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50 Years of Viewing and Still an Equipment Junkie

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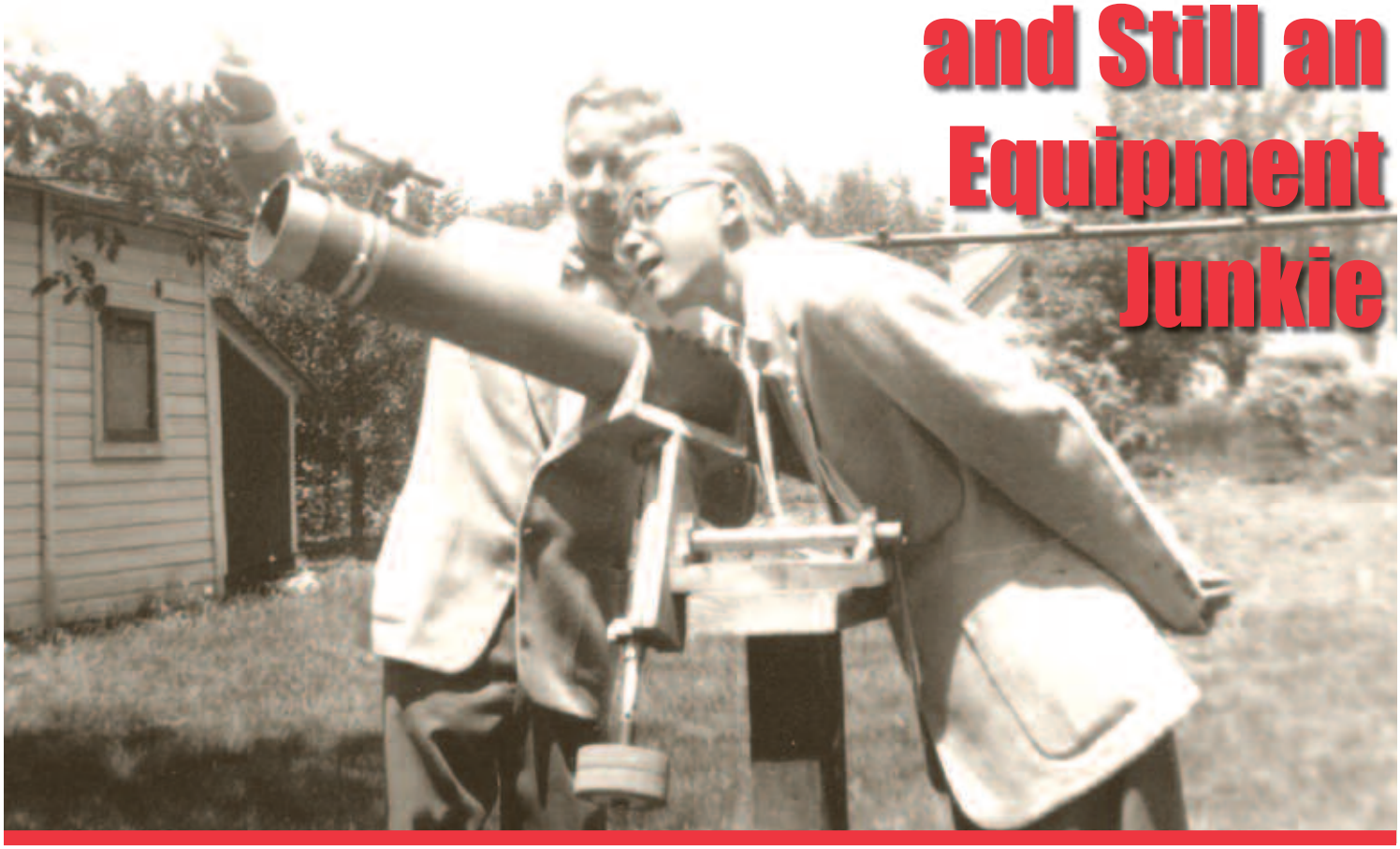


By Tom Osypowski

The night sky has been my steady companion for over five decades – ever since, at the age of 12, I had the urge to look up at the stars from my boyhood home in Milwaukee. Despite my age, I quickly graduated from learning the constellations and bright star names to building telescopes to look deeper into the night.

