

**DOWN HOME *Gumbo*
Astronomy from Chaos
Manor South!**

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Skywatch
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Uncle Rod Mollise's

Skywatch



Me and My Pal

Uncle Rod

I've told the story of my first look through a telescope and my own first telescope often enough, I reckon. That's natural; that's what sticks in our minds even as we get years and years on down the amateur astronomy road. Can I tell you about my second scope, though? It's the one that really mattered, that had the most to do with setting me on the strait and narrow to a lifetime of enjoyment and wonder. I'm not the only one who's loved and fondly remembers The Pal, either; this little classic of a scope, Edmund Scientific's 4.25-inch f/10 "Palomar Junior" Newtonian was how many, many space-crazy younguns got their start in the amateur astronomy in the 1950s and 1960s.

Before there was a Pal Junior, though, there was the Tasco 3-inch,

the comin' of which I've documented in some detail in [Stephanie's Telescope](#). I was the greenest of green novices at the time, sure, but it wasn't long before even I realized that something wasn't quite right with my Japanese wonder-scope. The Moon looked pretty good, good enough that I attempted some afocal pictures of her with my box camera. Stars and those deep sky objects I could see didn't look half bad neither. Oh, the stars were a little spikier and weirder-lookin than I'd expected, but I put that



down to my own inexperience. What tipped me off somethin' warn't quite right was the *planets*. As wet behind the ears as I was, I was still able to locate what I supposed must be Jupiter and Saturn and Venus. What did I see? No belts. No rings. No phases. What I saw was, as I've said more'n once, somethin' that looked more like a custard pie than a planet.

At first I supposed this must be *my* fault. I knew about collimation, and had attempted that fine and arcane art. I must have messed it up somehow. I spent hours tweaking, getting the Tasco *just right*—which wasn't really that hard. It had an OK primary cell and a surprisingly good secondary mount and spider. No dice. Custard pie still. I've often wondered about that little feller over the years. Was his primary really bad, or was it somethin' else? Maybe the little mirror was held too tightly in its cell by the clips? I hadn't known enough way back when to check that. In recent years, however, I've decided that, no, *it was just a punk little scope*. My Tasco Newton is long gone, and I've never run across that particular

model again, but it is very similar to its contemporaries sold under the moniker "Adams Celestial," and I have seen some o' them over the years and verified that their optics ain't nothin' to write home about either.

So where did that leave little Rod? Not overly happy, but happy *enough*. I still longed for belts and rings, but the scope did, as above, do a purty good job on the deep sky within the limitations of its tiny aperture, so I concentrated on that—not a bad thing, I reckon. No denyin', though, that I was, like every amateur then or now, soon lustin' after More Better Gooder. Me ol' Mum, a school librarian, had the kindness and foresight to order me a subscription to that little ol' rag from Cambridge M.A., *Sky and Telescope*, and that in short order edumacated me that my options extended way beyond Tasco and Gilbert. Soon, the folks' mailbox was burstin' with a brace of scope catalogs: Cave, Starliner, Optical Craftsmen, Criterion, Unitron, and, most of all, Edmund Scientific.

In this latter day, you newbies cain't imagine what a huge presence Edmund Scientific was in amateur astronomy in the 50s, 60s, and even into the 70s. Today, telescopes are a

sideline for both the original Edmund, which concentrates on sales to universities and industry, and the bought-out "consumer division," which mainly peddles science-oriented gimcracks. Back in the 60s, though, for many of us, Edmund *was* amateur astronomy. Like me, most of us amateurs, even those out o' short pants, couldn't afford the beautiful 4-inch Unitron Photo Equatorial or them hulkin' Cave Newts. We could, however, dream of Edmund Scientific's mighty SPACE CONQUERORS. These lovely white-finished scopes, which included a 4.25-inch, a 6-inch, and an amazing lookin' 8-inch were *still* dreams for most of us, mind you, but they were at least dreams with a tangible thread of hope runnin' through 'em.

Soon, Edmund's little (but thick) digest-sized [catalog](#) was my study-hall and lunchtime readin' matter of choice. Yeah, it was filled with gadgets and gimcracks aplenty, like today's Edmund. But there was some amazin' stuff even amongst the foolishness. In those less uptight days, you could, for example, order a little envelope full of [Trinitite](#), the baked glass sand resulting from ol' Oppie's

big party at Los Alamos back in '45. Most of all, though, there was an astronomy section, a big one.

Not only were there those lovely scopes, there were eyepieces, books, and accessories aplenty. Sam Brown's wonderful illos figured prominently. The little book just reeked amateur astronomy. Hell, I probably wore out three copies (Edmund kept sendin' new ones without complaint). Drool-soaked pages don't last long, you see. I liked lookin' at the accessories, of course, but what I stared at the hardest over the summer of '65 was **The Super Space Conqueror**. This majestic instrument was not just imposing-looking; a scan of the catalog blurb revealed it was a powerful performer, "Clearly shows you the Rings of Saturn, Jupiter's Moons, Mars, the Craters of the Moon, and all the wonders of the sky." Haysoos Christmas, this thing would even reveal stars, the catalog said, *down to 13th magnitude*. And it was equipped with a real equatorial mount, a finder scope, and—get this—a clock drive! Hotcha! **I was in**. Who could ask for more? The only trouble was how to get one.

Prominent in the advertisement were the numbers \$199.50. Which was a lot. Equivalent to about 1000 bucks in today's dwarf currency. Big Trouble in River City for li'l Rod. A quick back-o'-envelope calculation revealed I *might* be able to amass such a sum (mowin' lawns, birthday and Christmas cash, collectin' soda pop bottles) by the time I graduated high school.

How about Criterion, then? I had also received a catalog from that other giant of 1960s amateur scoppedom. Nope. Their highly regarded (including today) [RV6 Dynascope](#) was exactly five bucks cheaper than the Edmund SSC. What then? The next step down for both companies, a 4.25-inch Newtonian, might be doable...but...no...NO WAY. A six inch was the instrument for any self-respecting amateur. I knew that. Patrick Moore said so himself. I would *not* settle for a mere four. Not until fate landed a Palomar Junior in my lap, that is.

The funny thing about the little Edmund telescope all of us remember so fondly as the "Palomar Junior" is that the company never really called it that. In the catalogs it was always referred to as the "Deluxe Space

Conqueror" (as opposed to the SUPER Space Conqueror, natch) or as a "Palomar Type" telescope. "Palomar Junior" derived solely from the little shower-cap type aperture covers that shipped with the scope, which were indeed emblazoned with "Palomar Junior" in wonderful 1960s script and also adorned with an art-decoish star and Saturn. Whether that was what Edmund officially called the scope or not, the name stuck with us amateurs, and I've never heard anybody who owned one refer to it as anything else.

Other than a memorable name, though, what did the Pal Junior have to offer, according to the Edmund Bible? I was in favor of the Super, but I'd certainly devoted considerable time to studyin' the Deluxe's page as well. Optically, you got an f/10 (or thereabouts) spherical primary mirror. Finder? A 6 x 23mm in dual-ring mounts. The focuser, the Big E said, was a genu-wine **rack and pinion**. These components were installed in an aluminum tube painted, like all the Edmund Newts, a glowing, holy-looking, white. The mount was similar to that of the Super Space Conqueror but much

downsized and no drive was included (though an AC clock drive was optional). The mount featured setting circles and was perched on a metal pedestal rather than a tripod. In a fit of largess, not one but two eyepieces were standard, a 1-inch (25mm) Kellner and a ½-inch (12mm) Ramsden. There was a (gasp) achromatic Barlow, too. The included documentation was extensive and consisted of Sam Brown's *How to Use Your Telescope*, *The New Handbook of the Heavens*, and Edmund's Star and Satellite Path Finder (a cardboard planisphere).

