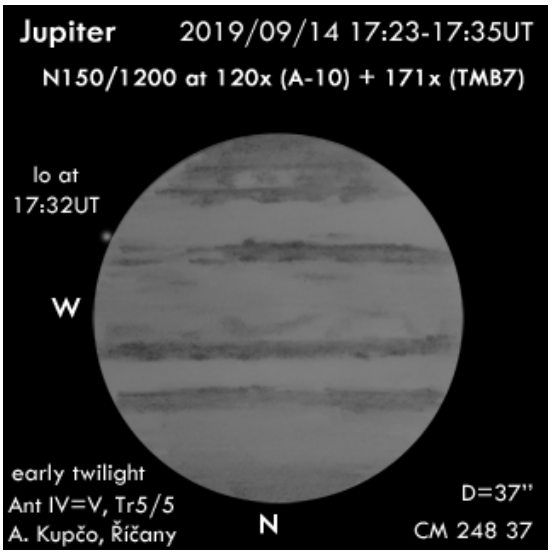
Tasting a Dobson N150/1200

Telescope: Sky Watcher **N150/1200**
Eyepieces:
TO-32 - Takahashi Ortho, f=32mm, (38×, 67′)
A-16 - Zeiss Abbe Ortho I, f=16mm (75×, 38′)
XF8.5 - Pentax, f=8.5mm (141×, 25′)

Time: 2019/09/21 18:45-21:00UT
Location: Konojedy.
Weather: Very good transparency.
Mount: Dobson

I have always wanted to get a hand on Newton 150/1200mm on Dobson mount. I recommend this setup to my friends whenever they ask for an entry level telescope for their kids or themselves. Of course, the kid should be grown enough to handle the telescope by himself alone. The reasons are well known. Aperture is large enough to taste almost every type of deep sky objects at quite detailed level. Slow f/8 optics makes it easier for a beginner to keep the reflector in a shape that would allow him to explore the telescope potential on Moon and planets at high powers. All this is packed in economic and light package that is quite intuitive to use.



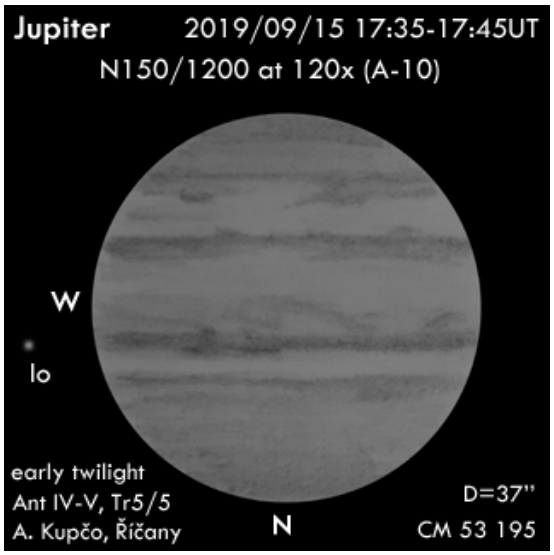
Nowadays 150mm Newton is considered as a humble entry level telescope. After all, the offer from mass making telescope companies, like Sky Watcher, just starts at 150mm for traditional Dobsons. I spend most of my observing time with 60-80mm class refractors and their capabilities still surprise me. The potential of 150mm aperture must be significantly larger. Therefore I welcomed an opportunity to borrow regular Sky Watcher Dobson 150/1200mm from a friend. To fully explore telescope capabilities would take quite some time. Couple of nights I had with the telescope is not enough to perform this task. At least, I could taste what the slow 150mm Newton offers.

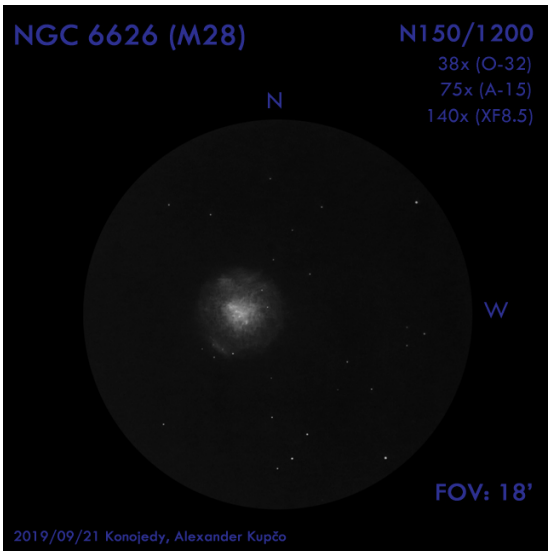
Star test on Polaris revealed a good but not an exceptional optics. The in and out focal patterns were definitely not the same. The secondary mirror shadow was in patterns with 3–4 inner rings visibly larger in one direction than in another. Also the brightness of the most inner ring was quite different. I'm not an expert on star testing so take my judgment with a grin of salt. Looking in Suiter's book[1], I would say that the dominant aberration was spherical one at the level of $\lambda/6$ to $\lambda/5$. Definitely better than the $\lambda/4$ images in the book but worse than the $\lambda/8$ ones.