Above I am pointing out to my brother, Ed (with glasses), how to sight through the finder of my newly made 3-inch f/10 reflector. I was 14, and this was 1955. The scope is mounted in an alt/az style with pipes for shafts, running in wooden bearings.

Designing and building telescopes, mounts and clock drives became as much an obsession as actually using them. I also enjoyed poring through ads in *Sky & Telescope*. Of course, the offerings then (this was the late '50s) were pretty meager – mostly war surplus eyepieces off of tanks and such. Still, I earned my "cred" as an equipment junkie very early, haunting hardware stores and junkyards, looking for possible telescope parts.

The Dobsonian Revolution and Tracking

The Dobsonian revolution in the early '80s really got my juices flowing. I was 40 then living in the country under dark skies. The promise of BIG aperture on an easy-to build mount was irresistible. Soon I had a 16-inch Dob up and running. This was a big leap forward from the 10-inch fork mounted scope I had been using. The 16-inch was easier to set up than the 10-inch and the views were twice as bright. Wow!

But there was a downside. While my 10-inch home-built fork mount had a serviceable drive on it, the 16-inch was strictly a "push and view" scope. Or so it seemed at first. It turned out that the Dob revolution spawned other developments, the most significant for me being the invention of the equatorial table by the Frenchman, Andre Poncet. That technology quickly evolved with the refinements that inventors, including Alan Gee and Georges d'Autume, added to Poncet's original ideas. I jumped right in and in 1984 converted the ground board of my 16-inch Dob into a tracking platform. Next I converted my 10-inch into a Dob with its own platform.

This is my first really good scope, a 6-inch f/10 on a classic pipe mounting. I worked all of one summer on the mirror, but never could bring it to a good finish, so a friend of mine put an excellent figure on it. I used the scope a lot for observing double stars. I was 15 years old when I finished it (about 1956).

Now we jump to 1981, when I completed this 10-inch f/6 at the age of 40. I worked a lot on this scope and its fork mount, trying to get a decent drive hookup to it. The hand control I built for it had about 10 buttons and a number of switches for different slew speeds, automatic focus and coffee maker operation.

After the 10-inch scope was finished, I moved up to a 16-inch Dob in 1983. When platform technology was invented, I immediately ran with the ideas being published and converted the groundboard of this Dob into my very first platform. With some tweaking, it worked very well, and I used it for a number of years before making new and improved platforms for the scope. This is the scope that took a number of fine photos for me.

From Aluminum Equatorial Platforms to Aluminum Dobs

People at star parties began to take notice – a Dob that could track was quite a novelty at the time and they were asking me to make them one of those "platform thingies" for their own scopes. This was the start of my present astronomy manufacturing business, Equatorial Platforms.

We have built over 500 platforms in the last 20 years for scopes from 6-inch to 36-inch. They have been shipped to astronomers all over the world. It's still a great feeling, shipping out a platform and knowing how much its use is going to enhance the viewing pleasure of its new owner.

My platform designs, and the techniques for making them, have evolved over the decades, with the addition, for instance, of the dual-axis drive and extended tracking run times. No development was more significant, however, than the production of my first metal platform. Wanting to exploit the stability and rigidity of metal, I had been thinking about such a step for years, but could never quite come up with a viable design. At first I was looking at replacing the sheets of plywood in my wooden platforms with sheets of metal. But this would be both expensive in materials and prohibitive in weight.

I experimented with lightweight aluminum tubing in square and rectangular shapes and hit upon the idea of just making a framework of welded tubing for a nice

solid structure. The framework could carry the Teflon pads needed for the rocker of the Dob. The first platform made using these materials and techniques was a resounding success. In fact, it turned out so well that the basic design and appearance has not changed much over the years. Over 150 of our aluminum platforms are now in service. The advantages of these all-metal platforms are their light weight, durability and stiffness over their wooden counterparts, especially in the larger sizes.