I thought all this was rather ho-hum soundin' compared to the Super, but judgin' by the pictures in their respective catalogs, the Pal Junior was a step or two above the Criterion 4-inch, which was mounted on a rather spindly-lookin' tripod. The problem remained, however, as to where I'd get 200 bucks for a Super. Till one mornin' at breakfast my Old Man, AKA "The Chief Op" around our house, let slip that one of his buddies down to The Station (he was a broadcast engineer at a local TV station) *had a 6-inch Edmund*

telescope he might be willin' to sell cheap. Oh. My. God. I implored the OM to find out more. I was in an agony of anticipation till the afternoon a few days later when he roared into the driveway in his VW hatchback and pulled a long cardboard box from the back. Just as I was about to lose it, I noted the look on his face that spelled "Hold on there, little pard." Turned out the 6-inch Edmund was *not* a 6-inch Edmund. It was actually the Pal Junior 4-inch instead. Have you ever seen the Warner Brothers Cartoons where Elmer Fudd, in a fit of acute pique or disappointment, shrinks to an inch in height? That was me.

Notin' my disappointment, the OM gently allowed as how he knew this was not what I wanted, but that he'd told the owner we would give it a try, anyway. After all, he observed, this was something I might be able to afford with some help from him. I tried to continue to appear dejected, but couldn't quite keep up the front. There was a **telescope** in that box. An almost new and nearly unused telescope. As I relate on the *Stephanie's Telescope* page, the OM's co-worker had bought the Pal for his son, despite bein' well aware that what the

boy wanted for his birthday was a go-kart. Mummy stepped-in and demanded a go-kart for her sonny-boy with the result that the Pal had to find a new home.

Yep, almost new and looking *good* once we'd manhandled the GEM outa the VW and mounted the OTA on it. Impressive? Hell, to tell the truth, this was about the size I'd imagined a 6-inch would be. It was, frankly, a fair handful for li'l Rod to lug around, with a tube every bit as long as that of the average 6-incher, and a mount and pedestal that, combined with a big cast iron counterweight, seemed to weigh a ton. Yes, the Pal looked good: ever'thing was there, and there literally wasn't a mark on him. Then as now, however, only the night sky can pass a verdict on a telescope. There was a nice Moon on the wax on this June evening, and Saturn would even be on display if I could wait till the wee hours. There was no question about that; I was one pumped 12-year-old.

First light was more fun than frustratin' for once, not that there were not some irritations. Number one was that pedestal.

While I thought one would be better than a tripod stability-wise, I had not figured *transportin'* the thing into my equations. Yep, if I'd had a dollar for every time Mama hollered at me for bangin' one o' them damned legs into her furniture, I'd a-had a Unitron Photo Equatorial by Christmas. More serious when it came to observing was the fact that the Pal's OTA was held in its cradle on the GEM by a couple of bolts and wingnuts rather than tube rings. That meant the eyepiece wound up in some purty uncomfortable positions. While I was vaguely aware that the RA axis should be pointed north all the time, I resorted to movin' it to point in whichever direction yielded the most convenient eyepiece angle. No, you couldn't track objects with a single motion with the polar axis pointing away from north, but I don't think I really knew that was what an equatorial mount was 'sposed to do for you anyway.

Them was minor irritants, though. While the mantra, "just a 4-inch, just a 4-inch" continued to murmur in my head, that stopped abruptly once I got my Pal—I was already

beginning to think of it as "**my** Pal"—centered on a sweet young crescent Moon.



Man alive! **The craters!** I'd thought the Tasco did good, but this was oh-so-much better. Not only was the image brighter at the 90x the [Ramsden](#) delivered than it was at considerably lower power in the Tasco, it was noticeably sharper too, with features away from the terminator being much easier to see. It was clear the OM was suitably impressed as well. Early in the evening, I probably also turned the scope to the few DSOs I knew how to find at the time—M13 and M8, likely—and these must have been pretty good as well, but I don't remember that. I spent most of the night on the Moon. Until Saturn was finally high up enough in the East to fool with. The OM, god love him, hung in there with me till well after

midnight.

In once sense we was downright unlucky. In the summer of '66, the tilt of Saturn's rings was about what it is right now—just shy o' edge on. It would have been so nice to have had a first real look at a Saturn with wide-open hat-brim rings and a razor-thin Cassini's, but 'twas not to be. As it was, the Pal did what we wanted her to do, proved her mettle. The little ball of the planet was a sharp bb, and the rings a nice not-quite-line through the disk. There was a hint of banding on the planet, Titan stood out well, and there were what I thought might be—but I wasn't sure—a few additional Moons. "Daddy, I like it, / *like it a lot*. Can we get it?" The OM wasn't ready to talk finance at 2 o'clock in the dadgummed a.m., but said we'd talk it over at breakfast, if I could get up for breakfast, that was. As you can imagine, I had a hard time gettin' to sleep despite the late hour, and paged through [The New Handbook of the Heavens](#) under the covers with the aid of my trusty flashlight until at least three.

The next mornin', true to his word, the OM discussed Ways and Means. Seemed as the telescope's owner

was willin' to let it go at considerable discount off the \$79.50 in the catalog, but not *that* much of a discount. The Old Man figured the Pal's owner would want at least 60 dollars, a still-frightening sum for me. He also said, though, that he'd find a way to pay that off if I'd pay *him* off by foregoing at least part of my small weekly allowance, kickin'-in my lawn-mowin' money, and contributing whatever dollars Aunt Lulu and any other relatives sent with birthday and Christmas cards. Also, seein' as my birthday was right around the corner, I would have to agree that the Pal would **be** my birthday, party and all—though he reckoned Mama would still bake me a cake. Finally, he ruled that we ought to at least try to sell the Tasco (as if I would miss it). "Yes, Daddy, sure will, that's fine." We both knew I had a hard time savin' money, especially to pay off somethin' I already had in my hands (like that big chemistry set a year back), but somehow we both new this was different and that there would be No Problem.

I now had my telescope; it was time to start usin' it. Instead of moonin' over

scope catalogs, I'd better start studyin' object catalogs. While I'd wanted Jupiter and Saturn bad, now that I had them, it seemed I was actually more interested in the Messier objects represented by those fascinatin' pictures of galaxies, nebulae, and clusters in *The New Handbook* and that most wonderful little Golden Guide, *Stars*. I'd been forced to stay outside the Solar System for nearly two years by the Tasco, and it seemed that was where I really wanted to be anyway. Soon, I began to make a concerted effort to do the Ms, aided and abetted by a spankin' new copy of *Norton's Star Atlas* (Fifteenth Edition). I'd been able to finance that because ol' Aunt Lulu had been right generous that year, and the OM decided half could go for a scope payment and half for "Whatever the boy wants to do with it; it's his."

What was my deep sky voyagin' like back then? It was somewhat hit and miss. The 23mm finder on the Pal didn't make starhoppin' easy, and *Norton's*, despite what my buddies in the informal astronomy club we younguns founded that summer had told me, was not that hot either. Oh, it was a beautiful book (if antique-seeming), but even

ignorant little me was soon aware that a 6th magnitude atlas just does not have enough "guide stars" to make object-finding easy. Nevertheless, I began to knock 'em off one by one. Some were sweet--the M42s and M37s. Some were a little disappointing; I was never sure I was really seein' any stars in M13, maybe because I'd been told that required "at least a 6-inch." And some, like M101, were impossible.

