

Steve Yates  
Fort Worth, Texas  
2021

# Astronomy Log

## Visual Observation Notes

Time: CST/CDT (UTC-6/-5)

Telescopes: Bresser Comet Addition, **AR102s**, 102 mm, f/4.5, Achromatic Refractor,  
Aperture Mask 60 mm (f/7.65) if needed to meet the Sidgwick Standard (CA)

Eye Pieces: Astro-Tech ED Paradigm, 5 mm, 12 mm, 25 mm; Stellarvue 15 mm EUW  
Ultra Wide Angle 82 degrees, Celestron 8-24 mm Zoom, assorted Plossls

Barlow: Celestron 2X

Mounts: Bresser Manual Alt/Az

**2021-12-27**

22:00-23:30

The Temperature was way above normal (70's F) and the humidity was high but the clouds had finally burned off. I used this opportunity to use my new 2.1 x 42 Ometron binoculars and my telescope.

I first turned my sights to the bright star Sirius. It was beautiful as always but try as I may, I still could not detect it's companion, the Pup. I had temporarily lost Sirius when I wasn't paying attention but accidentally discovered the triple star system Beta Monocerotis (11 Mon C). One star is slightly brighter than the other two but the other two are closer together. They all appeared white except I could perceive that the faintest of the closest pair was ever so slightly bluer. It's amazing observing these three stars knowing what they are.

Next, I extended my tripod for a near zenith look at M45, The Pleiades. My mother-in-law was in town and I wanted to show her something cool even though the skies were poor. It did not fail to amaze her.

I then swung a little southeast to the red giant Aldebaran and the Hyades Cluster in Taurus. Fast moving low clouds were coming in and I used the time of cloud obstruction to study more about Aldebaran on Wikipedia.

The clouds were getting thicker so I turned north to Capella and then to the eclipsing binary star Almaaz. Though I could resolve down to an Airy disk I could not detect any companion.

I called it a night for clouds and hoped for more clear skies before having to go back to work the next week. Any time behind a telescope is time we'll spent.

**2021-12-21**

17:39-18:45

I setup with my SvBONY camera and captured some good videos and photos of Venus while the sky was still bright. Venus was a large thin crescent at only a 0.10 phase.

I had heard that comet Leonard had maybe flared up by a factor of ten the day before. It was to be low on the horizon and making a triangle with Saturn and Venus. I scanned the skies with both my binoculars and wide field eyepieces in my telescope but I could never see it.

I turned to Saturn and captured a few good videos and photos of it.

19:15-19:35

I was going to try and catch some videos and photos of Jupiter after supper but the seeing conditions became so bad that it looked like I was looking at Jupiter from the bottom of a swimming pool. There was a slight breeze from the south now and I think warm air was coming in over the cold air.

**2021-12-20**

21:30-22:20

I noticed that the sky had cleared off when I took the trash out so I brought my telescope out and set it up at the end of the garage to look at the bright 0.96 waning gibbous phase of the near full moon. Though the skies were clear the seeing conditions weren't the best as there was some instability in the view. As expected the Moon was most featureless at this phase except for some structures on the eastern limb. Most notable was the central double-peak and crater wall shadows of the crater Langrenus. The Sea of Crisis was very distinctive yet desolate looking. It's crater wall borders were pronounced.

The Moon was in the constellation Gemini and very near the star Pollux and one of my favorite double stars, Castor. I swung my telescope over to Castor and put in my 5 mm Paradigm eyepiece. The bright pair were as beautiful as ever.

I went from Castor to the distinctive orange star Meksuta. One source says it is a blue-white double star. I could not see a companion and the color was not bluish at all. It's possible I've mis-identified the star.

I swung back to the Moon for a few final views before putting things away for the evening.

**2021-12-11**

21:43 - 23:40

I went out to take a look at the Moon. It was at a waxing gibbous phase 60.7% illuminated. The weather was 39 F and very clear. However, seeing conditions weren't very good due to a lot of thermal distortion. The main attraction on the Moon was the Sea of Showers. The Alps Mountains were casting long shadows and two "eyes" appeared to be looking at us from the just inside the dark side of the terminator, west of Mt. Piton and the Alps Mts. These most of have been the illuminated peaks of Mt. Pico and the unnamed peak to its south. The Alpine Valley (Vallis Alpes) was very distinct too. At the southern end crater Maginus was mostly dark except for the rim and three very tiny specs of light in the center of the dark crater. I took a whole bunch of cell phone photos just to have a record and to identify more features on the Moon later.

It was getting very cold and I was starting to have a hard time keeping my eyepieces from fogging up so I swung my telescope to check out the Pleiades with my wide field Stellarvue 15 mm eyepiece. It looked as beautiful as always. I gazed through the cluster for a while and then packed everything up for the evening.

**2021-12-02**

00:25-00:45

The skies weren't the best with some high cirrus clouds. I brought out my telescope and my little SVBONY SV-305 camera. I used my 60 mm aperture mask and my 2X Barlow lens. With this setup the camera/telescope had about 180x. I captured a bunch of my images and videos of Venus. Seeing conditions were not the best and clouds drifted across on occasion. Despite all of this I was happy with the results. It was now becoming a thin crescent at only 27.1%. Then I went out to eat with my wife.

02:25-02:45

Jupiter was now in a clear space so I took a bunch of images and videos of it too. The Great Red Spot and with a little imagination I could see it rotating into view. Two distinct cloud bands were easy to view.

With all of this data I had enough to chew on for a while so I packed things up.

**2021-11-28**

19:15-21:30

Took my trusty Minolta 10 x 50 and my 1+ years old Bresser 7 x 50 binoculars out to compare views. I looked at the M31, Andromeda Galaxy and the surrounding stars. The Minolta had a wider apparent field of view but the Bresser had a wider actual field of view. The image in the Bresser was brighter and I could discern the galaxy easier with it. The Bresser has a much larger eye relief though that can be annoying at times since I could not rest my eyes on the eyepieces. The Bresser 7 x 50 binoculars came with my telescope in a package deal and the Minolta 10 x 50s were a gift to myself about 30 years ago. I've had a great many observing sessions with the Minolta binoculars alone.

I brought my telescope out for the same view. I started at the orange star Mirach and star hopped north to Andromeda. I started with my Stellarvue 15 mm wide field eyepiece and immediately saw the galaxy, or at least the core of it. Amazingly I could see the smaller galaxy M32 also for the first time! I switched to my Astro-Tech 12 mm Paradigm eyepiece but the view was not as impressive. Next, I put in my Astro-Tech 25 mm Paradigm and though the view was brighter again than the 12 mm, I think the combination of magnification and light transmission was optimum with my Stellarvue 15 mm, 82 degree eyepiece. I put in the stock Bresser 20 mm, 70 degree eyepiece and I could see both galaxies though the smaller field of view and short eye relief made it less enjoyable. It was certainly a good thing that both M31 and M32 could be discerned in Bortle 8 skies with the completely stock cheap telescope configuration! Of course since the two galaxies appeared far apart when I know they are close together meant that I was really only seeing their brights cores. Installing my UHC Nebula Filter on my Stellarvue 15 mm may have increased the contrast of M31 but the view without the filter was of course brighter.

I next swung the telescope down to one of my favorite double stars, Almaak. I could barely split the pair with the Stellarvue 15 mm eyepiece but it was much easier with the Paradigm 12 mm and the 60 mm aperture mask. At 5 mm the pair looked very nice. The main bright star's color spectrum was towards the yellow to orange spectrum whereas the much fainter companion was blue. I did an experiment on the pair with my UHC Nebula filter. Since the filter only passes two narrowband wavelengths, one in red and the other in blue (teal to me) and even with the aperture mask there is still some minor color aberration at 92x, I found some unique effects. If removed the aperture mask and I focused on red, the main star was bright and I could barely detect the companion. However, when I focused on the blue light both stars were extremely sharp using the full 102 mm of my cheap telescope's aperture. I may have found a way to split some of the tougher double stars. Now I if I could just find a single wavelength filter somewhere near green I'd be set :-).

I turned to the west to catch Jupiter before it set. The nebula filter had some cool effects but it didn't really help my view much. My No. 58 Green filter and aperture mask gave me the best view as always. I saw several cloud bands but no storms. I then dug out all of my filters and experimented with all of them on Jupiter. It still came down to my No. 56 Light Green and my usual No. 58 Green filters. Both filters increased the detail that I could see and the No. 56 made Jupiter appear more of its normal color. However, I still think the No. 58 has a slight edge over all the others when viewing Jupiter through my telescope. Perhaps it is simply the additional attenuation of light the No. 58 provides that makes it easier to view the bright planet. The No. 56 has 53% transmission and the No.58 has 24% transmission.

Before going in for the night I turned my 7 x 50 binoculars over to the east and found rich star fields around Mirphak and then again further to the south around Aldebaran. These fields may be my next targets for my telescope. I had to pack up since I had to get up at 5:00 AM in the morning to go back to work.



**2021-11-22**

18:00-20:30

My wife and I and two of my three sons went to Fort Richardson State Park for some dark sky observing. It's far enough from the Dallas/Fort Worth city skies to at least see the Milky Way with our bare eyes. Skies were clear, winds calm, and temperatures were in the 60s dropping to the mid-40s F later.

We first turned to Venus since it was so bright and first thing on our list to set soon. It is getting larger by the day and a thinner crescent as it approaches Earth in its orbit. Skies were still twilight but the Moon filter was still necessary. Venus looked nice and sharp like a distant Moon.

Next we turned to Jupiter. The four Galilean moons were all to the east. Cloud bands were just visible, not as vivid as I've seen in the past. Europa was just about to go behind Jupiter. The star HIP 107567 was just to the south of Jupiter masquerading as another moon.

We then went to Saturn. Titan was just above it and the Cassini Gap was just discernible. My sons were impressed by the sight.

Next in tonight's list was the Double Cluster. It was actually visible to the naked eye but hard to find in the telescope due to so many stars! Surprisingly, better skies makes it more difficult for me to star hop. All the stars look bright!