The aluminum platforms led to another development: I had always wanted to build and market complete telescopes, as well as Equatorial Platforms, but there were already many manufacturers making very nice wooden Dobs. No need for another contender in that fray, I figured.

Then I found out that one could get rectangular aluminum tubing in sizes like 1-inch by 4-inch and 1.5-inch by 6-inch. That opened up a whole new arena of possibilities. How about using this tubing to fabricate low-profile and very stiff rocker boxes and mirror boxes? After more experimentation, I decided to offer a line of large aluminum telescopes to complement the metal platforms.

Go-To Drives

While that is a dynamite combination, the introduction of viable alt-az drives was starting to revolutionize large Dob tracking. Could such a drive be married with my aluminum telescopes? I didn't want to just do some kind of compromised "retrofit." My goal was to build a telescope system from the ground up that was designed around an alt-az drive, one that would offer a state-of-the-art go-to function and still not give up the easy hand movements of the traditional Dob.

This search ended at the Oregon Star Party a few years ago, where I saw a revolutionary telescope design and drive system that had been developed by Dan Gray of Sidereal Technologies.

Dan had brought a new 28-inch scope that immediately caught my eye (and many other eyes, too!). To me, it just looked like it had been done RIGHT. The altitude and azimuth motions of his scope were innovatively designed to accept his new alt-az drive system. His subsequent introduction of slip clutches for both axes sealed the deal for me.

Here's what I was looking for: a go-to scope that could be moved at will by hand without having to release any clutches, and without danger of losing positioning accuracy. I integrated Dan's ideas and his excellent servo motor drive system into a line of all aluminum-telescopes: the Spica-Eyes Slipstream Telescope with Go-To Drive.

Super Fast Optics

Fortunately, my activities coincided with the introduction of large aperture low f/ratio mirrors by master opticians like my friends, Steve Kennedy and John Lightholder. Here's the deal: big telescopes are fun to use, but few people like the big ladders that usually go along with them. Well, Steve Kennedy of Kennedy Optics

Pictured Left: 28-inch f/3.66 SpicaEyes Slipstream Telescope with Go-To-Drive

Pictured Below: Dual-axis Aluminum Platform

Pictured Above: 15-inch Dual-axis Equatorial Platform with Obsession Telescope

Pictured Right: 16-inch f/4 SpicaEyes Telescope on an Equatorial Platform

changed all of that when he started making large mirrors – 24-inch to 32-inch – with sub f/4 ratios. This opened up the possibility of big SHORT telescopes. For instance, my personal scope is a 24-inch on a platform with an f/3.75 Kennedy mirror. It's a real pleasure to use an instrument of that size, and yet be standing on the ground a lot of the time, with never more than 2 or 3 steps up a ladder. Of course, traditionalists immediately jumped in with objections: "You just can't make a really good mirror with that short an f/ratio. And even if you could, the coma will kill you. And then there is the critical mirror alignment that would be needed." Stuff like that.

It turned out that Steve Kennedy could make very good mirrors with f/ratios like 3.75 and 3.6. Steve had spent 10 years with Celestron as their master optician and therefore had a great background producing commercial optics. That coupled with a lot of innate talent and sheer doggedness allow him to produce consistently excellent short f/ratio parabolic mirrors.

But what about the coma issue and the critical alignment issue with such short mirrors? First, the coma was really not a problem, I found out. It only crops up significantly with the longer focal length eyepieces and their wider fields. The simple use of a coma corrector, like Tele Vue's Paracorr, tames coma to acceptable levels, and at higher powers, I find that the Paracorr is not needed. For instance, with my 24-inch f/3.75 mirror I use a Paracorr with a 26-mm Nagler. This combination gives me about 100X with a true field of over 3/4 degree. I can put a star in the center of the field, slew it to the edge with the remote control, and see virtually no change in its sharpness. What's not to like? I also use the Paracorr with a 17-mm Nagler, but for any higher powers, it is just not needed in my experience.

