galaxy (NGC 253), the Rosette (NGC 2244), the Horsehead Nebula (IC 434) and more! Sculptor galaxy is generally too far south to view, let alone image from Canada, but from Portal it rides high above the horizon. This large elongated galaxy was easily imaged on our first night; a pretty cool thing considering it was 10 million light years from my camera. We also imaged M-46 complete with a tiny planetary nebula (NGC 2438) tucked neatly within it, the Pinwheel galaxy (M-33), the North American Nebula (NGC 7000), and several other objects.

The most exciting object was, for me personally, the Horsehead Nebula. I took over 2 hours of successive 2-minute images of this most beautiful object, and eventually selected the best 114 minutes (57 time's 2- minute exposures) for stacking and further processing. I nearly jumped out of my seat the next night when I combined these images for the first time and saw the incredible detail available only with very long exposure time. In short, both Phil and I were ecstatic!

Our larger Telescope was not entirely neglected!

We also took along our larger observational telescope, a 15-inch f 4.5 Obsession Dobsonian, which provided some wonderful close up views on the heavens. Sheila and Joanne called Phil and myself over to view several times as they independently discovered Sculptor galaxy and other objects of note. I must confess though, if you haven't noticed yet, I am absolutely hooked on astrophotography! I never would have imagined when I began pursuing this hobby five years ago that I would be discarding viewing opportunities with a 15 inch scope, for more time imaging with a 3 inch! Such is the case, and many an observational buff might think that is more than a bit odd, but for me, that's ok!

Mosaic taken at our vacation home/imaging pad includes nine five arc minute wide fields of Sagittarius region, a tripod mounted shot of the Chiricahua Mountains to the west of the house, and the four of us (Chuck & Sheila on left) with most of our equipment set up at the observing pad.

Conclusions:

This years' trip was made much easier by the purchase and outfitting of a 4 by 8 foot Interstate trailer to carry all of our equipment. Any gear, such as the scope, electronics, 80 pound deep cycle battery used during our imaging sessions, could be quickly stowed. Once locked into our trailer till next night, we were able to get to bed just a bit sooner.

We had five consecutive clear nights, and with the longer nights of October working in our favor, we were able to get some shuteye each night before sunrise. So much raw data was collected that we had to make a quick trip to Radio Shack in Douglas, Az (60 miles south on the Mexican border) to buy a 300 gig external hard drive to down load and back up our data. Believe me, I wasn't complaining!

(To see some of these images, go to <http://www.fvas.net> FVAS Gallery, then Astrophotography and then pages ten and eleven under Chuck Webb photographs) □