Nevertheless, I kept pluggin' away, marking 'em off one by one on a paper scroll-like device I'd "invented." The OM had given me a discarded roll of teletype paper, and I'd written each Messier's vital statistics on a section of that paper till I had a long scroll listing all 110. Somethin' else the OM had tossed and I'd recovered from the trash without Mama's knowledge (you will *not* bring one more piece of junk into *my* house, young man) was a "calibration guide" for some kind some kind of electronic test gear. Maybe a surplus signal generator. Oh, he was big on war surplus electronics to Mama's horror, but my delight. This Thing consisted of two mounted rollers with cranks, I

wound my Messier scroll onto this and went to town. I'd observe M92 (or whatever), place a check and a short note on the scroll next to its name, and crank on to the next fuzzie. God how I wish I still had this Rube Goldberg Contraption!

As most of y'all know, Uncle Rod is a long time astrophotography dabbler. I've been tryin' to take images of the Solar System and the deep sky almost since the first moment I laid hands on the Tasco. I'd gotten some barely recognizable images of the Moon with the 3-inch. That is, you could tell, if'n you held your mouth just right, that they were photos of Earth's satellite, not a 1960s UFO or one o' them accursed custard pies--but just barely. I figured that I might be able to do better with my Pal, which was, after a year or two, now my beloved companion nearly every clear evenin'. To that end, I decided I needed a better *system*. With the alt-az Tasco, I'd simply set [my little box camera](#) up on a tripod next to the eyepiece, shot afocally, and hoped for the best. The two things I thought could improve my Moon Picture technique were

mounting the camera directly on the scope and, well, usin' a better camera.

The mounting problem was solved by a gadget Edmund sold that suspended a camera over the eyepiece via a bracket that mounted into four pre-drilled holes in the OTA (the OK but somewhat rickety focuser didn't have a lock and couldn't have supported anything but the lightest camera). This doo-dad, which sold for \$9.95, also included a small screen for Solar projection and, I thought, was therefore a Good Value. As soon as the scope payments ceased, I glommed onto one (with me ol' Mum *still* baffled that I *still* wouldn't rather have a slot car). The better camera problem depended on my OM. In addition to ham radio, he had an at least off-and-on interest in photography, and had been able to accumulate some purty fancy (used) cameras over the years, including an Exacta single lens reflex I much admired. Even the least of his stable, a Retina, would have been far better than my plastic 620 film Argus twin lens reflex (which, amazingly, survives in near mint condition to this day). I knew good and well he would not let me borrow one of his cameras—I freely admitted then and admit

now that that would have led to inevitable disaster. The secret was to get him interested in taking pictures of the Moon himself.



That turned out not to be as hard as I'd expected. I showed him a few of my humble prints made, I confessed, by borrowing his enlarger and print trays when he'd been on transmitter duty at night. Far from being miffed at that, he was intrigued, impressed even, and said he thought he might like to try his hand at the Moon too if I didn't mind. Mission Accomplished. First thing we discovered was that the heavy Exacta easily overcame the little Pal's dec lock. In two shakes, however, the OM had cobbled together a tube counterweight out of some surplus aircraft parts he had squirreled away. The

pictures he and I obtained were not perfect. The vibration induced by firing the Exacta's shutter was like the recoil of a .50 cal Ma Deuce. Oh, we tried the "hat trick," cable releases, and other work-arounds, but with minimal improvement. Still, our results were darned respectable. The one shown here is actually from one of our less successful evenings.

The real value of those nights with the OM and his Exacta turned out not to have a damned thing to do with the resulting photos, which were never good enough to grace the pages of *Sky and Telescope*, even in those simpler times (but which, nevertheless, mightily impressed my teenage amateur contemporaries). No, it was not the pictures, but the memories that developed. In just a few years, as my life began to change in ever accelerating fashion, as teen years melted into young adult years, I began to treasure my recollections of the nights the OM and I spent awash in Luna's silv'ry glow. I don't know why I was surprised, but I was, when I became aware the OM did too, at least as much as I did. Till the day he

died, way too soon at the end of the 1980s, he'd frequently mention "Those freezing nights Rod dragged me out to take his Moon Pictures." The twinkle in his eye showed he wasn't serious about the draggin' or the cold (in Possum Swamp?), and, like me, would have loved to have relived those years.

When the years begin to come thick and fast with high school and college graduations, change piles upon change, and some of the things of youth are inevitably forgotten or set aside. I'm proud to say my Pal never was. Oh, even before I was out of high school I had More Better Gooder, but I still found uses for the Pal, once in a while, anyhow. In fact, I didn't stop usin' the li'l guy till I left for the USAF.

I was surprised to discover, when I returned to the Swamp totin' a C8, that one of the acquaintances I found I most wanted to renew was with my Pal. Unfortunately, the intervening decade or so had not been overly kind. In want of space, Mama had exiled him to the carport with its damp and bugs. It looked as if the OM had tried to keep him covered, but the mirror's coating was in a sad, sad state. There were patches on the small

primary where there *was* no coating. Maybe a little bit guiltily, he had decided to repaint the now-weathered tube and mount. He didn't do a bad job on the tube, but the mount was now a weird shade of electric blue that nearly obscured the formerly lovely gray-crackle paint finish. I felt like that space voyager in a *Twilight Zone* episode who returns home to find that, in accordance with Mr. Einstein's rules, his best friend has aged to senility while he has remained young. I was a little P.O.ed, wishin' the OM had just left my Pal alone, but I had a C8, and there was a lot of other stuff to occupy me—like findin' a job. I cleaned up my Pal the best I could and stored him until the time I could give him further attention.

Which turned out not to be for nearly eight years. Driven by nostalgia, I guess, one day I pulled out the Pal's little primary, examined it, and, determining that it was fine except for its abused aluminum, sent it off for a new coating. When it returned, I immediately reinstalled it, and then, finally, my Pal and I were back out under the stars together after nearly 18

years. What did I think? I was *impressed* by the images almost in spite of myself. They weren't just as good as I remembered; they were better. Two decades had made me a much more capable deep sky observer, and I was seeing things with the scope I never saw back in The Day. What *didn't* impress me? The mount. It was still heavy, every bit as heavy as I remembered, but much **shakier** than I recalled. And that finder? I'd suffered with *that*? Which might lead you to believe I soon deposited my Pal back in the U-Storit and moved on. Not hardly. The Pal was to go on to gain at least a small measure of fame late in life.

Not long after the scope's "second first light," I conceived of a project, a series of columns for my club newsletter demonstratin' what could be observed from light polluted urban and suburban sites with minimal optical aid, a series I called "From City Lights to Deep Space." The scope I used for a considerable amount of the observin' I did for these columns was, you guessed it, my Pal. I did replace his focuser with a

(slightly) better one from Novak and the tiny finder with a Telrad (I carefully preserved both original items), but that was it. I had a ball runnin' the Messier again with my hallowed Palomar Junior, my readers loved the columns, and, eight more years later, the series evolved into an honest-to-god book, my [*Urban Astronomer's Guide*](#). If telescopes can feel anything (and I think they sometimes can) I believe my Pal is happy in his retirement, basking in a little glory. And I also hope and sometimes believe that somewhere out in the Ether the OM is smilin' too.

In the Footsteps of Galileo and Messier

Wayne Wooten

400 years ago, in 1608, the Dutch spectacle maker Hans Lippershey accidentally put together a long focal length convex lens in front of a shorter focal length concave lens and saw a magnified, erect image of distant ships in the harbor. Realizing the obvious military applications of his optic tube, Lippershey sold the patent to the Dutch Navy. But word spread throughout Europe, and by 1609, Galileo Galilei of Italy

was building his own early versions of the spyglass and turning them upward to discover the craters and mare of the Moon, sunspots crossing the face of the rotating Sun, four moons orbiting Jupiter, and the entire phase cycle of Venus, proving she revolved completely around the Sun; all supported the Copernican model and helped its eventual acceptance.