Finally, I have found the alignment issue also to be a non-problem. There are plenty of collimating tools on the market that make critical alignment a cinch to achieve, even with ultra short f/ratios. And

if you have a stiff scope, that alignment will be maintained with little difficulty.

Evolution of Viewing Habits: Binoviewers and Astrophotography

Just as with equipment, viewing habits have gone through a lot of interesting changes over the years. Back in the late 1950s a 12-inch scope was a huge instrument. And lucky me – at the age of fourteen I had access to such a scope at the observatory of the Milwaukee Astronomical Society. It was a behemoth, a 12-inch f/8 with a rolled steel tube, heavy German Equatorial mount, sitting in a dome two stories up on a 10-ton concrete pier. You could pound on the tube with your fist and barely shake the image.

I spent many a fine night with this telescope, first just viewing and getting to know my way around the Messier list, then taking up photography. A friend and I got the bug to compile a northern sky photographic star atlas. We constructed a camera around a 7-inch fl.-f/2.5 surplus lens. Stopping the lens down to f/4 allowed it to cover a 4-inch by 5-inch glass plate. We piggybacked the camera on the monster 12-inch scope, and used that scope as a guider for the camera. Each exposure was about 30 minutes, and was hand guided with a crosshair eyepiece in the main scope. I did all the darkroom work, developing the glass plates and making 8-inch by 10-inch prints for our atlas. Everything was going well until someone stole the camera about halfway through the project.

My next foray into astrophotography involved taking large-scale photos of the moon and Jupiter using eyepiece projection. This was a lot of fun, and resulted in an article in *Sky & Telescope* (Jan. 1965) entitled, "High Resolution Photography."

After the publication of that paper, other life adventures kicked in and I put astrophotography aside for many years. The need to see if the Equatorial Platforms I was now making were good enough to do imaging rekindled an interest. Turned out they were, and the results can be seen on the Equatorial Platforms Web site. A few examples are also included with this article. For the images of M42 I used a separate guidescope and hand guided for about 8 minutes. Others have used our Platforms with autoguiders for exposures up to 60 minutes at a time. And, for those who don't want to guide at all, modern CCD cameras allow stacking many shorter exposures of 15-30 seconds, and integrating them into wonderful images. Also, these same short exposure times are all that are needed to exploit a whole new generation of super sensitive video cameras that are revolutionizing viewing and imaging. More about that later.

If truth be told, despite various attempts at astrophotography, visual viewing has always been my primary observing passion. The advent of modern well-corrected, wide-field eyepieces has really opened up that arena. In my early astronomy days, a quality Kellner or war surplus Erfle was a premium eyepiece. Now look at what we can get from so many vendors!

Binoviewers have also come of age, especially with the introduction of the Denkmeier units, with that oh-so-clever "Power Switch" – three different powers at the flick of a lever, with no need to change

eyepieces. That is one lovely accessory, and I enjoy using mine. When the seeing is good and I want some detailed views of the Moon, Jupiter or Saturn, out come the binoviewers. I flat out see more using them on solar system objects. The views of deep sky objects, especially with a larger scope, are also terrific through a good binoviewer. But I feel there is some loss, and so tend to use a single eyepiece if I want to coax out the subtlest and faintest details in a galaxy or nebula. Bright planetaries might be the exception here. They too, like the planets themselves, seem to look best in the binoviewer at high power.

A Substitute for Aperture

Like many other observers, I have been afflicted over the years with aperture fever. It has always brought me deep pleasure to acquire a larger telescope and review all of my favorite objects and get to see them in a new light; or rather, with more light. It's always fun to see new detail in an object that you have already looked at dozens of times through smaller telescopes.

Unfortunately, I've come to realize that I am never going to own a larger scope than my 24-inch. Sure, I have manufactured a number of 28-inch and 30-inch scopes for customers, but making those scopes helped me see that I could never effectively use one. They were just two big and bulky for me to haul around to dark sky sites. For a while there, the "equipment junkie" side of me was forced to concede it had reached a wall, and the "viewer" side of me just had to accept that.