I swung over to the beautiful double star Albireo to give the others a chance to see the famous double star. I could see the yellow main star and the blue companion. However, my sons seemed not to be able to see much blue.

We saw the Andromeda Galaxy slightly with our eyes and it looked amazing with my 15 mm wide field eyepiece (no mask) and in my 10 x 50 binoculars.

The Pleiades look beautiful once it rose high enough about the DFW dome of light to the southeast. When I first looked at it I thought I could see blue nebulosity but in subsequent views I could not see any. Perhaps my eyepiece has temporarily fogged up.

We saw a great many satellites and a few meteors.

The Moon began to rise to the east over the Civil War era hospital so after taking a few pictures of it we packed up and left for the 60 mile trip back home.

**2021-11-17**

20:45-21:30

It was a windy and partly cloudy night. However, I knew the Moon looked really cool with clouds and if I was lucky I could see Uranus next to it.

The Moon looked awesome as usual with clouds quickly passing in front of it in my wide field of view Stellarvue 15 mm eyepiece. I hopped up to Uranus just to the north and it was as easy sight.

I repositioned my telescope to check out Jupiter. Light clouds made it difficult to see a lot of detail but all four Galilean Moons were lined up with the star 45 Cap masquerading as a fifth moon. Clouds started covering Jupiter so I went back to the Moon.

I admired the Moon and clouds for a while and then took some crappy cell photos of it. After that I packed up and went to bed.

**2021-11-13**

18:45-19:00

I thought about taking some photos later in the night with my SvBONY SV-305 camera in between TV Shows with the family. But first I set my rig up to check on Venus. I used both my Moon and No. 58 Green Filters to reduce the intensity. Venus was even larger than last time and only a 40.8% illuminated crescent.

21:45-23:50

Decided not to mess with my camera tonight and decided to just enjoy the sky.

Moved my telescope into the moonlight and turned to the Moon. I swapped out various eyepieces and filters and found my Stellarvue 15 mm 82 degree eyepiece and No. 58 Green Filter to provide the best view. The breeze had picked up out of the south slightly and brought in some low level moisture that way making the seeing conditions less than perfect but still good. At 5 mm there was some noticeable atmospheric distortion. The crater Copernicus with its two splash peaks and distinct debris field was the most obvious feature. The gibbous Moon was at 76% illumination. The Carpathian Mountains were quite a striking sight too. The craters Reinhold and Bullialdus were both casting long shadows into the terminator.

After observing many fine details of the Moon I turned to a fuzzy patch in my southeastern light polluted sky. It was of course the beautiful open cluster Pleiades, M 45. After swimming amongst the Pleiades stars I took a few sweeps of the star fields around the bright star Capella. After that I brought my telescope back inside for the night.

**2021-11-11**

20:45-22:45

The night was calm, cool, and clear. I brought my telescope out and started in the constellation Cassiopeia. I landed first on the star Caph (Beta Cassiopeiae). While perusing around the rich Star field near Caph I came upon a distinct red star WZ Cassiopeiae. Nearby to the east of it was a fainter blue star with no name. I went down from there to the open cluster NGC 7790. Though I could see a bunch of stars and they were most visible with my 12 eyepiece, it wasn't that impressive. This is probably due to my light pollution. Next I moved up to the open cluster NGC 7789. Though many stars were visible, I could not distinguish anything that made it stand out for the rest of the background stars.

I next swung over to the double star Achird (Eta Cassiopeiae A & B). It was a distinctive yellow star with a much fainter companion to the north west. From there I star hopped to the NGC 281 cluster. I could see some of the stars and "maybe" a slight hint of nebulosity. Adding the UHC Nebula didn't seem to help.

I found my way over to the beautiful Double Cluster. It all fit nicely in my 12 mm eyepiece.

At that point I remembered my cool iOS app called NightCap. It is a functional astrophotography app for the iPhone. I dug out my phone mount for my telescope and struggled endlessly to align my phone camera with the eyepiece. Once I did I had knocked the telescope out into deep space somewhere, far away from the Double Cluster, my would be photo subject. I did play with the app on other random targets and though I only have a manual alt/az app I got some good results. However, the struggles reminded me of why I'm a visual astronomer and not so much an astrophotographer. I do this for peace and enjoyment, not stress and struggles. I took the camera adapter off and re-acquired the Double Cluster for one last look. I could see an amazing amount of stars. I gazed at them for a while and then decided to come inside for the night.

**2021-11-09**

19:20-20:00

I thought I'd get some quick looks at the sky after supper.

I quickly brought my telescope out and turned it to view Venus very low on the horizon. It is getting larger and a thinner crescent as the days go by. It is now at 0.43 phase.

Next, I checked out the crescent Moon at 0.34 phase. The crater Theophilus with its illuminated two central peaks was the most distinctive feature. Next, Mt. Argaeus near the terminator looked like it was 100 miles tall with its long shadow! I took a few cell phone photos for record.

I next got in a quick view of Saturn. It looked fantastic as usual with Titan holding on to own far to the south. The view of Saturn was nice and sharp.

I turned to Jupiter and all the Galilean Moons were lined up on to the southwest side. The main dark band and several smaller bands were clearly visible on Jupiter's surface. Ganymede and Europa were right next to each other.

Low clouds were coming in fast so it was a good time to think about packing up. However, experience had taught me not to ignore the Moon with clouds. Putting in my 25 mm (~18x) eyepiece and turning back to the Moon with clouds quickly passing in front of it paid off. The moving moon lite clouds and the bright Moon makes a beautiful sight! The silhouetted clouds take on the appearance of reflection nebula. With that grand finale I took my telescope inside just in time to watch La Brea.

**2021-11-05**

21:00-23:00

Clear Winds calm 51 F-49 F

I started off at Altair as a datum point. Hopped from there to the orange star Tarazed, then to the double star Pi Aquilae that I could maybe perceive as a double star (1.436" separation), to star Psi Aquilae (48 Aquilae), up to star HIP 97431, double star HIP 97469 that was faint and unsplitable, to the star S Sagittae (10 Sagittae), to the eclipsing binary system 9 Sagittae, and finally up to the globular cluster M71. I could just barely perceive the cluster in my Bortle 8 skies but after some time I could make a positive observation just before it went behind the trees.

After that I admired the rich Star field in the constellations Sagita and Vulpecula.

I found my self at the stars Zeta Delphini and the double star Beta Delphini (Rotenev). I tried but I could split the double. Between the two brighter stars were three faint stars bunched together, two were doubles, HIP101700 A and HIP101698B.

Next I moved up in elevation to the obvious bright double star Gamma Delphini (12 Del), a bright white/yellow primary star and a fainter white/blue companion star.

I moved up to the double star HIP106605. Though I couldn't split it, a very faint and slow satellite passed to its north going east at roughly 22:16.

I then moved straight up (east) to the yellow double (actually triple) star Kappa Pegasi (Jih). If there is a companion, it is within my telescope's refraction rings.

I then turned myself and my telescope to the east into the constellation Perseus. I locked on to the star Mirphak. There is a beautiful star field just south of Mirphank. From there I worked my way up to the Spiral Cluster, by accident actually. It looked very pretty but I mainly saw the brightest of stars. I bet it looks beautiful in dark skies.

By now I was getting cold so I called it quits and brought everything indoors.

**2021-10-31**

19:50-21:25

Clouds were expected the rest of the week so I decided to get some observing time in. Venus was extremely bright on my southwestern horizon. I got the best view of the 48.2% illuminated crescent Venus with my 5 mm eyepiece and my No. 58 Green Filter. While viewing the very cool and sharp looking Venus, a meteor burned quickly in front of it.

I moved up from Venus to check out the familiar stars in NGC 6530, the Lagoon Nebula. Using my 12 mm eyepiece, UHC Nebula Filter, and no mask, I was able to easily see nebulosity around star 9 Sagittarii but I could not detect any color. I was surprised to see any nebulosity since it was only 14 degrees above the horizon.

I moved up near the Sagittarius Star Cloud. I could see many beautiful stars but I couldn't necessarily see a cloud of stars.

I moved my telescope up and found the open cluster M18. About three of the brightest stars visible and the rest of the cluster only while sweeping my telescope.

I next attempted to view the Omega Nebula but it went behind a tree before I could see any details.

I moved over to the open cluster M25. Explored it with various eyepieces and mask/no mask. No mask worked best. It was a toss up between 12 mm Paradigm ED and my Celestron 13 mm Plossl. The Plossl maybe was a little brighter, probably due to slightly less glass in the optical path.

While scanning with a Plossl eyepiece, I found the Wild Duck Cluster, NGC 6705 by accident. I spent some time observing the splendor of the cluster.

I then came across the odd , bright couple of stars Alpha2 Cap and the double star Alpha1 Cap (Algedi). I could not split Algedi even at highest power (2X Barlow and 5 mm). The star was slightly blue though.

I swung north to the stars 57 Agl A & B. Though a beautiful pair, they are not a double. They were both white/blue with the more westerly star slightly fainter.

Next is another good reason I love visual observing. I get to see weird stuff live. At 21:22 a satellite crossed my view flashing like Morse code but it made no sense! It moved west to east path in a slightly ascending orbit. I was using my wide angle 15 mm Stellarvue eyepiece. The light seemed to have a very sharp response, like an on/off switch, not Gaussian like a usual specular spin. (Edit: I may have identified it as Japan's JAXA Experimental Geodetic Satellite AJISAI (EGS) based on Stellarium. It is literally a Disco Ball in space with 318 mirrors! It would have passed by Altair at 21:21:51).

After that freaked me out I packed up.

**2021-10-27**

20:30-21:45

Albireo Double HIP 91707 double

Though it was a work night it was getting dark early enough to get little telescope time in. My western sky was open between the trees so I turned my telescope to the well known double star Albireo. It was a bright pair, one yellow and the companion blue.

