

The southwest parking lot at Fremont Peak State Park, California, was chock-a-block full of telescopes when I arrived in late twilight on Saturday, May 3, 1997. There were so many large truss-tube Dobsons, wrapped in black light shields and pointing in every direction, that I could half close my eyes and see the tilted and skewed tombstones of an ancient cemetery, or perhaps the ceremonial hillside of Easter Island, where the statues of the long-ears once stood akimbo, half buried in the ground, vacant eyes staring eternally at the open sky.

Fortunately, I had only brought small equipment. I had no problem finding space to set up the 98 mm f/6.7 Brandon refractor that I had brought, and my Meade model 165 50 mm f/12 refractor was light enough to be carried from place to place in one hand, as necessary.

Comet Hale-Bopp was sinking fast toward the horizon, so I borrowed a look at it through a friend's 6-inch f/4 rich-field telescope (RFT), at 24x. The comet had faded, but the dust tail was broad and prominent; the wide field of the RFT gave a nice view.

I haven't said much about the Brandon 98 in these postings. It started life as a Brandon 94 mm f/7, but a prior owner enlarged the front retaining ring of the lens cell to gain extra aperture. That's not something I would have done, but it seems not to have hurt the telescope or diminished the image quality from the early Christen triplet objective. Someone also refinished the tube from robin's-egg blue to gloss black, and added a Celestron 6x30 finder. The result is a small, fast, high-quality refractor, with all the virtues of that breed (compact, excellent images, versatile), and also all of the vices (small aperture, touchy to get sharp focus, very sensitive to collimation errors).

As received, the telescope was slightly out of collimation, and did not seem to true up when I put in a Cheshire eyepiece and fiddled with the push/pull screws on the cell. Then I noticed that one "push" screws was missing. I replaced it, and everything came right. I got rather a bargain on the instrument -- I would hate to think that the previous owner sacrificed it for want of ten cents' hardware. But I won't complain too much.

The seeing was better than any other night I had had the instrument out, so I eagerly turned it on a demanding target -- Mars -- and was amply rewarded. I looked at the planet several times during the evening. At 263x, I had a nice view of the north polar cap, the tiny dark band surrounding it, Mare Acidalium, Niliacus Lacus, Margaritifer Sinus, Sabaeus Sinus, and Meridiani Sinus. The

"notch" in the latter was not visible.

Next, I looked for the dwarf galaxy Leo I, which I had just barely detected in a six-inch instrument last month. 53x got Regulus out of the field and exposed a marginally brighter patch of sky background at the position of the galaxy, though it took advance knowledge of exactly what to look for, and exactly where to look, to see it.

The owner of a nearby 20-inch Obsession was viewing galaxies at 125x; he was looking for NGC 4038 -- the "Ring-Tailed Galaxy" (or more likely, "Galaxies"), in Corvus, and having trouble -- his digital setting circles were misaligned. We fixed the problem by having an observer with an LX200 go locate the object, then look through his finder, memorize the field, and come back and steer the Dobson. The things people do to avoid using a chart...

We had a modest discussion about whether we could see the long "tails" of NGC 4038. The problem was, that they are faint, and the sky was not perfectly dark (though seeing Leo I in 98 mm means at least that we were past the end of twilight), and we all knew more or less what they looked like. So how could we be certain we were not fooling ourselves? It's hard to be sure, but what I thought I saw as the southern tail was brighter, curvier, and longer than what I thought I saw as the northern one, and when I double-checked in Burnham's Celestial Handbook the next morning, I found that my description matched his. So I think I saw them. Others may disagree.

(I once looked at NGC 4038 in my Celestron 14, but did not see any tails. On that occasion, I described the central clump of the object as looking like a pair of shrimp. Perhaps the "tails" are merely their antennae.)

Not wishing to look at a chart myself, I snuck a peek through the Obsession's finder and then set the Brandon on NGC 4038, still at 53x. "Hey, want to see what it looks like in 98 mm?" People seemed amazed that I could detect it at all. I don't know what it is about just having looked through a 20-inch telescope that makes finding a 10th-magnitude object in a four-inch amazing, but I kept my mouth shut: People find such scant and meager wonder in the world today, who am I to deny a little growth to their souls? However, we did not see the tails in my telescope. Shucks.

The Brandon did show some interesting detail in other popular galaxies. I and another observer agreed that at 53x, we could clearly see part of one spiral arm in M51, on the side opposite the companion galaxy. I thought I could also detect the "bridge" to the companion. And at the same magnification, the view of NGC 4565 was magnificent -- I could see the long edge on strip of the galaxy, bisected by the dark dust lane, widening and brightening into the central bulge, with

the star-like nucleus peeping over the dust, out from the very core. I also spent a while romping through central Virgo at 53x, where many galaxies beyond the Messier objects were easy to see. These included NGC 4387 and 4388, just south of M84/86, and many of the long chain of pairs of galaxies that leads northeast from M84/86. I sometimes call this chain the "avenue of galaxies". And while I was lining up on M13, I noticed tiny NGC 6207 nearby, clearly visible as a short streak, still at 53x.