Then some friends and customers started talking up a new camera gadget that offered almost live views of deep sky objects that compared to eyepiece views through scopes 4 or 5 times larger. This new instrument was a small video camera called the MallinCam, manufactured by Buck Mallin in Canada. Turns out this was not an off-the-shelf camcorder or webcam that has been adapted for astronomy use, but rather, a very carefully designed astronomical CCD imaging device capable of recording both high light level objects like the Moon and bright planets and also the much fainter light of deep sky objects. It has a built-in shutter with speeds as short as 1/12,000 sec, and as long as 56 seconds. The images that are recorded by this camera, whatever the shutter speed, can be sent directly to a screen for an almost "live," highly detailed, color view of whatever you are focused on; a view, so it was said, that would rival that through the eyepiece of a much larger scope.

Was this a way to assuage my aperture fever without a 4-foot mirror and a 14-foot ladder? The only way to find out was to try one of these new cameras so I contacted Jack Huerkamp, who is the U.S. dealer for the MallinCam, and within a week the camera was on my scope sending photons to my laptop. Because the MallinCam itself, and the laptop video viewing accessory that I had bought, have a lot of possible image adjustments, it took a bit of fiddling to get it all right. But once I got the hang of it: "OH…MY…" There on the screen was an extremely real looking color image of M51, replete with bluish spiral arms, dark lanes in the arms, the bridge with its dark lanes, a sprinkling of pinkish HII regions, and a bright core with interesting nodules around it. The image truly looked like a live view of the galaxy through, say, an 80-inch or a 100-inch telescope.

I could choose integration times of 7, 14, 28, or 56 seconds. The image on the screen would then be updated at those times. For my view of M51, the 7-second integration time proved to be quite satisfying, showing all the detail described above. I was truly stunned. Every 7 seconds the image on the screen was refreshed with a new one. I could watch them pop up and see the differences as the seeing, wind, or tracking affected them. Then I made another exciting discovery: the add-on video card that I was using with my laptop (AVerTV Express MCE) had an image capture feature. Whenever an exceptionally clear integration image came up on the screen, I could instantly save it to my hard drive. Wow, color CCD imaging made easy!

Other galaxies were just as spectacular in appearance on the screen. Edge-on galaxies like 4565 and 6855, 4651 and M104 were spread across the screen in great detail. The Owl Nebula, M97, showed up as a mottled bluish-green disc with obvious "eyes" and three stars in the nebula. The jet from the black hole in M87 was totally obvious, and even looked bluish in color.

What about solar system targets? Well, with the proper settings, views of the moon and Saturn were excellent. With these objects, the feeling of actually observing is enhanced, since the integration times are on the order of 1/500 second. This means real-time viewing, showing seeing effects and wind movement. It is very much like looking through the eyepiece.

The Dual-axis Platform I use with my 24-inch scope and the MallinCam has a nice two-speed slew in both RA and DEC. It would be a pain to have to go over to the scope and try and make the subtle adjustments necessary by shoving the tube around. But with the little cordless remote control

button fob, I can sit in my chair by the laptop and easily center the objects on the screen, or scan up and down the lunar terminator. The tracking of the platform is accurate and gives consistently good images with integration times of 7, 14, and 28 seconds. Some guiding would be of advantage with longer integration times. So far, though, the 7-second and 14-second times are more than enough for the brighter galaxies and nebulae.

This new type of observing has made it even more fun to get out under the stars. The skies at my home viewing site have been diminished over the years by creeping light pollution (sound familiar?) and even the views through a 24-inch had been getting more and more washed out. But viewing with the MallinCam has revitalized the night sky for me, and it is also proving to be an amazing teaching tool when I throw little star gatherings for neighbors and friends. Everyone who is treated to these images is truly stunned and amazed by the views this little camera offers.

Well, that's the account (the short version) of my astronomical journey: many years of viewing and amateur telescope making, culminating in a professional career designing and manufacturing Equatorial Platforms and large Aluminum Telescopes. At 65, I am still going strong, still enjoying the views, and still making the equipment.