I then turned up towards Lyra just west of Vega. I came across the double star HIP91707 for the first time. Though it is supposed to be a double star, the star that I thought was the companion was actually it's own double star, HIP 91712. I could only see one star of each but I thought they themselves made a double.

Next, I hopped over to the double star HIP 92060. It was easy to split and was again new to me. The star to the west was slightly fainter than the other and the pair were slightly blue.

I went to the northeast near Cygnus to check out the orange star Epsilon Cygni (62 Cygni, Alijanah). It is a cool looking giant star.

I moved over to the Sadr in the middle of Cygnus. From there I star hopped over to the Cooling Tower, IC 4996. It wasn't my first time there but it is still cool to look at. Next I moved over to the other side of Sadr to the open cluster NGC 6910. Next I tried to view the Crescent Nebula. I tried with my 25 mm eyepiece and my UHC Nebula Filter but I could not see the nebula in my light polluted skies.

I finished up the evening viewing the star Deneb in the tail of Cygnus.



**2021-10-25**

20:30-21:30

My city skies were exceptionally clear so before going to bed on a work night I brought my telescope out for a few targets. Starting with my low power 25 mm eyepiece I aimed west and immediately came upon the open cluster NGC 6633. I have not logged it before though I've likely seen it by accident. In my telescope the stars in clusters are quite sharp and beautiful. While gazing at the cluster a west to east satellite passed right through the foreground of the cluster. From there I swung next door to the Graff's open cluster that I had observed shortly during my last session. I wanted to check it out longer before it goes behind the trees again. At first glance it just seems like several bright stars but the longer I observed it a great many more stars came into view. I put in my 12 mm eyepiece to peer deeper into the cluster and it was quite a sight. And of course while observing a north to south satellite passed through it.

I turned my telescope to near my zenith to the constellation Cygnus and to the star Sadr. Sadr is embedded in a rich Star field so I spent some time gazing at the beauty. Next I thought I'd try to see Crescent Nebula, NGC 6888. I knew it would likely be a futile attempt with my 4" telescope and Bortle 8 skies but I had an Astronomik UHC Nebula Filter as an advantage. I found all of the stars in the vicinity of the nebula but as hard as I tried I could not detect the nebula, even with the filter. At least I know how to find its location easily and maybe later this fall or winter I can make it out to some dark skies and give it another try.

As I was turning away to scan the vast star fields in Cygnus, a meteor shot across my 25 mm eyepiece's wide field view. Man, it was so fast it startled me. I enjoyed the view in Cygnus and scanned across several clusters I've seen before. After that I had to call it a night. It was getting too late and the very strong smell of skunk was a warning. Gun fire nearby was unsettling too (I'm NOT in the country).

**2021-10-21**

20:00-23:21

I brought my telescope out to take a look at Venus before it set. It was just above my neighbor's shed. It was at 0.53 phase, gibbous but nearly a half phase, and about 10 degrees above the horizon, larger in apparent size than the last time I looked at it a few weeks ago. Atmospheric turbulence that low in the sky causes lots of color variations but overall it was sharp. With my small telescope unstable air tends to make entire planets move around instead distorting the planet itself.

I decided then to do some star hopping. I noted that Gaff's Cluster (IC 4756) should be in view and I don't believe I've viewed it before so I decided to hop my way to it. I started with Altair since it was nice and bright and one of the few stars visible in my Bortle 8 skies. From there I went to  $\alpha$  Aquilae. I had two faint satellites cross my field of view from west to east. Then I hopped down to Deneb Okab while my neighbor turned on a blinding porch light :-(. Just above this star was an interesting string of faint magnitude  $\sim 8$  stars, one of which is the eclipsing binary star system V1454 Aquilae. Though I looked at it very carefully, I could not detect a companion star. I went on down to the double star  $\gamma$  Aquilae. Once again I could not split the stars even with the 5 mm eyepiece (91.8x). I moved west to  $\delta$  Aquilae and another satellite, NOAA 19, crossed my view. Went down to the globular cluster NGC 6760 and a bright, unknown satellite crossed my field of view. Unfortunately, with my city lights the cluster was at the "ESP" level of detection. In other words, I could only imagine it was there. I temporarily got lost in space after that but soon found myself at the double star HIP 94331. At magnitude 7.5, it got pretty faint with the 5 mm eyepiece and I could not see a companion. I then star hopped my way over to the beautiful triple star system Alya (Theta Serpentis). Two main stars were clearly visible even with my 25 mm eyepiece (18.36x). Both stars were white but the more easterly star was slightly bluer and just a very little bit dimmer. Before leaving the pair another satellite zoomed past the pair. I left Alya and hopped to another double star HIP 92027. These were a much fainter pair and very close though I could split them clearly with my 5 mm. Both were white/blue with the northern star being the brightest. I hopped from there to Graff's cluster, which was the main target for the evening just in time before it went behind the trees! It was quite beautiful even my bright skies though I can only imagine how great it looks in dark skies.

Jupiter and Saturn had now moved out from behind the trees. I was able to see the usual multiple bands on Jupiter though no storms. 3 of the 4 Galilean moons were visible with Europa being hidden in front of Jupiter.

Saturn was nice and sharp with the moon Titan just above it. Saturn's shadow was distinct against the rings. The Cassini Gap was just discernible as was a faint cloud band on Saturn's surface.

I moved west from Saturn to the double star Alpha Capricorni. The pair were easily split and both were bluish white with the more westerly star about half as bright as the other.

Hopped over to the double stars, Omicron Capricorni (o Capricorni), p Cap, and Okul (n Cap) and I couldn't split any of them at maximum power (5 mm and 2X Barlow). The companions were likely within my telescope's diffraction rings.

Turned to my east over my roof top and came across the double star HIP 10680. I could split it with low power at 25 mm and with the 5 mm I could tell that the more northern star was slightly brighter than the other. The colors were similar and mostly white. I would get a hint that one was bluer than the other but then my perception would switch. So the colors are inconclusive.

While scanning the eastern sky I came across the brilliant double star Mesarthim (Gamma Arietis) in the constellation Aries by accident with the 12 mm (38.25x) eyepiece. These are two identical white stars that with the 5 mm eyepiece look like a pair of eyes in the dark looking back at me.

The one day past full Moon came up over my rooftop. I took some good looks at it with my 12 and 5 mm eyepieces and decided then to call it a night.

**2021-10-09**

19:00-19:50

I wanted to take a look at the waxing crescent of the Moon before it set. The sun was still up and transparency wasn't very good. I got a good sharp image at 12 mm with details of the plains on the Sea of Crisis clearly visible. The two small craters Peirce and Picard stood out. Further south the central peak of the crater Langrenus was sharp and clear. The craters along the terminator appeared to pucker up like something on the Jetsons!

West of the Moon, Venus was nearby. The waning gibbous phase was clear. It was 58.6% illuminated. As it got darker I had to put the Moon filter on to clearly view it. Quite awesome!

23:25-00:15

Saturn and Jupiter had now cleared the trees. Turned to Saturn and though it was getting low on my horizon, I had a clear and sharp image of it. The shadow of Saturn onto its rings was very clear. The Cassini Gap was detectable but not resolved well. The moon Titan was clearly visible and though there were other objects around Saturn I believe they were background stars.

I swung over to bright Jupiter and the four Galilean Moons were shining bright, Callisto on one side and the other three on the opposite side. Two, maybe three cloud bands were visible. I put on the No. 58 Green filter to coax out some more detail. The two main cloud belts were clearly visible but despite the floaters and who knows what else in my eyes, I could steadily look at Jupiter for a long time and bring out much more detail. The Great Red Spot was not visible as it was on the far side. I could see a "knot" on the north side of the darkest equatorial cloud band.

I manually scanned the southwestern sky with my Stellarvue UBW wide 15 mm eyepiece until I grew so tired I almost fell asleep at the telescope several times. I brought everything inside and went to bed.

**2021-10-06**

20:50-21:45

The night was exceptionally clear and I wanted to check out the stars in the constellation Sagitta. I found the nearby bright star Altair. I hopped over to the distinctly orange star Tarazed. Hopped from there to the double star Pi Aquilae (52 Aql B). I could not split it even with the 5 mm and the 2X Barlow but I may have to come back to it. I found my way into the Sagitta constellation and located the variable double star 7 Sge A, another distinctly orange star. I could not split that double either. My goal was the globular cluster M71 but I could not detect in my city lights.

I next turned my telescope over to the constellation Delphinus. There are many double stars in the constellation but the only pair I could split is  $\gamma^2$  Del (12 Del AA). They were two yellow stars with the star to the west being about 80% as bright as the other.

I spent a few minutes scanning the depths of the Milky Way before bringing everything in to go to bed.

**2021-10-02**

21:30-12:30

Jupiter and Saturn were high in the sky. I had set up my telescope in the daylight, went in for supper and a movie, and now I was ready to view. I put the Astro-Tech Paradigm ED 5 mm eyepiece in the check out Saturn. It was bright, clear, and stable. though there was the usual high light pollution, seeing conditions were ultra-stable. I could detect one cloud band and just make out the Cassini Gap with my small telescope masked down to 60 mm. I put on my No. 58 Green filter and that helped sharpen the image and bring out the Cassini Gap. The moon Titan was easily visible.

Turned to Jupiter with 5 mm and filter in and it was as beautiful as always with the four Galilean Moons all lined up to the east. Several distinct cloud bands were visible though no red spot. I believe the Giant Red Spot had just rotated out of view.

Hopped down to the star Deneb Algedi (Delta Capricorni) which is actually a multiple star system but I could not split it. I did see sharp diffraction rings with the 5 mm eyepiece.

I put my wide angle 25 mm eyepiece on and turned back to Jupiter. Just as I adjusted the focus and meteor shot through the middle of my wide field of view from west to east!

I turned down south to the bright star Fomalhaut. Then I jumped back to Jupiter and star hopped to the south to find the globular cluster M30. sadly I could not find M30 and even the star patterns didn't line up. I seemed to be hopefully lost in space though I usually have great success star hopping to my targets. It was pretty far into the city light glow so I'll blame it on that.