This earliest refractor used only simple lenses, which act as prisms and produce a lot of color distortion, or chromatic aberration. Also while the negative eyepiece does give an erect image, the field of view is tiny, less than 15 degrees. You get the impression of "tunnel vision" when using the scope with this eyepiece.

Figure 1 shows the optics needed to build both of these historic telescopes. Optics are from Surplus Shed, and available online at www.SurplusShed.com. Parts for Galileo Replica are (4) 38x300mm double convex lens, item L1906D, \$1.25@ for the objective, and (5) 26 x -32mm double concave lens, item L 5163, \$4.00, for his negative eyepiece.



Figure 1

Figure 2 shows the PVC tubing, available at any hardware store, cut and ready to assemble into a working scope in less than half an hour. The main tube for Galileo's scope (1) is 1.25" x 9.5" long, with a 1/4x20 tap in the middle for mounting on a tripod (highly recommended, due to narrow field of view). The focuser is (4) 1" x 5" PVC, and the eyepiece holder (5) is a 1" PVC coupling, to hold the concave eyepiece lens. The objective lens is held in place by a 1.25" x .25" retainer ring, with a slot cut across it for compression, which slides inside the dew cap (3), a 1.25" PVC coupling. This ring is needed to hold and center the 38mm thin objective lens when the main tube is pushed up inside the dew cap. Before the optics are finally assembled, paint the inside of the dew cap, front portion of main tube,

and front of focusing tube flat black to cut down on internal reflections. Do not paint areas involved in focusing the drawtube, however. Dry paint makes focusing with the taped bushing difficult.

Figure 3 shows how 2" masking tape is used as a bushing to make the drawtube fit snugly but still allow easy focus travel. Masking tape allows you to custom fit this to your own preference. It's always better to put on too much tape, then gradually unwind a little at a time to your desired fit. Not so loose it could slide out accidentally, of course.

In this configuration (the scope with the wood grain Contact Paper covered tube

in Figure 4), we use the simple convex lens, 38mm diameter and 300 mm focal length, as the objective lens at the top of the tube; secure it in place by pushing the dew cap over it. Now for the eyepiece, use a round of tape to fit the negative lens in the 1" bushing, and slip it on the end of the focuser. Expect to push the drawtube in most of the way to reach focus; the erect image is about 10X. When pointed at the moon, you will see larger craters and mare, just as Galileo did. The moons of Jupiter can also be spotted. It is best to mount the scope on a photo tripod (1/4"x20 mounting hole tapped in tube), since the narrow field of view makes it hard

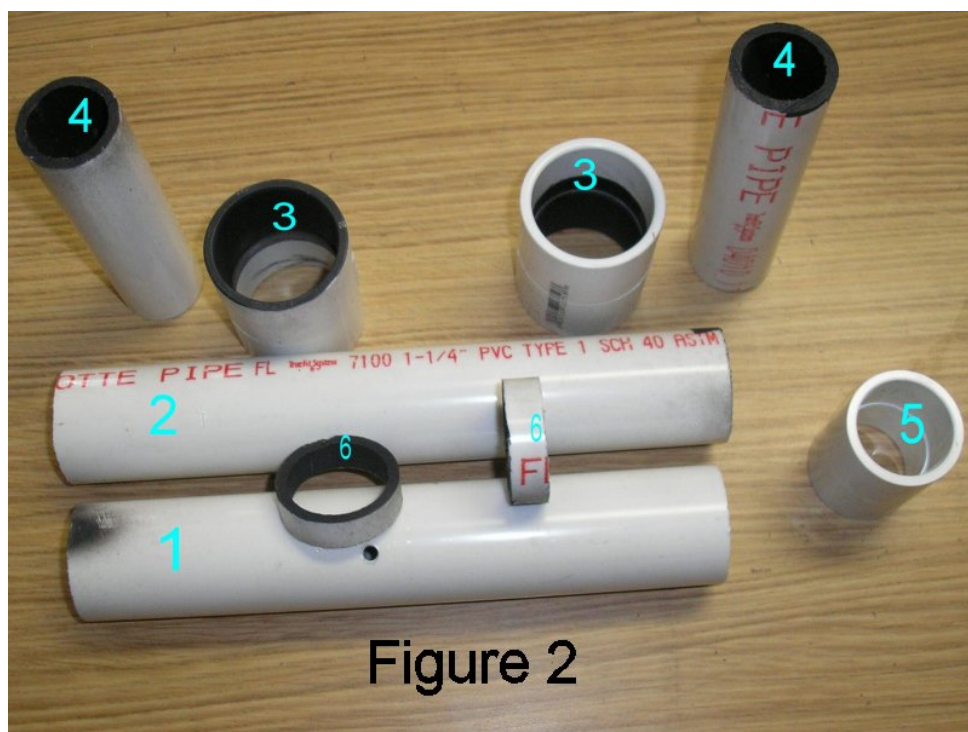


Figure 2

Use 2" masking tape to give snug but easy focusing for the eyepiece drawtube.

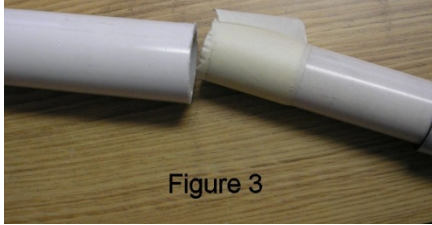


Figure 3

to find objects in the sky, even at this fairly low power. Makes you admire Galileo for finding as much as he did, considering the limitations of this optical design.

Galileo's scope did not have the resolution to reveal the true nature of Saturn's rings. For that, a better eyepiece was needed. Christaan Huygens in 1660 invented this double lens design. In Figure 1, it is (2) marked H 25mm in your set of eyepieces. Substituting this eyepiece gives about the same magnification as before, but a much flatter, broader field of view. Figure 5 shows how it can be fitted into the second drawtube. It is item L 1801, and costs \$3.75 from Surplus Shed.

You will also note the Huygens eyepiece has a positive focal length, meaning the eyepiece is placed behind the focal point of the objective, so the image is inverted as

you view it. In binoculars, prisms re-erect the image for terrestrial viewing, but as some light is lost and image distortions produced, astronomers don't use these prisms in their scopes.

Isaac Newton was, like other early observers, frustrated by the color distortion in early refractors. He noted that mirrors reflect all colors the same way, so invented the reflecting telescope to get better images without the colorful fringes. But about 1758 the British

correct", and when this thicker 38mm, 333mm objective is compared to the simple lens, the performance is much better, even with the early negative eyepiece. In figure 1, this is lens (3), and is item L4696, and at \$7.00, is the most expensive item in this project. With a longer 333 mm focal length, notice a slight increase in magnification. Note also that its main tube (2) in figure 2 is a half inch longer than in the Galileo