I still managed two early twilight Jupiter sessions, see the two sketches on this and the next page. Jupiter was already quite low and seeing was pretty bad. The telescope was providing clearly more resolving power than my 60–82mm refractors even in these harsh conditions.

I also managed one DSO night from our light polluted backyard. I set up my small 60mm refractor Takahashi FOA-60 as well for a direct comparison with the Dobson.

[1] H. R. Suiter, *Star Testing Astronomical Telescopes*, Willmann-Bell, Inc., 1994





There was almost no surprise, larger Newton was showing DSO targets and faint stars with more authority. For example, comet **2019/B1 Africano** was in 150mm just a faint rounded glow with a medium central condensation, like an unresolved globular cluster. Once I knew where to look, I was able to glimpse the comet in the 60mm refractor as well. Here it was a threshold object.

The surprise came from the edge galaxy **NGC 891** (10.0v, $13.5' \times 2.5'$, PA22°). I was trying quite hard to see it in 150mm Newton with no success. The galaxy is quite difficult target from our backyard. Yet, I was able to observe it in 60–82mm refractors on many occasions. With 100mm ED refractor, I was even able to detect the dark line.

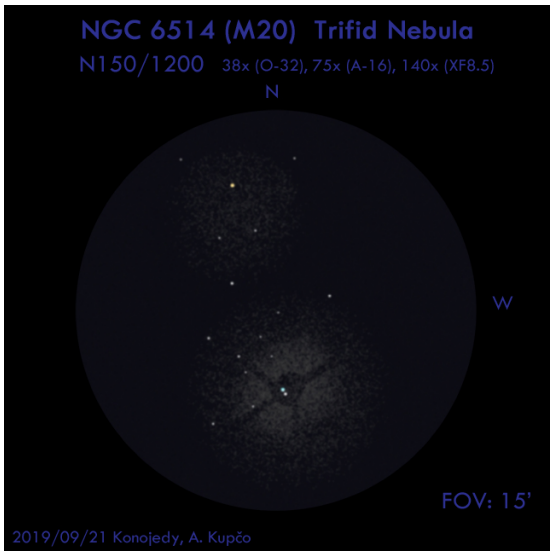
This failure could had been just due to the atmospheric conditions. As FOA-60 was sitting next to the Dobson, it was simple to check it. The galaxy was actually visible in the 60mm refractor. I plotted observed location and position angle for the later verification. The recorded features agreed well.

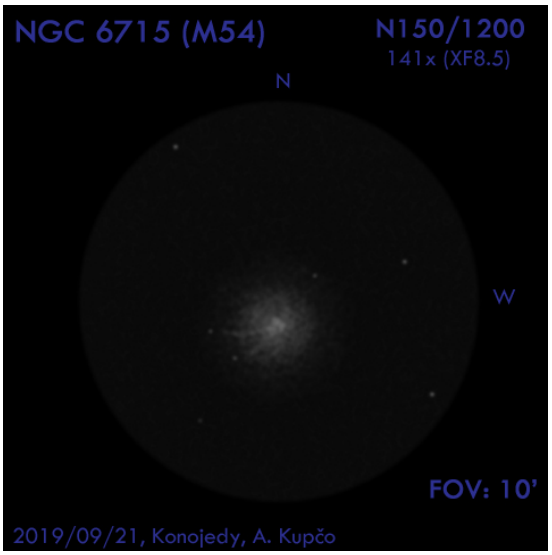
I did not pick up NGC 891 by chance. I experienced the same failure with my former Maksutov Cassegrain Orion Optics 140/2000. That night, I was not able to find in the Maksutov not only galaxy NGC 891 but comet ASASSN1 as well. Being desperate, I set up my refractor 82/1670. It had no problem with showing both targets. I suspect the better DSO performance of refractors is due to their better handling of side light. This is even more important under light polluted skies.

Therefor I was glad that the weather was kind enough to allow me at least one DSO session under darker skies. I knew the night of September 21 was going to be short as Moon was rising two hours before local midnight. To keep the setup simple, I took with me just three 1.25" eyepieces. For the low power views, I picked up my latest addition, Takahashi 32mm ortho. The remaining two eyepieces were selected to provide jumps by factor of two in power.

As Sagittarius was still well placed I decided to start there. I avoid this area from our backyard, most DSO are rather dull in there due to light pollution. This was an excellent opportunity to visit this region packed with many interesting objects. The first one had to be globular cluster **NGC 6656 (M22)** (5.2v, $24'$). Under dark sky, it is a showcase in practically every telescope. In 150mm, it was peppered with stars already at 38×. Many of them were direct vision stars. One of the brightest stars in the cluster was showing an interesting orange color.

M22 was too complex for sketching. I could have spent on it easily the whole night, still not be satisfied with the result. I moved to a nearby Messier's cluster **NGC 6626 (M28)** (6.9v, $11'$). The cluster was at 38× just a small rounded nebular patch with a strong central condensation. It started to mottle a bit at 75×. I noticed a slightly elongated core. The mottling was stronger at 141× and several stars in the halo began to show up with concentrated averted vision. The core seemed irregular. I noticed also a brighter





rounded patch near the northern edge. The faintest recorded star was of visual magnitude 13.0, see the sketch on the previous page.