I next turned my telescope to the east into the constellation Aries. Locked onto the star Hamal (Alpha Arietis) to use as my starting guide. Hopped up to the star Mothallah. Then hopped to star HIP 7906. I tried to find the Triangulum Galaxy but I had no luck. So I went up to the star Mirach (Beta Andromedae). I hopped from there to the beautiful double star Almaak (Gamma Andromedae). It took me a while to find it because I didn't realize it was just behind a tree. As usual it was easy to split with the 5 mm and the dimmer companion star was a pretty blue. From there I went south the the double star 59 Andromeda (HIP 10176 A and HI0 10180 B). The main star was very slightly blue while the companion was about 3/4 as bright and a deeper blue. Star hopped from there to the open cluster C28 (NGC 752). I could see a lot of beautiful stars though the cluster did not seem very tight or I just couldn't see the many of the fainter stars. Moving down further to the east I came to a beautiful cluster of blue stars. Of course it was M45, Pleiades but after only recently (days or a few weeks) seeing it set in the west it surprised me to pop up in the east so soon! I was also kind of saddened as I could not see it with my unaided eyes due to the lights of the Amazon warehouses though when I was young it stood out amongst the stars to the naked eyes and I could count the stars. I decided to finish out my session just

observing Pleiades with my wide angle 82 degree Stellarvue 15 mm eyepiece. It was a beautiful floating in space view of the cluster that made for a good finally for the session.

**2021-09-27**

20:20-21:45

It was the last clear night before a possible week of rain. Brought the telescope out and turned my sights to the constellation Cygnus nearly straight overhead. Started with the triple star system Rukh (Delta Cygni). Though the star was sharp and bright, I could not resolve any of the companion stars at 5 mm. Found my way over to the bright yellow star Sadr. Star hopped from there over to the Cooling Tower open cluster. The main stars were clearly visible. Hopped up to the pretty open cluster IC 4996. I then moved over to where the Crescent Nebula should have been but couldn't see anything. Put on my Astronomik UHC nebula Filter and still couldn't detect it.

I eventually just did a free for all scan of the Milky Way in Cygnus, first with the 12 mm and later with the 25 mm eyepieces. The dense star fields were beautiful even with my high light pollution.

I came across the open cluster M39 by accident and it was a pretty sight. I explored around it for a while.

I changed direction and swung over to star Vega in Lyra. It was like a super bright blue diamond in the sky. Hopped over to the Double Double star system Epsilon Lyrae. I could easily split epsilon 2 at 5 mm but epsilon 1 took the 5 mm and the 2x Barlow before I could split it. Epsilon 2 appeared as two near identical stars whereas Epsilon 1, the main star, was about three times as bright as its companion. The most amazing thing about the system is knowing what you're looking at.

Star hopped over to the eclipsing 6 star system Sheliak (Beta Lyrae). Saw a faint blue star near it but it wasn't part of the system. I wasn't able to readily split any of the stars. I hopped up from there and found the M57, the Ring Nebula! I was told I could not see it visually. I found it with the 12 mm eyepiece and no aperture mask. The addition of the UHC Nebula filter helped bring it out. The overall round shape was obvious and I could faintly detect the hole in the center. It was an obvious aberration in the sky, like a fuzzy donut. With the filter it looked slightly blue/green. It appeared to subtend an angle slightly less than that of Jupiter.

My mosquito repeller wasn't charged and clouds started moving in so I quits for the night.



**2021-09-25**

20:00-21:00

Jupiter is was in view between the trees so I brought out my telescope to check it out. 3 of the Galilean moons were visible to the east of Jupiter. Several cloud bands were visible with the 5 mm eyepiece. Once again I put on the No. 58 Green filter to bring out more detail of the surface. The Great Red Spot was not visible nor were any of the dark storms. I brought out my case of Plossl eyepieces and I noticed that at high power the 6 mm Plossl eyepiece had better light transmission than the 5 mm Astro-Tech Paradigm ED eyepieces (more than expected). Lower power eyepieces didn't make much difference. It was also noted that eye defects like floaters were not nearly as disturbing using the Plossl compared to the Astro-Tech. This of course ignoring the wide to the edge field of view of the Astro-Tech. All this to say I still enjoy my Plossl eyepieces though I don't use them as much as the Astro-Tech.

Turned the telescope into the Milky Way (which isn't visible to the eye here) and view the great many stars with various Plossl and Astro-Tech eyepieces.

Had plans so I had to pack things up for the night.

**2021-09-18**

18:00-19:52

The sun was still up but I was able to find the very hot “pixel” of Venus with my 10 x 50 binoculars. Just before finding Venus, I spotted what looked like a giant wad of metal foil spinning randomly in the sky at a high altitude. It slowly drifted south and varied from a faint, dark object to very bright glint. There was no order to its spinning though its linear movement was consistently slow.

I brought out my telescope and after viewing Venus with my 12 and 5 mm eyepieces I hooked up the SvBONY SV-305 camera. Using the 2X Barlow I took a large number of images and videos of Venus hoping for something good. Though Venus is very tiny when viewed from Earth, it is still immensely bright, even in the broad daylight.

21:10-22:20

It was now dark so I started off at Antares as it was a bright red ember getting ready to set to the southwest. From there I went up to the double star Sabik. I could not split the pair.

I turned southeast to view the almost full Moon while it was in an opening between the trees. It looked best using my 12 mm eyepieces and No. 58 Green filter though using the same combo with the 2X Barlow gave me a clean 50 degree view of the Moon all within the same 60 degree field of view.

Turned overhead to the bright star Altair to get an anchor in the constellation Aquila. Star hopped to Tarazed and then onto the double star Chi Aquilae ( $\chi$  Aql,  $\chi$  Aquilae). I thought I could detect a companion star at times but I think it was just the first diffraction ring playing games with me. Interestingly, I did detect an unidentifiable smudge of light between the double and star HIP 96859. I later scanned around Aquila and around my zenith just to take in the beauty of what I could see in the dense star fields. The Moon was very bright and the heat index was too so I called it quits for the night.

**2021-09-14**

20:50-21:40

Since the visibility was so good I thought I would check out Jupiter again to see if any scarring from last night's possible impact. Though I could see about four cloud bands I could not detect or resolve any new features.

I moved south of Jupiter to the eclipsing binary star Deneb Algedi. I could not resolve but one star.

Turned to my zenith to observe the rich Star fields of the Milky Way. I stumbled on the beautiful double star Albireo. One star was a bright yellow and the companion was a slightly less bright but distinct blue. They were separated enough to easily split with the 25 mm eyepiece.

I had work in the morning so I called it quits.

**2021-09-13**

20:20-21:40

The smoke from the world burning had been cleared by the approaching hurricane so I brought my telescope out even though it was a work night. I started at the Moon and began scanning the skies to the east of it with my 25 mm wide field eyepiece. I soon came across the open cluster M25. But could see a large amount of stars that looked better with the aperture mask off. From there I went south to the double star 21 Sgr A. It was cool watching a satellite pass by it just to the southeast at 20:39! I could not readily split it with the 5 mm and I didn't have my Barlow lens out.

At about 20:42 I began seeing the ISS or another bright satellite pass from south to east on an ascending pass.

I star hopped down to the bright star Kaus Borealis as a guide star. Hopped to the nearby double star HIP 90574 A but it was too faint for me to pick out its companion star. Went down to the double star HIP 90510 A and though I could easily see another star, it was cataloged as an unnamed star. The adjacent double star HIP 90478 had no visible companion.

Swung over to Saturn and it was very bright with Titan clearly visible. A faint satellite passed to the west of Saturn on a descending pass at 21:07. By putting the No. 58 Green filter I was able to discern the Cassini Gap without the aperture mask! Saturn still looked cleaner with the mask and I could just make out the Cassini Gap.

I turned my telescope to the Moon with the 5 mm eyepiece and filter still installed. The image was extremely sharp with no detectable atmospheric distortion. The most impressive feature was the peak in crater Albategnius and its enormous shadow. I spent a long time examining the exquisite detail along the terminator.

I noticed that Jupiter was coming over the trees so I had to have a look. I'm glad that I did, it was the best I've ever seen it with good detail in multiple cloud bands and 3 of the Galilean Moons on one side and Callisto way off my it's lonesome on the other side. (Note: Apparently another observer witnessed an impact flash about 5 hours before unbeknownst to me. I didn't notice any impact remanence though it had probably rotated away from Earth's view by the time I was looking).

**2021-09-11**

20:30-21:15

Dense smoke tonight from the world burning. Thought I'd check out the Moon through unavoidable moon filter atmosphere. It was dark orange at a waxing crescent of 30%. Most notable were the distinct double peaks in the crater Theophilus.

Once the Moon went behind the trees I turned my sights to Jupiter. The smoke reduced the contrast of Jupiter and three of the visible Galilean moons. Multiple clouds bands were visible with both the 12 mm and 5 mm eyepieces.

I put things away after the short session due to the smoke and the party next door.

**2021-09-08**

21:00-22:00

Jupiter was nice and bright so I decided to check it out tonight. It and its four Galilean Moons looked sharp in the 12 mm eyepiece. I then compared the 12 mm with the 2X Barlow to just the 5 mm. There may have been slightly less chromatic aberration with the Barlow combo but it was really a toss up. The 5 mm only was certainly better than the 5 mm with the Barlow simply because the worm like floaters in my eyes distorted my view in the latter. Significant banding was visible in the mid-latitudes but the Great Red Spot was not visible.

I turned my telescope just east of my zenith into the rich Star fields of Cygnus. First stop was the bright star Deneb and then hopped over to Sadr. Went down to the open cluster NGC 6910 and saw the main stars though as a cluster wasn't that impressive. I hopped over to M29, the Cooling Tower cluster. It was pretty and stood out amongst the other stars so it was easy to find. It looked best with my 12 mm eyepiece. Scanned around Cygnus for a while until I couldn't keep my eyes open and then I brought the scope inside.