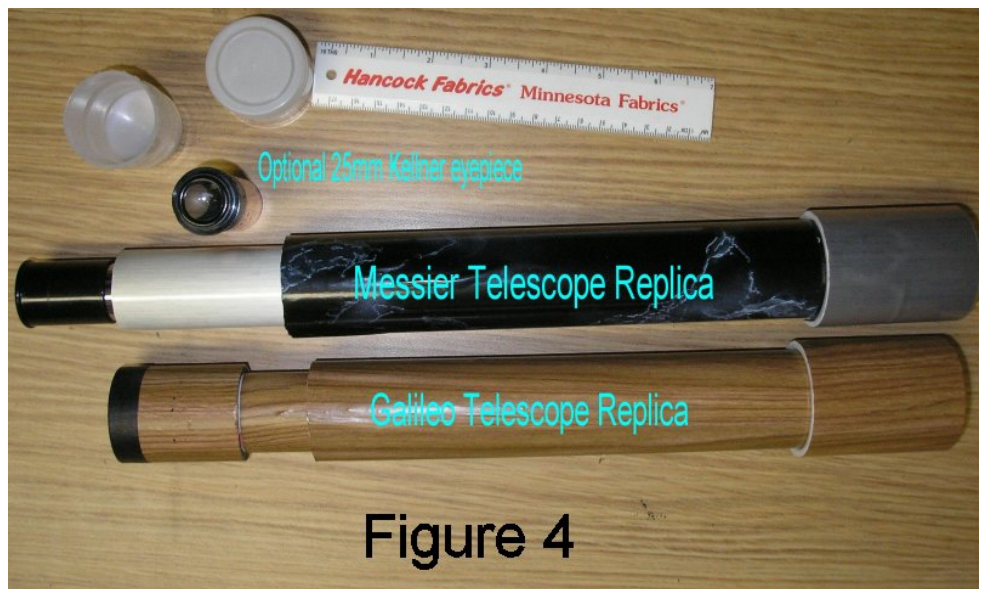


Figure 4

optician John Dolland, after much experimentation with different types of glass, realized a combination of lenses made of crown and flint glass could get the red and blue rays focusing much closer.

The metallic tube uses this lens doublet. It is achromatic, or "color

kit. When used with the 25mm Huygens, you have a close approximation of the refractor used by Charles Messier during the time of the American Revolution to discover comets (and his 110 famous deep sky objects), giving about 13X, a four degree field of view, and objects about 40X, or four

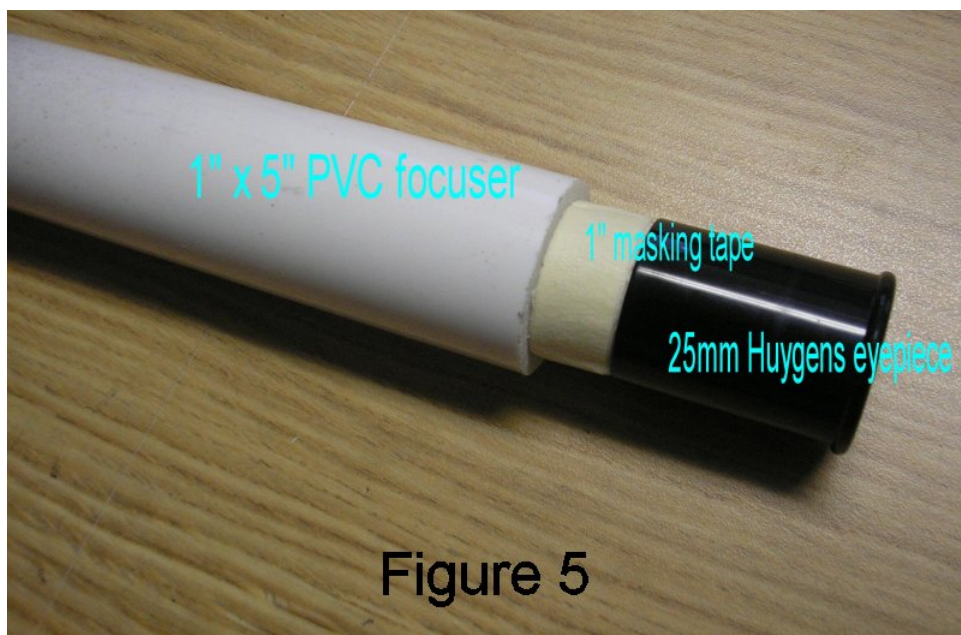


Figure 5

magnitudes, fainter than the eye alone can see.

The next major advance would be in eyepiece design. Huygens design still had some chromatic aberration, but if achromatic eye lenses were substituted, image quality and field of view could be greatly enhanced. In 1849 Carl Kellner introduced the first achromatic eyepiece. The one shown has a focal length of about 25mm, comparable to the Huygens, but has a field of view almost twice that of the Huygens, and over four times greater than Galileo's spyglass. It is (1) in figure 1, and was made from

surplus binocular eyepiece. Draco sells them for \$15.00, but they are optional.

All these eyepieces are the older .965" barrel format for cost reasons. If you want to adapt them to 1.25" barrels, you can provide a 1" bushing extension, but it may not focus with both scopes.

To top it off, Draco Productions has a 21st century 1.5" Baader solar filter (item MB-1) for sunspot viewing for only \$4.00. Solar filter ordering info is found at www.dracoproductions.com, and instructions on how to fit it to your scope at <http://www.dracoproductions.net/endcap2.html>. With the Messier scope, you can easily spot and track spots no bigger than our moon, a vast improvement in

resolution and safety over Galileo's early observations. Hope you find these scopes fun to build and use.

Rebirth of a Legend

Paul Cezanne

I just bought a new scope, well, not really new, new for me. The telescope is actually almost as old as I am. It is an Edmund Scientific 6" reflector, the **Super Space Conqueror**, as it was called in the catalogs back then. (This scan is from a 1968 catalog.)



I'm pretty sure my scope is from 1963, it came with a

typed sheet from the original owner showing the elongations of Mercury and Venus, as well as the oppositions of Mars, Jupiter and Saturn. The December 18, 1963 elongation of Mercury is the oldest date on the list.

Now let that last paragraph sink in for a bit. I said "*I have a typed sheet.*" When was the last time you used a typewriter? I can just see the original owner at the library, copying the data from an ephemeris, and then typing them up at home. It is hard to remember a time when information was so precious, so hard to come by. You're reading this on a blog, or reprinted in a newsletter which will probably be delivered by email. Yet L. M. Kazarian of Providence, Rhode Island, had to get himself to an ephemeris and then use a typewriter to preserve it.

But, onto the telescope! As I said above, it is a 6" reflector. The optics were provided by UPCO, [the same company that provided the mirrors for the venerable Criterion](#)

[RV-6](#). The tube is mounted on a GEM and pier that seems to weigh 200lbs, but



is really only 44.

The tiny finderscope and clock drive are present, but the clock drive isn't working, the wires are cut off short. Steve Forbes, of [Trapezium Telescopes](#), tells me that this is an easy repair and he may even be able to get it to run on 12v for me.

There is also a box of eyepieces, including a 25mm Kellner and two Ramsden eyepieces with focal lengths of 1/2" and 1/4". All are 1.25" eyepieces. An achromatic

barlow is also included but I'm not sure all the spacers are intact. The lenses slide freely in the tube, and that can't be right.

4 years later, a few days after January 17, 1967, another package from Edmund arrived at the Kazarian household. In a little box bearing a whole \$0.12 of postage were two Orthoscopic eyepieces, a 6mm and a 12.5mm.

The OTA is a white metal tube, with a 4 vane spider with a collimatable secondary. The rack and pinion focuser is fairly crude by today's standards, with a T cut into the drawtube to help provide a friction fit for eyepieces.

The OTA is attached to a non-rotating cradle with 2 wing-nuts. There are 3 feet on the short pier, also held on by 3 wingnuts.

I was quite looking forward to seeing how the scope worked. It wasn't my first non-goto scope, my Swift refractor was, but this one will be the first non-goto scope I'll really use. The Swift stayed in the box since I got my Burgess

scope not too long after getting the Swift!

First Light (for me)...

One evening, I headed out to to do some public astronomy with the Burgess. Yeah, pretty strange with a brand new scope at home, but the tourist season is almost over and I wanted to get another night of that in.