Best regards and clear dark skies to all! ATT

Related Web sites

www.equatorialplatforms.com

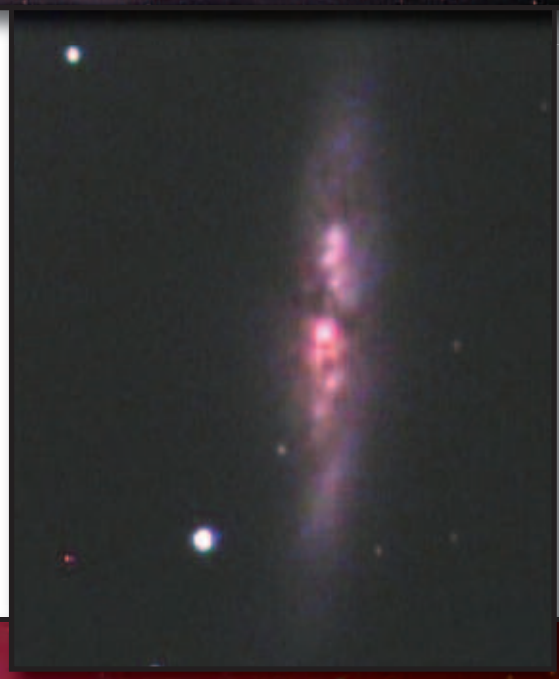
www.siderealtechnology.com

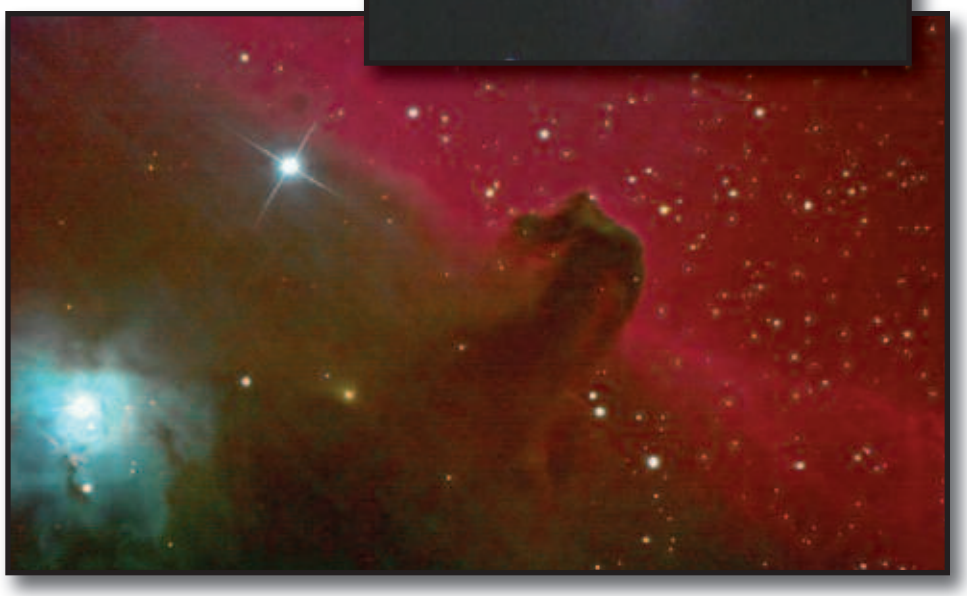
www.mallincam.tripod.com

www.waningmoonii.com

www.kennedy-optics.com

www.lightholderoptics.com





Pictured Top: M42 taken with a 16-inch f/5 Dob on a Dual-Axis Equatorial Platform. 9 minute exposure on 1000 ASA film. Hand guided with a separate guidescope taken by Tom.

Pictured Right: M82 from a 7-second exposure with a MallinCam Hyper Color camera with a 24-inch f/3.75 SpicaEyes Telescope on a Dual-Axis Equatorial Platform taken by Tom.

Pictured Below: Horsehead Nebula taken with a 20-inch Obsession on a Dual-Axis Equatorial Platform. This is a combination of 36 60-second autoguided exposures by Glenn Schaeffer.