**2021-08-30**

20:30-22:05

I thought I'd scan the southern skies with my Bresser 7x50 binoculars before going to bed. That was a mistake. As the skies darkened I saw several tantalizing targets. One appeared to be a galaxy that I should not have been able to see. I decide that I better get my telescope out to investigate.

It was so hot and humid that my eyepieces kept fogging up. What I thought was a galaxy turned out to be the open cluster NGC 6530 and the Lagoon Nebula. Just above them I could see the stars of the Trifid nebula but the nebula itself was just detectable. I put on my Astronomik UHC Nebula Filter and did help pull out the nebula on both targets despite my very polluted skies.

I surveyed the sky and found the open cluster M7 and the C76 cluster, the latter being a new one for me.

I also found a beautiful unnamed cluster of stars near where the Sagittarius Star Cloud would be though it should be undetectable by my telescope (mag. 11.00), much less in the binoculars that I first saw it with. I found the open cluster M25 just to the east of it.

While it was peaking through the trees I took a look at Jupiter using the nebula filter. Amazingly it increased the contrast of the cloud bands while reducing the dynamic range of Jupiter and its Galilean Moons. I will need to try it with my SV-305 camera soon since it is difficult to capture the entire scene in a single exposure.

I had to pack it up because I was up way too late for a work night.

**2021-08-20**

22:20-00:20

I decided to re-evaluate my assortment of optical filters while Jupiter and Saturn were up.

I went thru all of my filters on Jupiter on my 5 mm eyepiece. The most detail was brought by the #58 Green filter. No filter removed the need for the aperture mask however.

On Saturn the #58 Green filter did make the Cassini Gap more visible.

Used various filters on the 97% waxing gibbous moon but of course the #0.9 Moon Filter was the best.

Scanned the skies but the sky was way too bright to tell what I was looking at.

Turned east. Found Mirach and star hopped to the Andromeda Galaxy, M31. It was detectable but just barely. Put the Nebula Filter on but it didn't help much. Sky just too bright tonight.

Star hopped down to the double star Almaak. Easily split at 5 mm. Bright orangish/yellow star flickering like a candle with about half as bright blue companion. Very pretty.

Quit for the night.



**2021-08-15**

2115-2310

Brought out the SvBONY SV-305 camera and my telescope and captured cool images of the Moon and Saturn. However, despite the clear skies seeing conditions were not the best with more than the usual instability. I still got some cool Moon photos.

**2021-08-11**

2100-2330

Pre-scanned the southern skies with my Minolta 10x50 binoculars. After finding Scorpio's tail I came across the open cluster M7 in the twilight sparkling like diamonds in the binoculars.

Brought my little 102 mm f/4.5 achromatic telescope (stopped down to a 60 mm, f/7.65 apochromatic) out and looked at the beautiful open cluster M7. From there turned to Arcturus and jumped up to the double star  $\rho$  Ophiuchi. I was able to clearly split them with my 5 mm (91.8x) eyepiece. Both were white/blue with the star to the secondary star about half as bright as the main star. Star hopped over to the double star Sabik though I could not readily split it. Went from there to the star Serpentis, then E Serpentis,  $\omicron$  Serpentis, I Ophiuchi, on to the recurrent nova RS Ophiuchi (ref. Sky & Telescope) just to the left (west) of HIP 87366. It had a yellow to orange tint to it and a very visible star that wasn't visible before. I can now say that I saw my first recurrent nova!

Scanned the Milky Way and came across the Wild Duck Cluster. City lights obscured it pretty well. Found the open cluster IC 4665 next. It looked quite beautiful at 12 mm (38x) with the aperture mask removed.

Once Saturn cleared the trees it looked great in the 5 mm with aperture mask. The Cassini Gap was just discernible and Titan was obvious as usual. I believe I saw the moon Enceladus with averted vision.

**2021-08-06**

2245-0000

Went out to view Saturn through my narrow window of opportunity through my neighbor's trees. The view was great at 5 mm and the 2X Barlow made it bigger. Showed my wife and son Wes and they were both amazed. The rings were bright with Saturn being in opposition and the Cassini Gap was detectable. My wife exclaimed "Oh wow!".

Scanned the skies while waiting for Jupiter to clear. Easily saw the star Sadalsuud though M2 was barely perceivable, about the same magnitude as the light pollution.

When Jupiter cleared three or four cloud bands could be seen and three of the four Galilian moons, two (Europa and Io) of which were nearly eclipsing each other.

Played around with various Celestron filters. I found the No. 80 Blue to be the best for my telescope and Jupiter. It brought out the cloud band details the best without losing too much light.

Scanned around the skies despite the poor visibility. In Cygnus I found a pretty cluster of stars just northeast of the bright star Gienah. It looked like a miniature Orion constellation with the middle star in the belt missing. Keep in mind my telescope flips everything left to right.

**2021-07-24**

2335-2350

Saturn was finally visible between the houses and trees so I quickly setup to share the first view of Saturn for the season with my son. At 5 mm and a 2X Barlow (184x) the image was the best I've seen it (help of the aperture mask). The rings were clear and we could very slightly detect the Cassini Gap and a color band on the planet. Titan was visible southeast of Saturn.

0130-0140

Jupiter was now in view and the best view was with the 5 mm eyepiece. I could discern at least two bands in the atmosphere, four Galilean Moons, and a very distinct black spot on the surface of Jupiter that was Ganymede's shadow! This is by far the best view I've ever seen of Jupiter with my own eyes. The aperture mask does a good job of turning my 102 mm achromatic refractor into a 60 mm apochromat.

**2021-07-20**

2045-2140

Went out before total darkness to check out Regulus, Venus, and Mars conjunction. I couldn't see them yet so I turned my sites onto the Moon. The elongated Schiller crater was probably the most obvious feature at this 0.88 waxing gibbous phase of the Moon. The brightly illuminated crater wall of Aristarchus was probably the brightest feature on the Moon.

I then scanned the southern sky and came across the beautiful double star Acrab (Beta Scorpio) in Scorpious. The main star was bright yellow while the much fainter companion was blue. They were very obvious and easy to split even with the 12 mm (38x). Further research says that the pair are actually a multi star system.

Just to the west of Acrab I came upon the double star Jabbah (Nu Scorpii). Very similar to Acrab except the pair were separated visually about 3 times as much. Further research says they are likely to be a septuple star system.

I swung south to find the globular cluster M4 but first came across Antares. Its brilliant red color shocked me at first as I said "What the hell is that!" With the atmospheric turbulence it appeared to be a brilliant flaming sphere. I could not find M4, likely due to the bright moon, light pollution, and the world being on fire.

The mosquitoes were having a feast on me despite Ed Ting's approved mosquito repellent so I quite for the night.

**2021-07-14**

2100-2144

Sky looked better than most recent days so I decided to take a look at the crescent 0.25 phase Moon with my 12 mm Astro-Tech Paradigm eyepiece. The most obvious feature was the two illuminated peaks within the large crater Theophilus that was straddling the terminator. Large mountains just inside the night side shadow had their peaks brightly illuminated. A lone mountain peak was illuminated well into the dark side at the southern end of the Moon.

I started scanning the skies within my narrow window between trees and came across the double star 24 Comae Berenices. The upper Star was bright yellow with fainter blue companion below it, quite beautiful.

Above 24 Comae Berenices I found another double star called HIP 62783 (STF 1685?). It was in a no-name cluster of stars at the tail of the constellation Coma Berenices.

It was an enjoyable time of awe but now it was time for bed.

**2021-07-04**

2250-2310

Started off with the bright star Arcturus. From there I star hopped to the double star Izar. The main star was bright and yellowish but I could not separate the companion. The diffraction rings did look significantly brighter on one side however. I then hopped from Izar (Epsilon Bootis) to the Globular Cluster M5. I switched to my 5 mm eyepiece and used the star MQ Ser to focus on. M5 was easily detected as usual but no detail other than occasionally seeing two of the brightest stars opposite of MQ Ser (HIP 74975).

Found a new double star while scanning the skies between M5 and Arcturus, HIP 73716 A (HR 5610, HD133408). They were easy to split at 12 mm and at 5 mm they both had the same bluish tint though one was ever so slightly brighter. I can find no information on this double star for some reason.

After chasing a runner (a.k.a., satellite), I found another double star, 37 Boo A (HIP 72659 B, Xi Boötis). The primary star was white to yellow and the companion was much fainter. At 5 mm it was just outside my primary diffraction ring and obvious. I found it at 12 mm and though I couldn't split them then, I could tell there was something else there.

Found another double star while scanning in Corona Borealis, HIP 74432A. They were separated well at 12 mm. The brightest star was white and the fainter star (by about 25%) was a little bluer.

Clouds started moving in and it was getting harder to discern 4th of July fireworks from gun fire so I called it a night.

**2021-06-19**

1930-2230

Participated in my first Tandy Hills Star Party with the Fort Worth Astronomical Society. Tandy Hills is a wilderness area just southeast of downtown Fort Worth. I brought my son Wesley and my telescope out. We had a great turnout with about 11 astronomers letting the public view through our telescopes. I actually had people lined up to view through my little telescope! Targets for the night were the Moon at 71.4% illumination and great detail, a gibbous Venus at 92.1% illumination, Arcturus, Vega, and the double double star system in Lyra, 5 Lyr C and 4 Lyr A. Even with COVID-19 precautions taken we had a lot of fun. I had brought my three Astro-Tech Paradigm eyepieces with me but I need to also remember to bring my moon filter next time.



**2021-06-18**

2150-2325

The Moon was 60.8% illuminated. Viewed the Moon on various eyepieces as seeing conditions were good. I could see very good detail at 5 mm. Noticed the double star Porrima in Virgo was just below the moon. This was a new double for me and I clearly split it with the 5 mm. Both stars appeared to be the same magnitude though the more westerly star was more yellow while the other was bluer. It was tougher to split in my 6 mm Plossl eyepiece. The binary pair are said to be 2.93" now (ref. stelledoppie.it).