Anyway, I got to the site and found the parking lot was full. Now there are many other parking lots in town, and no, I won't tell you where the good, *secret*, ones are, but when you have 3 trips worth of gear, you can only choose the close lot.

I turned around and headed home. I had already setup the Edmund before I left, knowing that I would just have to grab a few peeks before heading to bed. I took the plastic bag off the business end (memo to myself: buy a pair of shower caps), plopped a 40mm Plossl into the focuser and aimed at the Double Cluster. I had just been there with binoculars and I knew I'd be able to find it.

I had wanted to do Jupiter, but with the short

pier it was hidden by my light blocking shields.

So I'm down on my knees--did I mention the pier is short?--trying to see through the soda straw finderscope and, dang, I can barely see anything. I can see the Double Cluster with my naked eye but I can't find it in the 23mm Edmund finderscope! After what seemed like eternity I gave up and headed over to M31. I somehow hit that very quickly.

This was it. First Light.

Well, it was much better than I remember from the Celestron C8, and I could see M110, so it was better than the binoculars, but you know, I didn't have the Burgess set up but I know the image in the Burgess was better, much better, actually, M32 was clearly visible in the Burgess. However, that was another night so the sky conditions could have been better.

I looked a lot more, trying to look for subtle details that would wow me. But frankly, I wasn't impressed. Don't get me wrong, the image was great, but not as good as the Burgess. And it was **work** getting the object in the view. I head down and bit and put a nearby bright star in the center of the

eyepiece. I figured I should align the finderscope.

Well, the star was right in the middle! But, the stars, as they were, were blurry! I need to focus the finderscope. I got the red flashlight on it but couldn't see an obvious way to rotate or push or pull something so I figured I just wing it for tonight.

I went back to the Double Cluster and found that fine after a few minutes of searching. I looked at this a bit, then switched to a 30mm Plossl. I found the larger image more pleasing and both of them were still nicely framed. Stars were pinpoint; that was nice to see. I could make out serious detail in the center of the clusters.

I took part of the light shield down and found Jupiter after a ton of difficulty. The view was very disappointing but I think I can attribute that to the seeing, it seemed to be shimmering, and that wouldn't have been the scope's fault. I gave up and headed up to M13

I found that pretty quickly. I think I just got lucky. I certainly didn't find any of the pointer stars in the finderscope. Basically I just

pointed in the right area and moved it all around.

M13 look pretty nice, well formed and framed. I took the 30mm out and put in a [9mm Burgess Planetary](#) eyepiece in the focuser.



I moved it around until it was centered and then refocused. It looked a lot better; I could certainly see some detail in the middle. But, alas, it was slowly slipping out of the field of view!

Ah, my first non-tracking scope experience. So which axis do I lock and which axis do I turn? Intellectually I know what the mount needs to do, but I never had to pay attention to that before. I found the shaft that had the big gear on it. This shaft must be the Right Ascension axis and that is the one I needed to turn. I locked the other axis and found that it was very easy to track, a little nudge was all it took. No worries about moving it the proper amount in x and y, GEMs do have their

advantages!

So now I wanted to see a bit more, so I headed inside and found the book I bought that afternoon in Hyannis, Sky and Telescope's *Pocket Sky Atlas*, 80 single page star charts. I figured I needed this since I was moving away from the Goto land.

I figured I'd find the Double Double in Lyra. Vega was easy to locate. Hey look, diffraction spikes! I sure never saw those before in a scope. I never did find the Double Double; it turned out I was reading the chart incorrectly. I quickly gave up and headed down to M57. I was able, to star-hop to Sulafat through the 30mm eyepiece. And, sure enough, M57 was there! I put the 9mm back in and, well, I was impressed now. The ring was looking sweet indeed.

Feeling cocky I headed over to Deneb and tried to find the North America Nebula. Yeah, right. I actually thought I saw a slightly brighter area in what could have been the right spot. I was tired so it was hard to match the star patterns on the chart with the star patterns in the eyepiece. This is a skill I'll certainly need to develop.

Next it was back to M31 and the Double Cluster, now that they were higher in the sky. I found them both with ease. Maybe I was getting used to this manual aiming.

So then I was off to Triangulum, which had now risen above the trees and then some. I didn't use the star charts; I could remember where it was based on my finding it a few nights previously. And, sure enough, there it was. Diane, my neighbor, came over about now. She often looks through the scopes with me and she was anxious to try out the new one. Let's just say that she was less than impressed with M33! So after showing her the Double Cluster with the naked eye, I showed her the Double Cluster in the Edmund. She had seen it with the Burgess before and she pronounced the old scope as a good scope.

That's where I ended my night. It took about 3 hours, and I learned a whole lot about how manual scopes work and how astronomers did it when Kennedy was still president. If you had come up to me in the first hour and offered me what I paid for the Space Conqueror, I would have helped load it

into your car. It was extremely frustrating. But by midnight, **no sir**, I wouldn't part with this one. My "new" scope is a keeper.

Mount Jennings Observatory

Don Gallian

Choosing a name for a personal observatory can certainly be a daunting task. However, I've known for over 20 years the

remember that the first two were held in Racine, Wisconsin in the early 1980's. The second became affectionately known as "Mudfest" because it rained almost non-stop during the event.

Several of us had planned a weeklong observing trip immediately following Astrofest #2 since the skies began clearing Sunday morning thanks to 40-mph winds. We headed west to Apple River Canyon State Park in northwestern Illinois, stopping only for breakfast

the first night. Next day it began raining and didn't stop.

So there we were in the rain. Again. Luckily, one of the guys had a pop-up camper and graciously invited everyone in to dry out. I remembered that I had brought along some old-time radio shows on tape so we decided to listen to one. We chose the famous 1938 broadcast *War of the Worlds*. During the first few minutes, the announcer interrupts the program stating that "Professor Farrell of the Mount Jennings Observatory, Chicago, Illinois reports observing several explosions of incandescent gas, occurring at regular intervals on the planet Mars." The thought of an observatory on a mountain in Chicago was just too much for us poor sopping wet astronomers to handle! We couldn't stop laughing!

From then on, anywhere we observed became "Mount Jennings Observatory." Later, I even designed a Mount Jennings "Staff Astronomer" badge. These highly coveted symbols of observing prowess were duly presented to all who came out to observe with us. We



name I'd use if I was ever lucky enough to have one...

Some of you may be familiar with the star party held in the Midwest named Astrofest. But only the more 'seasoned' may

in Janesville, Wisconsin - at Pizza Hut.

By the time we arrived, the sky was perfectly clear. We set up our telescopes and had one of our best nights of observing ever. That was

eventually had T-shirts and sweatshirts printed too.

Perhaps the most famous (honorary) badge recipient was Walter Scott Houston. As some of you might recall, Scotty would begin his star party talks with a question. One year at the Texas Star Party, he asked if anyone knew where Mount Jennings Observatory was. Much to his surprise, someone raised their hand and gave the correct answer!

Some years after our rainy trip, a woman who was camping nearby at Apple River saw our telescopes set up and came over to ask what we were doing. We explained that we were amateur astronomers and also told



her the Mount Jennings story. She ultimately developed an interest in astronomy and wound up attending the Texas Star Party the year Scotty was the speaker!

When Scott and Don from Backyard Observatories

built a roll-off roof observatory for me in October of 2007, the choice of name was obvious!

