

ASTROTENT

November 2006

The November NYAA meeting, held at the Toronto Botanical Garden, was a lively affair, hosted by the ever-generous John Merchant. Although attendance was slightly down from previous meetings, the room was filled in spirit at the very least. Rick and Rosemary arrived with Jeff Boylin and John Hicks, our speaker for the night. Rick, Cathy and Norm added to the list of regulars. Two visitors also showed up – Mark, from somewhere in Toronto, and Gary, from the UK.

Walter MacDonald made a rare appearance, staking out his territory at the back of the room. He was soon joined by the other MacDonald: Dave. The arrival of Tony Ward seemed akin to the addition of sulphur to the mixture of charcoal and saltpeter provided by the MacDonald lads, but aside from an ear-splitting shriek or two and a few execrable puns, the fireworks did not materialize.

Ray Sampson, Andreas, Bonnie, Dave Ledger and three other NYAAers (I apologise for forgetting your names) rounded out the cast of characters in attendance.



Cathy McWatters started the formal part of the meeting by asking the question: Which scope is better for astrophotography, a Mak-Newtonian or a Schmidt-Cassegrain? This question had been posed to Cathy herself, so she decided to seek advice of other club members. The majority gave preference to

the SC over the MN. (After this vote no Defense Secretaries were forced to resign.)

Next, Bonnie jumped in to shill some calendars “for make benefit glorious club of RASCstan.” The 2007 calendar features a neat photo of Isaac Newton’s house, snapped by Roy Bishop.

Rick McWatters followed by showing two images taken during this year’s Starfest using David Levy’s observatory in Arizona. With rain pelting down on the Big Tent in Mount Forest, Bob Denny took remote control of “Clyde” (David Levy has a name for each of his scopes) and commanded it to image several different objects. We got to view a low res image as each one was acquired. David himself was on the phone providing a running commentary as the telescope acquired and imaged each object.



John Hicks was our featured speaker for the night. John's talk on solar imaging was one he should have given at Starfest, but was unable to, due in part to the lack of sufficient Tim Horton's franchises between Keswick and Mount Forest.

John has been photographing the Sun for over 25 years and his talk distilled his experience over that time into a 45-minute package. Succinctly, the keys to getting a good solar image are top-quality equipment, rigorous technique, a good location and, above all, a large measure of luck.

John started off with a brief introduction on the physical structure of the Sun's surface (photosphere) and the chromosphere. He explained the life cycle of sunspots and their interaction with the solar magnetic field. Other solar phenomena such as faculae, granulation and limb-darkening were touched on.

Some of the things to look for when observing or imaging the Sun in white light are the umbral and penumbral regions, delta groups (i.e. several umbral regions within a

common penumbra, spots that merge and spots that fracture. Under ideal conditions you may be able to see filaments within the penumbra and light bridges across the umbra magnetic field lines.

A narrow band filter (e.g. 100 Angstrom band pass) used with a CCD camera or video is capable of obtaining excellent results with moderate sized scopes.

The chromosphere is best observed using a filter tuned to the hydrogen-alpha line at 6563 Angstroms. Due to the Doppler shift, this line is approximately 1A wide, so filters with a band pass of less than 1 Angstrom give the best results. John related to us how he obtained excellent images with a (supposedly) 0.8 Angstrom Daystar filter. Years later when he returned the filter to Daystar for refurbishing, he was told he actually had a 0.4A filter, which is considerably more expensive than a 0.8A filter. So he didn't get his old filter back, but instead received a 0.6A band pass replacement.

(To get an idea of the H-alpha line, imagine the visible solar spectrum from 4000A to 7000A spread out on a metre stick. With the blue end starting at zero, the H-alpha line would be one-third of a millimeter wide, centered on 854.3 mm at the red end.)

Generally, Daystar filters are designed to work with f/30 optical systems. John's set-up consists of a 4-inch refractor, stopped down to 2.5 inches, an energy-rejection filter (which allows only red light to enter the telescope), a Barlow, a telecentric unit, extension tubes, the filter, and a camera. The telecentric unit

makes the light-cone nearly parallel before it enters the Daystar filter.

The Daystar filter uses an Etalon tuned to the H-alpha line. Basically an Etalon consists of two partially reflecting plane surfaces, separated by about 100 - 200 nanometres. Destructive interference allows only certain wavelengths to pass through. Additional filters allow only the H-alpha line through. Several factors determine the filter band pass: the surface reflectivity, the purity of the components and the spacing of the elements. Daystar filter are all hand-tuned by trial and error.

Coronado also uses an Etalon for a filter, but in this case the filter is placed before the objective. The advantage here is that the light rays are parallel as they pass through the Etalon.

Narrow band filters are ideal for observing prominences. Some filters are tunable over a narrow range, so that various surface phenomena can be seen. Bright transient spots, known as Ellerman bombs can sometimes be seen, as can Moreton waves, which are gravity waves (i.e. a vertical oscillation) propagating along the solar surface.

Recently a new type of filter has become available. This one is centered on the calcium K line at 3933 Angstroms, somewhat too blue for older eyes, but ideally suited to capture with a digicam.

After John finished his presentation, Tony Ward gave an impromptu paean to the use of "over-corrected" glasses for correction of night myopia. By adding an extra half dioptre to his normal prescription, Tony was able to get a dramatically improved view of the night sky. Most notable was his naked-eye view of the Pleiades, which lived up to



(and beyond) its moniker of "Seven Sisters". Tony cautioned that improvements could only be seen when his eyes were fully dark adapted, and he was observing from a truly dark site.

John Merchant closed the (formal) meeting and invited all who could, to attend the informal session at a local eatery.

47 Tucanae as imaged by David Levy's observatory.



Remote capture from Starfest 2006.



NYAA Meeting November 7th, 2006