Checked out super bright Arcturus again and moved up from there to the double star HIP 69751 A. At 5 mm the double star became pretty faint. I think I resolved a secondary star but I may have been seeing fleeting diffraction rings. My neighbor's flood light coming in didn't help.

Though it was 11:25 PM local time it was still a hot and muggy 87 F so I quit for the night.

**2021-06-10**

2210-2240

First night in weeks without clouds. After 10" of rain the mosquitoes were horrible, 84 F, and 66% humidity. I didn't have to charge my new Ed Ting recommended Thermacell Mosquito Repellent machine so I just setup for a quick look of Cor Caroli (Alpha Cancun Venaticorum), the double star in Canes Venatica. I've been wanting to observe this double for a while. Being nearly at my zenith it took a few minutes to position my telescope into a comfortable position. Once set the double star was easy to find and split. It looked best with my 12 mm eyepiece.

The primary star was bright with a slight yellow tint. The secondary star was much fainter but white with no tint. At 19.6 arcseconds apart they are very easily separated.

Since I was in the neighborhood I checked the brightest star in the constellation Bootes, Arcturus. It was a very bright, deep yellow star. From there I swung back towards Cor Caroli to find the globular cluster M3, halfway in between the two.. It looked best at 5 mm with the aperture mask off. As usual it wasn't bright but very discernible. I could make out adjacent magnitude 8-10 stars but none in the cluster itself. Averted vision did bring out one star within the cluster.

I decided to packed it in while I still had blood left.

**2021-05-20**

2145-2345

The moon was 64.9% illuminated so I brought my telescope out to take a peak. The relief along the terminator was fantastic so I called a neighbor friend over who had been wanting to take a look through my telescope. He seemed thoroughly impressed. We talked astronomy while looking at the Moon every way we could. Next I turned to the double star Mizar in Ursa Major so he could see his first double star. After he left I turned to the star Denebola in Leo and star hopped from there to the double star HIP 57606. However, I could not split it. After that I finished and went inside.

**2021-05-17**

2145-2210

Even though it was mostly cloudy with approaching storms the air was exceptionally clear in between the clouds. I just had to take my telescope and 12 mm eyepiece out real quick before bed to look at the 0.33 phase Moon and the double star Mizar again in Ursa Major. I wasn't disappointed.

**2021-05-13**

2010-0015

Set up my telescope including my light shield wall. Scanned the skies while I waited for Arcturus to clear my roof. I then star hopped over to the Globular Cluster M3 using my Astro-Tech EP Paradigm 25 mm eyepiece. Once I found it I went to 12 and then 5 mm. M3 was easier to see at 5 mm with the aperture mask removed. I noted that I was able to see two adjacent stars, HIP 66770 at magnitude 10.20 and HIP 66890 at 10.55 with the 5 mm and no mask or the 12 mm with mask. At 12 mm the sky light pollution is of comparable brightness to the two stars.

While waiting for M5 to be in the clear, I hopped off to the tail Ursa Major to the diamond like star Alkaid (Eta Ursae Majoris,  $\eta$  Ursae Majoris). From Alkaid I went to the beautiful double star Mizar ( $\zeta$  Ursae Majoris, Zeta Ursae Majoris) easily split with my 12 mm eyepiece. I switched to the 5 mm and saw that the star to the more southern declination had a slight yellow tint and was nearly twice as bright as the greener companion star (not the further companion Alcor).

Though easier at 5 mm, the pair looked pretty through the 12 mm because they are brighter and the telescope's star diffraction rings aren't visible.

Went back to Arcturus ( $\alpha$  Boötis) to star hop my way down to M5. On the way down through Boötis I made a stop on the double star 29 Boo A ( $\pi$  Boötis) I could split them clearly at 5 mm and while both were tinted blue, the more easterly star was slightly dimmer. I also stopped at the double star 30 Boo B (Zeta Boötis) though I could not split it, possibly due to the fact the pair are very near (2023) perigee in their 125 year orbit. I finally hopped through the scarcity of bright guide stars to M5's location, right behind the corner of my house. Took a short break to wait for the earth to rotate.

I came back out after about 19 minutes and M5 had cleared my house. It was very obvious but not impressive given the poor transparency of the night and my Bortle 8 level light pollution. I was still impressed that I could see it at all 40 degrees directly above the Dallas-Fort Worth skyline.

The constellation Corona Borealis was rising above my roof so I swung my telescope over to the bright eclipsing binary star Alphecca (Alphekka,  $\alpha$  CrB). Though pretty, I could not detect a companion star. Since their orbital period is only about 17 days I'm sure they are too close together to split. I hopped over to the double star  $\theta$  Coronae Borealis (4 CrB B, Theta Coronae Borealis) and easily split the pair at 12 mm. I could not detect much color but the slightly fainter companion may have had a slight blue tint.

I swung the telescope back over to Bootes and to the double star Izar (Epsilon Boötis,  $\epsilon$  Boötis). The star was yellowish red but I could not detect a companion. At 5 mm I don't think I had enough contrast and dark sky to see the much fainter companion (I didn't have my 2X Barlow

lens out). However, (about ~2340 CDT) I was treated to a large, relatively dim, and slow moving spacecraft crossing my field of view considering that it took notable time (~1 s) to cross my high power field of view. I could even see some kind of structure in the craft!

Hercules was now starting to rise above my house. I locked into to the star Kornephoros (Beta Herculis,  $\beta$  Herculis). From there I star hopped to the double star Zeta Herculis ( $\zeta$  Her,  $\zeta$  Herculis, 40 Her A). I could only discern one star. I then star hopped over to M13, The Great Cluster in Hercules. It was easily discernible in the 25 mm eyepiece. It was quite visible in the 5 mm though I still could not make out individual stars.

Star hopped down to the Globular Cluster M92 just as it was rising over my house. The cluster was still small even in the 5 mm eyepiece and not as bright as the others I've seen this evening.

At this point I decided to call it a night.

**2021-04-24**

2120-2250

Thought I'd check out the 0.94 phase Moon while there were still clouds floating past it. It looked awesome in my 12 mm Paradigm eyepiece. Saw a large bird fly across it at a high altitude. The skies cleared and I took a couple of quick iPhone photos of the Moon.

Put in the 25 mm Paradigm and scanned the skies. 4 satellites crossed my view, one very bright. Set my sight again on my favorite cluster, Praesepe (Beehive Cluster). Put in my wide field Stellarvue 15 mm eyepiece and enjoyed the show.

Chased several more satellites across the sky. Settled on Regulus in Leo. Star hopped up to the double star Algieba and then over to asteroid 4 Vesta to check on its progress through Leo. I'm still amazed at how well I can see the tiny asteroid in my city lights. I took some cheap iPhone photos to capture its position. After that I quit for the night.

**2021-04-18**

2040-2210

A cool, calm night. Sky was not the most transparent but seeing conditions were very good. Setup the SvBONY SV-305 camera on the telescope to capture some good frames and videos of the moon. I got many great shots.

After tiring of the camera I put the 25 mm Paradigm eyepiece in and scanned the dense Star fields near the moon. Worked my way over to the star Mekkuda that looked like it may have a companion but it was just a chance alignment with an unnamed star. Hopped to Alhena, Alzirn, and to the double star 15 Mon to try and see the Cone Nebula (NGC 2294). I could see (or imagine) faint nebulosity but I wouldn't have noticed it if I didn't know it was there. 15 Mon fell below the trees before I could try and see it's companion.

Decided to just scan the skies with my 25 mm before calling it a night. Came across the Open Cluster Praesepe (Beehive Cluster) in Cancer. It is always a beautiful sight and a good view to finish the evening.

It's interesting to note that even though my skies are about a Bortle 8 and I can see only a few stars with my eyes alone, just a low power view with my telescope and a 25 mm eyepiece I can see millions of stars.



**2021-04-10**

2155-0030

Perfect night. Put my light fence up to block neighbor's lights. Started looking straight up into Leo Minor at the "dancing pairs of stars beginning with 13 LMi.

Turned southwest into Cancer and got a beautiful view of Praesepe (or Beehive Cluster). Explored the cluster for about 10 minutes.

Next I went to my favorite double star Castor In Gemini (actually a sextuple star system). They both shined bright and clear in my Astro-Tech Paradigm EP 5 mm eyepiece.

Turned to Leo and star hopped from Regulus to Algieba. Searched for the cluster of galaxies north of Algieba but could only barely perceive the main 8.30 magnitude star in the foreground of galaxy NGC 3190. My city lights drown out any hint of galaxies. Star hopped over to asteroid Vesta to see how its travels through Leo were going. It was easily visible and just west of the Star HIP 53105. Past the tail of Leo I discovered another double star, 24 Com AA. The brightest star was slightly yellow and its companion was about 60% as bright and bluish. Easy to separate even with the 25 mm.

Swinging north I found an interesting little grouping of stars that looked like a scorpion. It was just north of the Globular Cluster M53. The cluster was just a faint smudge but I could see it pretty well with the 12 mm. Just to the north I found the double star HIP 64779 A (or C). I could not split the double even with a 5 mm. The smaller companion may be in the diffraction rings.

Bootes finally rose above my house for the season and I set my sights on the Double Star Arcturus. It had an orange tint to it but I could not see a companion star.

I star hopped my way to the Globular Cluster M3. It was easy to spot and was a very distinct smudge in my 12 mm. I could not resolve individual stars.

Went north to Ursa Major to check out the double star Mizar. Mizar and companion Alcor can probably be resolved with the naked eyes in dark skies. Mizar also has a much closer companion that requires a telescope. Those two stars were very easy to resolve even with the 12 mm and their colors looked identical. Magnitudes were about 2:1.