I spent much of the evening conducting Messier surveys. I wrapped up the survey with my 10x50 Orion UltraView binocular, that I bought last fall. Yes, you can see all the Messier objects with a 50 mm binocular -- I did it once before, with a 7x50 -- and yes, some of them are tough -- notably M74 and M76. I am nearly done with a similar survey with the Meade 50 mm refractor -- which is the least powerful (in the sense of light-gathering ability) instrument with I have ever attempted such a project. I have already found M74 and M76 with it, so I am confident that it will show them all. Actually, many of the Messier objects show interesting detail in a 50 mm refractor -- it is possible to do real amateur astronomy, even with so tiny an instrument. And with the Brandon 98 mm, all the Messier objects are of course easy, and there is a lot of detail -- for example, most of the globulars show at least a trace of individual stars at high magnification, and some -- such as M13 -- are truly spectacular.

I closed the night by helping an observer find the Veil Nebula in an 8x44 UltraView binocular. Cygnus was only part way up the sky, and there was beginning to be occasional high cirrus, but even so, I could hold the brighter, eastern arc with direct vision, and could talk the binocular owner through star-hopping to find it successfully. I did not think to try it in my 7x35 Tasco. Maybe next time...

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Extremely hot weather in the first week of August, 1998, made me reluctant to enter my non-air-conditioned home after work, even well past sunset, so on several nights I set up a telescope in the somewhat cooler yard, for a few hours' observing. A waxing gibbous Moon combined with Palo Alto, California's regular light-pollution to make it difficult to do Messier or Herschel-400 observations with Refractor Red, my 55 mm Vixen fluorite refractor -- these have been my standard in-town observing programs for some months -- so I did something else.

Targets were limited to high-magnification stuff like the Moon, Jupiter (if I stayed up late), and double stars, and I wanted equipment that was easy to cart outside and that came to thermal equilibrium

quickly, so I set my Brandon 98 mm refractor up on my Great Polaris (GP) mounting, and left it ready to go in the living room. That "98" is not a typo, incidentally: Some previous owner bored 4 mm more out of the front of the cell of what once was a Brandon 94.

The stubby f/6.7 refractor is an easy carry for the Great Polaris, is light enough so that I can pick up the whole thing at once, and is compact enough that I am not too likely to knock pieces off on the door frame. I attach battery container and drive electronics to one leg of the GP tripod with Velcro and bungee cord, so there is nothing to do outside but open up the optics and add an eyepiece.

I have a problem with an equatorial at home. My yard has many trees, and I am forever moving the telescope to find sky to look at. I don't care to take time to keep doing polar alignments. No matter, by preadjusting the polar axis elevation to my latitude and jiggering the legs of the tripod around, I can get the polar axis within several degrees of where it ought to be, just by eye, and that results in a drift rate of objects in the eyepiece that is less than an arc-minute per minute. That's small enough for visual work.

So far this week, I have mostly been observing at 164x, using a Brandon 8 mm eyepiece and a Celestron Ultima 2x Barlow. The seeing hasn't been up to more, and 164x will probably show me almost all the detail the 98 mm Christen triplet has to offer, anyway.

The Moon has been the showpiece. On the first night out, I caught the terminator just past Aristarchus, and had a nice view of Schroter's Valley and of Aristarchus rilles I and II. Further south, Rupes Liebig and several of the Mersenius rilles were well placed with respect to the terminator, and easy to see. On subsequent evenings, I saw first the northern extremity and finally the full length of the Sirsalis rille, as well as Darwin rilles I and II. I also had a wonderful view of Grimaldi, just emerging from darkness. Much further south, Nasmyth and Phocylides looked like a giant footprint, with their common wall and its dark shadow separating the heel from the rest of the sole, and beyond them, at so low a sun angle that the convexity of its floor was obvious, and at a libration favorable enough to see it, was the great walled plain Bailly.

I only stayed up late enough for Jupiter one night. The 98 mm does a pretty good job on it -- one can see the shapes of the edges of some of the bands, and I chanced upon a Great Red Spot passage and the emergence of one moon from occultation by the planet.

The bright sky makes it hard to use a finder -- the limiting

magnitude of the 6x30 that the Brandon presently has is probably no deeper than 5 or 6 in such conditions. Furthermore, the naked-eye limit is only 3 or 4, so there is a serious problem knowing how to point the finder in the first place. These problems led me to a new approach to finding double stars to look at.

What I did was work by repeated star-hopping from a quite bright star, using the main telescope at low magnification (24x with a 28 mm Meade Research-Grade Orthoscopic, which gives me a not quite two-degree field). I used volume two of *\_Sky\_Catalog\_2000.0\_* together with *\_Uranometria\_2000\_* to look up and identify doubles near my bright star, then used the finder only to put the bright star in the field of the main telescope. It's no problem star-hopping eight or ten degrees with a two-degree field. When I got to the double, I swapped in more magnification for a better look, then went back to the low-magnification eyepiece, navigated back to the bright star, and went on to the next object. That worked quite well, and when I got lost, the bright star was not far off, and easy to locate again. In this manner I could find and study new doubles at one every three to five minutes, about as fast as if I had been working in dark sky.

My previous double-star survey was done using entries in the old *\_Atlas\_Coeli\_*, which had a catalog limit rather brighter than *\_Sky\_Catalog\_2000.0\_*. So there are lots of new ones to be seen, even within the capability of so small an aperture as 98 mm. This kind of observing is a pleasant way to pass the warm summer evenings. I even manage to water my roses at the same time, moving the hose from one place in the garden to another in between doubles. So far I have managed not to drench the telescope in the process, but there's a first time for everything, I suppose.