Then I visited Lagoon nebula **NGC 6533 (M8)** ($90' \times 40'$). Again, the sketching was out of question due to the complexity of the target. Nearby Trifid Nebula **NGC 6514 (M20)** ($20'$) seemed to be about right. I already suspected the dark lines in the previous visits of M20. This was a right time to try to record them in a sketch, see the result above. The sketch was redrawn completely on computer with a dedicated software, which I designed to mimick the old stippling technique.

There were two rounded large nebular patches visible at 38×. The northern one was quite faint. Its central star was bright and clearly orange. The southern nebular patch was much brighter. There was a bright pair in its center. The brighter star seemed to be of light blue hue. The dark lines were best visible at the highest magnification of 141×.

When I compared my sketch with M20 images, I found that the overall picture is about right. With some imagination, I can identify the recorded dark lines but their positions and orientations are sometimes quite wrong. I need to be more careful next time. You should take all sketches from this night with reserve. I did not want to spend on them more than 10 minutes. This is clearly not enough when you are hunting for hardly visible features like those dark lines in M20.

The last target that I decided to sketch was Messier cluster **NGC 6715 (M54)** (7.7v, $9.1'$). Even the highest magnification 141× was revealing nothing more than just three faint stars in the halo. I saw two interesting spikes pointing to the two stars at the eastern edge, see the sketch above. The longer spike is clearly visible on several images of M54. The only other feature that I noticed was a mottled central bright core. There seemed to be three brighter patches. Again, the sketch was created completely on computer using the stippling technique, so the mottling is somewhat artificial. The cluster was more smooth in the eyepiece.

I spent the remaining hour visiting mostly other Messier objects that I was sketching recently and I was familiar with their appearance in smaller refractors. The most breath taking view was probably open cluster **NGC 6705 (M11)** with literally hundreds of stars packed in a small space. The Great Galaxy in Andromeda **NGC 224 (M31)** was showing hints of dark lines. Its satellite **NGC 205 (M110)** was unusually large already at 38×. Another object for further study was definitely nearby galaxy **NGC 598 (M33)**. I noticed several bright patches and hints of arms at 38×. Larger power of 75× revealed the presence of nebula **NGC 604** ($1.9' \times 1.3'$). Even some irregularities in this distant cloud started to show at 141×. Comet Africano was much easier to notice than during previous night backyard session.

I also visited Ring nebula **NGC 6720 (M57)** shortly. I know by heart positions of two stars in the nearby field. I used them many times to test the reach of my telescopes.

One of them, magnitude 13.0 star, is located just at the eastern edge of the ring. From our backyard, this one is a threshold object in my 63mm Telementor and just a ghost in 60mm FOA-60. At 141×, it was well visible in the 150mm Newton. A little bit south, there is a magnitude 14.1 star. It was usually a threshold target in ED100/900 and a little bit easier in AS110. To see the star in the refractors, I had to push the power at least to 240× under darker skies, and to $300 - 350\times$ from our backyard. This night I was not able to see the star in 150mm Newton, even a slightest hint of it. Power of 141× was probably not enough.

Of course, I had to try to find galaxy **NGC 891**. Under the darker sky, I noticed the galaxy already at 38×. It was just a narrow line difficult to locate. Galaxy was more obvious at 75×. I was looking for the dark line but I could not see it at all. I completely lost the galaxy at 141× and I was not in the mood of finding it again.

Overall experience with 150mm Dobson was positive. As expected, the telescope was easy to setup, intuitive to use, and it provided respectable light gathering power and resolution.

I would love to write that the telescope was joy to use. This would be true only at low powers. Mount movements were not that smooth, especially in azimuth. Observing at 141× with 60 degree field of view eyepiece, like my Pentax XF 8.5, was not easy but still doable with reasobnable effort. Observing at 400× with 3mm DeLite eyepiece was still possible but it was testing my patience clearly too much.

This difficulty of operating the telescope at high powers is a serious obstacle if you are like me and you are trying to use the full potential of your telescopes. Several nights spent with 150mm Dobson confirmed my conclusions made with my former Dobson 250/1600mm. Based on the aperture, it should go deeper by 2 magnitudes than the 100mm refractor. And while I was able to reach from our backyard with ED100 regularly stars below magnitude 14.0, I never recorded on the sketches made with 250mm Newton a star fainter than 15.0. I believe the main reason was the discomfort when operating the Dobson at magnification above 200×. My conclusion was that my future Dobson, if any, should be motorized and mechanically well made to allow for a reasonably comfortable operation at least up 400×.

Beginners and probably most of the observers do not care about getting to the full potential. There is nothing wrong with this strategy, there are many ways how to enjoy a starry night. The telescope provides at well managable magnifications around 150× a light gathering power and a resolution clearly beyond the capabilities of my 60-82mm refractors. I still believe that Newton 150/1200mm is one of the best choices for a beginner observer.

Alexander Kupčo