**2021-04-05**

2115-2145

Took my telescope out after supper and a couple episodes of Dr. Who. Put in my Celestron Zoom eyepiece and filter. Observed the Orion Nebula with my Astronomik UHC Nebula filter. The filter improved the visible nebulosity but I could only see one star in the Trapezium Cluster instead of the usual 4 or 5. Removed the filter and played around with the zoom on Alnitak, Alniliam, and Mintaka. Found a common cluster just west of (under) Alnitak, including the bright double star 48 Ori A and its companion HIP 26551 D. Since the filter passes narrow wavelengths around red and blue/green, it was easy analyze any chromatic aberration by focusing in and out on point source stars. Had to go to bed and get up in a few minutes to go to work.

**2021-03-28**

2050-2220

The “Worm” Moon was up but too close to the neighbor’s houses to view with the telescope in the front yard. Started in Orion first with my Astro-Tech 25 mm eyepiece. Star hopped the three red “stars”, Betelgeuse, Mars, and Aldebaran. I was observing the beautiful star field just west of the Ruby Star when a relatively slow meteor crossed my wide field view! I followed a faint N- S satellite from the star field to another associated with the Orion star Meissa. Chased another satellite across the top of Orion, this time one on a S-N ascending orbit

Stumbled upon NGC 2169 open cluster because it stood out. I could see at least 8 stars but possibly many more faint ones with averted vision.

Came across the variable star Tejat Posterior and a serpent like string of stars just to its northwest. The variable, double star Tejat Prior was also in the field of view with all them making quite a sight. I could not see a secondary star, only diffraction rings with my 5 mm eyepiece. Found the open cluster M35 just to the north. I could tell that this may be an impressive cluster in much darker skies someday. While noting that the stars I could see resembled a winnie dog, satellite number 3 went across my view S-N.

Turned my sights to Alhena at a foot of Gemini. To the northwest of the star is a very rich Star field to admire.

An owl or night hawk grabbed a rat and hit the fence doing so scaring the bajivies out of me! The prey was screeching as they both flew right over my head.

Found the double star HIP 31258A to the north of Alhena even with the 25 mm eyepiece. With the 5 mm the main star appeared slightly yellow and the westerly companion had a bluer tint and slightly fainter.

Finished out the session with the bright star Procyron. Zoomed in with my 5 mm to see the diffraction limits of my telescope. At least 3 rings were visible with no chromatic aberration (mask on).

**2021-03-25**

2130-2230

Setup with the SvBONY SV-305 camera to experiment and optimize taking photos of Moon. Seeing conditions were excellent with almost no atmospheric distortion when observing the Moon even with the highest power (SV-305 with 2X Barlow, ~180X). Collected many images and videos. I did something in the past that makes all of my videos run at double speed. Still haven't figured that one out.

Put the camera away and spent a few minutes visually scanning around the rich star fields of Gemini with my Stellarvue 82 degree UWB 15 mm eyepiece.

2021-03-20

1945-2015

Experimented with my SvBony SV-305 camera on the Moon. Started capturing shots while the sky was still blue.

2230-0015

Captured more Moon shots. Adjusted settings for clearest images.

Turned to Castor and I was able to capture the double star with good clarity with the little camera. Castor AB

Put the camera away for the night.

Found the double star 48 Cnc AA (Iota Cancri) in Cancer by accident. East to see with the 15 mm eyepiece. Main star magnitude 4 and slightly yellow, secondary about 40% as bright and bluer.

## **2021-03-19**

2015-2115

Hooked up the SvBONY camera to experiment some more on the Moon. I copy some incredible images and videos. I also grabbed some images of the Moon using my iPhone XS for comparison.

Later I visually observed Aldebaran, Mars, Hyades, and the Pleiades. Swung over to Meissa to capture some images of it with the SvBONY. I was able to see the companion star with the camera using the 2x Barlow lens and they were easily split.

2215-2320

Found the double star Mintaka in Orion. The distant companion star was easy to see. Turned up the Betelgeuse to see it's beautiful orange hue. Viewed it with the camera and played with settings.

Took the camera inside and came out and plugged in the Astro-Tech 12 mm Paradigm ED. I just happened to land on a new double star, 8 Mon AA (HIP 30419A) at the nose of Monoceros. He

5 mm separated them by a large amount. While a faint slow moving satellite crossed the path at about 22:50. Chased it for a while.

Found a cluster of 6 or 7 stars that formed a roof too near Gemini. Still trying to identify it.

3/18/2021

2030-2110

Setup to show my son Austin and his girlfriend Lisa my telescope. Observed the Moon, Mars, Pleiades, and the Orion Nebula. Lisa also witnessed a satellite through the telescope.2330-2245

Scanned around in Orion and the cluster of stars around the double star Meissa. I could easily split Meissa from its much fainter double. Interestingly, none of my family could see the secondary star that I could easily see.

Scanned around deep Star fields at 25 mm and found the Ruby Star near the tip of the right horn of Taurus.

Found the open cluster NGC 2169 by accident. Very distinct in my 12 mm. I could detect the adjacent NGC 2194 but just barely. The cold breeze made me call it a night.

**2021-03-14**

2115-2230 (CDT)

Took telescope out on the first clear night in more than a week to try out my new Astro-Tech 25mm 1.25" Paradigm Dual ED eyepiece. First viewed all the cool stars and nebulas in Orion. Next the Pleiades and the cluster Hyades west of Aldebaran. Went back towards Orion and found an unusual cluster just to the west of Bellatrix a little over 1 degree that was faint but pretty.

Turned to Gemini and observed the rich star field to the right of the star Algina.

A neighbor to my west turned on his blinding flood light so I turned to the part of Leo that was above my house. Started at Regulus and went to the left to the double star 34 Leo A. It's double was faint but separated a good distance. I put in my 5 mm eyepiece and could easily see them both. Maybe, the second star may have been HIP 49938. Moved down to the constellation star Zosma and star hopped to check on asteroid 4 Vesta to see how far it has moved from last time. At a reported magnitude of 6.14 it was very easy to see with the 25 mm. It formed a stretched out triangle with HIP 54470 and HIP 54319.

The time change has screwed up my work night observing so I had to call it quits at 22:30, still to late to get up at 05:00.

**2021-03-06**

2115-2225

Began in Canis Major to scan some new stars. Skies clear but glowing badly of city lights. Immediately came upon the open cluster M41 with 15 mm Stellarvue eyepiece. Though I could fit the whole cluster in my 5 mm eyepiece, the best view was with the 15 mm and no mask. Moved over to the star Miriam. It was bright and sharp. I then went to the red supergiant star Omicron1 Canis Majoris (16 CMa) and it had a very distinct in its orange color. Went to beautiful Sirius and tested my scope's optics. Diffraction rings looked circular and the same in and out of focus except out of focus was ever so slightly softer.

Went to the open cluster NGC 2335. Saw a few stars but nothing to indicate a cluster. Star hopped to the Heart-Shaped cluster. I could see the main stars and tell it was a cluster but hard to discern the heart shape. Found the open cluster M47 while scanning. It looked really cool with one pair of stars looking like a close double.

Thin, wispy clouds began to move in so I stopped for the night.



**2021-03-02**

2030-2145

Started in the constellation Orion. Explored the familiar Trapezium Cluster.

Next turned to Mars and Pleiades that are beautifully net to each other but still too far apart to fit in my lowest power eyepiece. At 2047 chased a “runner”, a faint satellite and it precisely and shockingly intersected with a jet aircraft.

Scanned the constellation Taurus. Experimented with various eyepieces. Checked out Aldebaran. Looked at the double star Cleia in Taurus but I could not split the stars even at highest power with or without mask.

While scanning found the double star 11 Mon A or Beta Monocerotis (Beta Mon,  $\beta$  Monocerotis,  $\beta$  Mon) by accident east of Orion. One of the two stars was actually a double itself. All three were bright and easy to discern with the 5 mm eyepiece. Called my son Wesley down to view it too.

**2021-02-23**

1830-1700

Warm 82 F day after -3 F a week ago. Went outside in the warm evening with my telescope, laptop, and new SvBony SV-305 telescope camera. Practiced on the Moon before it was dark.

2000-2100

Finally got the colors and exposure correct. Took some goo pictures of the Moon. The camera seems to be equivalent to about 5 mm eyepiece. It works great with the Celestron 2X Barlow lens to give about the equivalent to a 2.5 mm lens. I noticed that there is no detectable chromatic aberration when using the camera alone with my telescope as long as I'm using the 60 mm aperture mask.

Turned to the Orion Nebula but with no tracking I could only take short exposures of the Trapezium Cluster.

Moved to the Pleiades and grab some images of the stars with no Barlow. Even then I could not frame the whole cluster.

Explored Taurus with my Stellarium UWB 15 mm eyepiece. Noticed the intense yellow of Aldebaran and looked around the cool Hyades cluster.

**2021-02-22**

0930-1000

Went out with 10 x 50 binoculars again to check on asteroid 4 Vesta. It now makes more of linear shape with the two neighboring stars as it moved south.

**2021-02-21**

0930-1000

Went out with my son Wesley with the 10 x 50 binoculars to observe asteroid 4 Vesta again. Once our eyes were use the dark we could easily see it. I noted that it was now a stretched out triangle with neighboring stars instead of a right triangle as it drifted south.

**2021-02-20**

2130-2200

Observed with my Minolta 10 x 50 binoculars. First, observed “my star”  $\kappa$  Dra - 5 Dra - HIP 61281, Kappa Draconis near the tail of Draco.

Checked out the rich star fields in the constellation Taurus. Looked quite beautiful with the wide field of binoculars. Included Aldebaran, Pleiades, Mars, the Moon, and Hyades.

Turned east to see if I could see the constellation Leo. Stellarium showed that the asteroid 4 Vesta was in Leo and I indeed could see it with the binoculars. Was able to see my next double star target Algieba.

Turned southwest to scan the rich Star fields of Orion. The secondary star was about 25% as bright and blue than the main star.

2240-0000

Turned to Leo with the telescope to view the double star 38 Lyn A. Could see the double at 12 mm but had good separation at 5 mm and the Barlow. Main star slightly orange and the smaller secondary star was whiter. Viewed 4 Vesta again but this time with the telescope. Good view even at 20 mm. It made a triangle with the stars 88 Leo A and 85 Leo and all three were about the same magnitude with Vesta being 6.21. Vesta is 1.3955 AU from Earth at this time and I'm surprised I can see it.