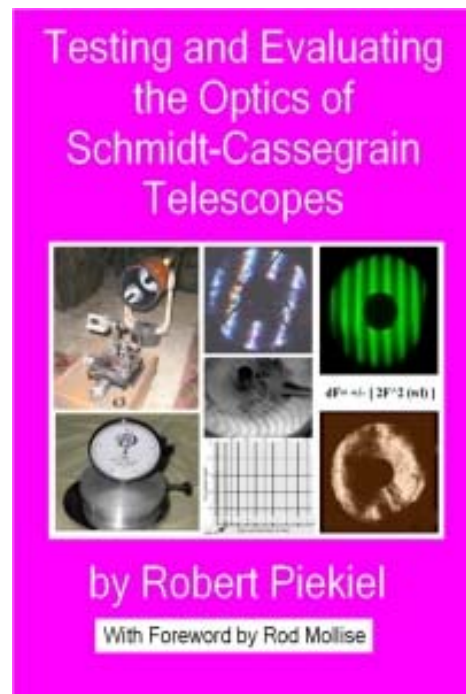
Bob's New Book: *Testing and Evaluating the Optics of SCTs*

Robert Piekieł

My new book "Testing and Evaluating the Optics of SCTs" shows amateurs how to perform simple but effective optical tests on their telescopes using modest and inexpensive equipment. Unlike a Newtonian, which can be easily tested at focus on a bench, an SCT is an "open-ended" design where a beam of light sent up the scope from the eyepiece comes out the front and just keeps going, never to return back to the focal plane. Therefore, some different test methods must be used to assess optical quality. (These methods can also be used on a variety of other telescope designs, including the standard Newtonian!)

The book covers several basic techniques (and a couple you've probably never heard about before) that can be done on real stars or artificial stars, plus more in-depth chapters

describing how to test each optical component separately if problems are found. There are even chapters describing hand-figuring of secondary mirrors for the more ambitious ATM. NO COMPLEX MATH IS USED IN THIS BOOK.



You don't need an optics degree or a million-dollar lab to perform these tests. All of the equipment needed is described in detail and the book is profusely illustrated with REAL PHOTOS of REAL TEST IMAGES. No computer-generated images are used. There's even a chapter with about two dozen tests of commercial SCTs to show readers what results you might get with your own

scopes, and what they reveal.

Price is \$29.95 + \$3.00 postage in CONUS. Overseas shipping is between \$9 and \$12. Contact me directly at piekielrl@yahoo.com to order.

Uncle Rod Note: I've read Bob's new book cover to cover a couple of times, and can testify that it's even more valuable for SCT-totin' amateurs than his previous Celestron: The Early Years. If you love and use SCTs and want to learn how to test and evaluate them—or just get a better idea how they work—this is the book for you!

Giving Back

Barbara Syriac

I have been a member of my local astronomy club, the Boise Astronomical Society, for a number of years and I have been the club treasurer for the past five. I would like to talk to you briefly about *giving back* to the clubs that give *you* so much. Many of us think that if we just pay our dues and show up once in a while, our obligation to our organizations is

completed. Not true! Our clubs give us *so much*. Presentations, loaner equipment, star parties, community outreach programs, alerts of upcoming events, advice on everything from equipment to finding a target, not to mention the wonderful people who become our true friends. I could go on and on, but you already know how much these organizations give and mean to those of us in the astronomical world.

As a club officer, I have really enjoyed helping make decisions for the good of the club. Our club has a wide variety of board members and that gives us many different perspectives for most of our decisions. Each member has an equal voice when it comes to discussion. Each one of us has specific duties, which enables the club as a whole to get a lot of good work done, with a limited amount of effort on the part of each individual. As treasurer, I keep track of the money using a simple financial computer program; I pay some bills and generate the financial reports each month for our board meetings by clicking a button that says "print this report." I spend an average of about 2 hours per month on my treasurer duties. Some months are

busier than others, of course, as we host a big annual star party and I have the registration money to track, and, of course, there's the beginning of each year with dues renewals. It's work, but I have the satisfaction of knowing our club would not be able to function without my help.

We have done some really great things in the past few years. I am proud we were able to purchase a new Stellacam for our local observatory, which has helped bring the world of astronomy to so many young people. We do outreach programs with our local Discovery Center using inflatable planetariums, solar system walks, and classroom presentations. I have really loved being a part of all these great things.

Now is the time when most groups are looking for new officers to help keep the club active and functional. I would like to challenge every club member out there to **give back** to the club that has given you so much. Please consider volunteering your time as a club officer to help keep your club alive and keep it doing great things for your members and your

community. The work you do will be so rewarding; especially considering the fact that it doesn't take a lot of time or effort on your part to help out.

ADAM'S DOB:

A QUARTER OF A CENTURY
SAW THE COMMERCIAL
TELESCOPE INDUSTRY
BLOSSOM WHILE A BOY
BECAME A MAN

Jerry Chern

The heavens peeked back at young Adam Chern as he looked through the long tube. My eight-year-old son had never used a telescope before, so he struggled to steady his eye on the tiny point of light. The cold and light pollution were little match for our curious eyes back in the winter of 1974 in Lincolnwood, Illinois, a tiny village bordering Chicago. His heavy down jacket brushed past the light-weight equatorial mount causing the 60-millimeter refractor to veer off target. Even the more controlled glances through the "454-power" Jason-Empire were blurry enough to discourage inquisitive minds, young and old. At much lower magnification, however, the views were good enough to keep us out there in the chilly night.

We were innocents whose thoughts never wandered toward better equipment.

The 1970's were not particularly friendly to the entry-level astronomy buff. Commercial telescopes of good quality were expensive, their access limited to the dedicated and well-heeled. At the other extreme stood the department store telescopes with poor optics and even poorer introductory literature. Only a very motivated student of astronomy would find anything beyond naked-eye objects to explore. So it was no more than once or twice a year that Adam, his younger brothers, Kevin and Eric and I lifted the telescope from its handsome spot as a living-room furnishing and actually used it to behold the wonders of the night sky. Sadly for my sons, my introductions to observing inspired no more passion than just another theme park tram ride past a really neat exhibit. Momentary and fleeting.

Adam was always a good audience for the miracles of creation. After his studies at the University of Wisconsin, he fell in love with the Madison area and became a permanent resident. Now 34, his work allows him to choose his schedules and

indulge his passions. Nothing stands in the way of regular visits to the nature preserves near and far with long-time partner, Dawn Hinebaugh, a wildlife ecologist, and their dogs, Montana and Cedar. It was through their mutual interest in bird-watching that Adam and Dawn originally met. Although I had always been the "birder" in the family, they are now my "go-to-guys" when I have a bird question. Now Adam and Dawn's property is a haven for birds with a section dedicated as a carefully-planned natural prairie.

Meanwhile, on the astronomy front, my interest outpaced Adam's as I joined the general population as an armchair observer of such once-in-a-lifetime events as the appearance of Halley's Comet in 1986 and the Shoemaker-Levy 9 Comet's bombardment of Jupiter in 1994. Even though I could videotape the comet scars on Jupiter through the old 60-millimeter refractor, I felt that I was participating from the sidelines as I heard about the wonderful views through "backyard telescopes". Then, in March of 1997, like a multitude of others, I was moved to the next level by

Comet Hale-Bopp. Although exciting as a naked-eye object and through binoculars, my blurry photos with a tripod-mounted camera shouted, "Get yourself a clock drive". This is a motorized device which allows the camera to track the ever-rising sky, usually as part of a telescope. I now had a good deal of learning to do.



The process of getting educated about the optical system appropriate for me culminated in late-August of '97. Purchasing a used 8" Schmidt-Cassegrain telescope with a right-ascension motor, I lucked out on my first night. With near-perfect seeing conditions and Jupiter just past opposition¹, a Barlow-assisted² 412 power resolved the

Galilean moons³ into tiny disks! The hook was permanently set.