Turned about Orion and found the double star 8 Mon AA by accident while scanning the stars with the 15 mm. The secondary star was bluer and about 25% as bright as the main star. Just above (east) of the double star I found the Satellite Cluster. The stars were pretty but no nebulosity was seen. Scanned up and noticed a star cluster with a hint of nebulosity. I think it was the Cone Nebula (NGC 2294) but have to investigate further later.

Winds picked up so I had to come in. Also, the drone flying at night towards me with no lights on gave me the heebies-jeebies.

**2021-02-18**

1830-1910

After sunset the Moon was near the zenith and at a phase of 0.43. Using the Celestron 2x Barlow with Astro-Tech 12 mm Paradigm the Moon looks better than with the Astro-Tech 5 mm Paradigm alone (brighter). Took several iPhone XS photos of the Moon. The Stellarvue 15 mm with its wide view gave a long time for the moon to drift across the field. The image of the Moon was nice and sharp.

**2021-02-05**

2040-2340

I started in the constellation Taurus, first to Aldebaran and to the Hyades cluster. Star hopped to star Ain, then to double star t Tau (94 Tau A). Easily separated pair with main star bluish and the other about half as bright.

Went to Pleiades and to the southwest was a trifecta of doubles stars that I've seen before. Most are unnamed but the most curious couple are near HIP 16659. Star hopped to 44 Per in Perseus and then to the cluster IC 348. I could barely perceive the cluster below the double star Atik. Could not see the second star of the double. Interestingly I could perceive 4 stars when out of focus only on that star. (Tree branch in my view :-))

Went to Auriga almost straight up. Star hopped to the open cluster NGC 1778. I could faintly detect it. I could barely perceive NGC 1908 but the adjacent Starfish Cluster was pretty and could be seen. Star hopped to the open cluster M36. It was a very pretty cluster of stars.

Went to Orion and saw the double star 48 Ori A and unnamed "doubles" near it. Hatsya in NGC 1980 has a dim but distinct "double" with it.

**2021-02-03**

2040-2125

Used on Astro-Tech 12 mm Paradigm ED eyepiece and aperture mask. Started with Sirius and then to the NGC 2335 open cluster in Gemini but I could not perceive. Then I star hopped to the Heart Shaped Cluster. Tried my Astronomik UHC Nebula Filter but didn't see much improvement. I could see only the brightest of stars. I then slewed over to the star 13 Pup and then onto the bright star Procyon.

Went to Orion to the star Mintaka. Star hopped from there to 48 Ori A again to view the double stars. Then to the Trapezium Cluster and was again amazed at the detail and dynamic range of the central stars.



**2021-02-01**

2030-2140

Installed my new Astronomik UHC Nebula Filter on my Astro-Tech 12 mm Paradigm ED eyepiece. Observed the Orion Nebula before and after installation. The difference was dramatic. Some stars in the Trapezium Cluster disappeared whereas others didn't. The nebulosity was much more pronounced. In fact a darker than the rest of the sky region appeared to be on the northeast side of the nebulosity.

Turned to M45, the Pleiades Cluster. Though beautiful, no nebulosity was detected. It was noticed that due to the narrowband of the filter the aperture mask was not that necessary.

I removed the filter and manually scanned the sky and came across what at first I thought was Mars. It was the orange giant star Aldebaran. I detected an interesting grouping of stars just to the west of (below) Aldebaran that I'll have to study another night. It is supposed to have a few double stars in the region.

**2021-01-30**

2145-2245

Very dusty and windy night but temperature was 60 F and sky was clear. Setup in the garage to look at the waning gibbous Moon and have some wind protection. It was also the only place I can see the Moon rising in the east. Had very good detail of mountain ranges and crater rims on the terminator. Beautiful views with my Paradigm 12 mm eyepiece with and without the 2X Barlow lens. Zoomed in on detail with my Paradigm 5 mm eyepiece and Barlow but my eye defects were magnified too much to be enjoyable. Took several iPhone photos with good detail of the Mare Crisium (Sea of Crises) with its crater wall illuminated as if the mountains were 50 miles tall. The crater Cleomedes was dark with the central peak well illuminated. Numerous faults or walls were visible in the Mare Fecunditatis (Sea of Fertility).

**2021-01-25**

2015-2145

Tried out my new light shade for neighbor's lights.

Took some iPhone photos of the moon.

Went to Tejat Prior in Gemini next to the Moon. It is an Airy disk the color of Mars but I could not detect its double. Maybe in diffraction rings of my telescope..

Star hopped to M35 open cluster but it was next to the Moon too. Saw the brightest stars but wasn't much to look at. Fit my Paradigm 5 mm eyepiece nicely.

Went to Orion and star hopped from Betelgeuse to Bellatrix to the double star Meissa. I was easily able to detect the fainter double just outside the main diffraction ring and both had a blue tint.

Moved to the adjacent HIP26215 Double Star but I could not split it.

Scanned around Monoceros and noted several nebulous objects that I will have to identify later.

Turned to my favorite double Castor in Gemini for my last observation for the night using my Paradigm 5 mm and 2X Barlow.

**2021-01-17**

1800-1845

Moon. Looks awesome with 12 mm Paradigm and 2X Barlow, whole moon just fits fov. Best iPhone photos were with 12 mm Paradigm and 2X Barlow too.

Mars. With 5 mm Paradigm and 2X Barlow I could see gibbous phase and slight detail in the middle.

Star hopped from Mars to Uranus. Found it for sure this time. Slightly blue but difficult to see at maximum power.

2130-2255

Observed Pleiades M45 and took some photos with my iPhone XS. Best again were with the Paradigm 12 mm eye piece.

**2021-01-15**

1730-1830

Observed the crescent Moon at 8.9%. View looked great in the Astro-Tech Paradigm 12 mm eye piece (38x) and the 60 mm aperture mask.

2130-2245

Went to scan around Orion. Took in the Orion Nebula with various eye pieces. The Trapezium Cluster was as sharp as ever. Looked best with my 12 mm Paradigm eye piece.

Noticed the Hatysa (iota Orionis) below the nebula was at least a double in NGC 1980. Checked out the three bright stars of Orion's Belt:

Mintaka, could one distant double or other star

Alnilam, couldn't see double

Alnitak, couldn't see double

Went 48 Ori A below Alnitak and though it is supposed to be double it looked more like cluster of 4 stars with at least one very close.

Jumped over to the bright star Procyon in Canis Minor. I did not notice that it was a double star.

I found Praesepe or the Beehive Cluster in Cancer by accident. It is always beautiful and it looked really nice in my Bresser 20 mm (23x) eye piece before bringing the setup inside.

**2021-01-11**

2035-2120

Turned to the constellation Cassiopeia to the star Navi. Hopped from there to Ruchbah and then to M103. Because it was dim I got the best view with the mask off. Next onto the double Iota Cass. to try out my new 5 mm eye piece. Couldn't tell if I was seeing a companion star or just diffraction rings. Nothing obvious.

Went to the constellation Gemini and found the sextuple star system main star (pair) Castor A. The main pair were beautiful with mask and the 5 mm eye piece. the lower right (left) star Castor B was only slightly dimmer as seen before.

**2020-01-09**

2200-2315

Tested new Astro-Tech Paradigm ED 5 mm eyepiece.

Jupiter was too low at sunset too check it out.

Turned to Orion Nebula. 5 mm had sharp views of the stars all the way to the edge of the field when using the 60 mm mask.

Still counted only 4 stars in the Trapezium Cluster but could faintly detect possible other stars around the brightest star, C.

Moved to Rigel and after some time I consistently saw Rigel B to the lower left of Rigel A (telescope flips horizontally). Looked up afterwards and confirmed that Rigel B was to the lower left (lower right in reality).

## 2021-01-02

1730-1830

Earlier, I made a 60 mm aperture mask for my 102 mm achromatic refractor telescope make it an f/7.65. The hope was to reduce chromatic aberration.

I was able to compare views Jupiter with and without mask even it was still light out. The improvement with the mask was dramatic. Flare was gone, contrast increased, and two cloud bands were easily visible. As it got darker I did the same comparison with Mars. Mars with the mask was seen as an orange disk rather than an overexposed flare.

Turned the telescope to the Pleiades, M45. I had originally thought that my star view was good and any spiking were due to my old eyes. However, with the mask all stars were simple pinpoints with readily visible colors. A marked improvement over no mask. Even with the highest power with my Plossl 6 mm and 2x Barlow stars were still pinpoints.

Turn to the constellation Perseus. Observed the Spiral cluster, the stars Almaak, Algol, and Mirphak.

Moved to Cassiopeia. Checked out the star Ruchbah, open cluster M103 and only saw 4 main stars, the star 44 Cas, open cluster NGC 659 but it was barely perceivable, NGC 663 open cluster looked pretty good. Hopped to the NGC 654 open cluster but only two stars were visible.

2230-2345

Waited for the gibbous Moon to rise. It looked much better with mask.

Went to Rigel. Looked much better with mask but still could not split.

Orion Nebula had better contrast and sharper stars with the mask. The 4 central stars in the Orion Trapezium Cluster were sharp and easy to see. The star Theta-1 Orionis C appeared to be more but I could not split the stars with or without the mask.

Moved to the M41 open cluster and Sirius through the trees. Still could not split Sirius but it looked much clearer with the mask. Found the NGC 2302 (Ed. Probably NGC 2301) open cluster and all I saw was a serpent of stars.

The conclusion is that in my light polluted skies the mask removed practically all chromatic aberration, allowed smoother focus, increased contrast, sharpened stars, and increased the details of Jupiter and the Moon. Though the resolving power is theoretically reduced with the mask, it was not detectable because the unmasked aberrations made any increase in resolution unnoticeable. The only costs may be the light gathering reduction in really dark skies.