Never one to contain my enthusiasm, I regularly shared my excitement with Adam by phone from my Buffalo Grove, Illinois home. His own appreciation of the night sky had been enhanced during his many camping experiences in wilderness areas such as the mountains of Montana, often many miles from even the nearest campers. There the idyllic black sky is an ongoing treasure, sixth-magnitude⁴ objects a given. He had become familiar with the awe of the unpolluted sky as it had appeared centuries earlier. In Madison, he is able to see the Milky Way from his back yard, a treat I can't hope for from my Buffalo Grove lawn. It was impossible for me to gauge the true depth of Adam's interest until one day in 1998. My wife, Karen, had asked Adam his preference regarding a gift for a special occasion. We both were warmed and surprised by his response. He had dreamed of one day owning the telescope he had looked through as a child. Karen and I agreed that such a gift would be fulfilling for us all. The old refractor, still in pristine condition in our basement, was polished up and presented to him.

As Adam and I compared notes on observing during the following months, I admired his results with such limited gear, but sensed some discouragement. I feared that his wonderful spark of interest might die at the hands of a limited optical system.

After a time, Adam acknowledged that his commitment to astronomy had indeed surpassed the capabilities of his equipment. We discussed the various optical systems and how individualized and personal one's choice of gear can be (quality, cost, aperture⁵, portability, accessories, etc.). In September, 1999 we attended Astrofest in Bourbonnais, Illinois, an annual event sponsored by the Chicago Astronomical Society. There, among over eleven hundred attendees, we were able to see many of the products we had read about in magazines, look through a number of scopes, ask questions and learn a great deal. Adam came away from the experience with a wealth of ideas and impressions as well as a definite bias toward a Dobsonian-mounted Newtonian reflector⁶. In the months that followed, the flurry of activity

centered around planning a budget and exploring the "Dob" market.

It all came together in January, 2000. I read about an 8-inch Dobsonian that had gotten great reviews. Coincidentally, Adam saw it at the same time and called to tell me about it. Masking my excitement, I asked, "Are you sure that's what you want?" He was sure! The decision was made...that is, everything but accessories. He had a firm budget. Then, to my surprise, he threw me the ball, *carte blanche*. "You can decide what I'll need". Wow! I felt like a kid in a candy store. This was a big responsibility, however, since I wanted this package to be user-friendly, well-rounded and thoughtful of future possibilities.

We had originally made a wish-list of features we would like to see in a Dobsonian. This scope had most of them, but lacked the first on the list: Can the optical tube rotate? This would allow for the most comfortable viewing position at all times. Not really necessary, but a nice convenience. I instinctively knew that

this shouldn't be too difficult to accomplish. After all, our whole family had been "Chern-rigging" our environment to suit our comfort for decades, so the potential for disaster was minimal. And so it was with a good measure of confidence that Adam agreed to have the scope shipped directly to me for assembly and any modifications I might make.

When the telescope arrived, I was ready with a number of upgrades and accessories to enhance the observing experience. Right out of the box, however, this little scope broadsided me with ideas for improvements until they totaled eleven. Certainly, few people would go so far as upholstering the tube-rotation harness as I did, but every other modification was done to achieve either optimum safety, protection of the optical tube or improved and easier viewing. After three weeks of filing, cutting, gluing and often backtracking to correct mistakes, the hours flying by like minutes, it was done.

In April, 2000, when Adam's Dob made its way to its new home in Madison, Wisconsin, we began comparing notes, long-distance, on our observing conquests. I had made several attempts to

schedule a visit, but the weather was uncooperative. In that way, astronomy is, of necessity, an opportunistic pursuit, since conditions are largely unpredictable. You have to seize your chances and be ready to go. Finally, on July 23, 2000, I drove up to Madison. Adam and Dawn had reserved some excellent sky conditions for our first night. Traveling only sixteen miles northwest, we settled at Indian Lake County Park, where we happened upon two members of the Madison area astronomy club doing some astrophotography. Tom and Mike made us feel right at home. We set up our scopes and began observing immediately.

Although it was I who located Comet 1999 S4 LINEAR (which a couple of days later disintegrated, never again to be enjoyed by mankind), it was Adam who directed his scope to one deep sky object after another. Most notable was M51, a galaxy with spiral arms, one of which brightly embraced its companion. One of the fellows from the Madison club remarked that Adam's Dob gave him the best "look" he had ever had at M51. My son and I smiled with pride, knowing

that Adam's Dob had proven its mettle. Like M51, my arm embraced my companion. Like Comet LINEAR, this moment became one beautiful memory.

*Uncle Rod Note:
See the section following
"My Back Pages" for
details of Jerry's
Dobifications.*

Notes:

¹ That point in the Earth's orbit where the sun is precisely on the opposite side of Earth from Jupiter, which crosses the meridian at exactly midnight, is visible longest in our sky and appears largest in our view.
² A lens which multiplies the magnification of the eyepiece, most commonly by double.
³ Four largest of Jupiter's moons: Io, Europa, Ganymede and Callisto, discovered by Galileo in 1610, visible even through small binoculars.
⁴ The measure of star brightness, the lower the number, the brighter. The brightest star, Sirius is -1.47. The North Star and stars of the Big Dipper are around +2. Darkest skies allow unaided views to about 6th mag.
⁵ The size of the opening at the light-gathering end of the optical tube, or the diameter of the primary mirror or lens, usually measured in inches or millimeters (e.g. 8-inch or 203-millimeter aperture).
⁶ In the 1970's John Dobson adapted the tube of the Newtonian reflector (which uses a parabolic mirror as a primary) to an inexpensive system using a cannon mount (for altitude

adjustment) on a turntable (for azimuth or horizontal adjustment)

EXTREME STARBURST

Tony Phillips

A star is born. A star is born.
A star is born.

Repeat that phrase 4000 times and you start to get an idea what life is like in distant galaxy J100054+023436.

Astronomers using NASA's Spitzer Space Telescope and ground-based observatories have found that the galaxy gives birth to as many as 4000 stars a year. For comparison, in the same period of time the Milky Way produces only about 10. This makes J100054+023436 an extreme starburst galaxy.

"We call it the 'Baby Boom galaxy,'" says Peter Capak of NASA's Spitzer Science Center at the California Institute of Technology in Pasadena, CA. "It is undergoing a major baby boom, producing most of its stars all at once. If our human population was produced in a similar boom, then almost all people alive today would be the same age."

Capak is lead author of a paper entitled "Spectroscopic Confirmation of an Extreme Starburst at Redshift 4.547" detailing the discovery in the July 10th issue of *Astrophysical Journal Letters*.

The galaxy appears to be a merger, a "train wreck" of two or more galaxies crashing together. The crash is what produces the baby boom. Clouds of interstellar gas within the two galaxies press against one another and collapse to form stars, dozens to hundreds at a time.

This isn't the first time astronomers have witnessed a galaxy producing so many stars. "There are some other extreme starburst galaxies in the local universe," says Capak. But the Baby Boom galaxy is special because it is not local. It lies about 12.3 billion light years from Earth, which means we are seeing it as it was 12.3 billion years ago. The universe itself is no older than 14 billion years, so this galaxy is just a youngster (Capak likens it to a 6-year-old human) previously thought to be incapable of such rapid-fire star production.

The Baby Boom galaxy poses a challenge to the Hierarchical Model of galaxy evolution favored by many astronomers. According to the Hierarchical Model, galaxies grow by merging; Add two small galaxies together, and you get a bigger galaxy. In the early years of the universe, all galaxies were small, and they produced correspondingly small bursts of star formation when they merged. "Yet in J100054+023436, we see an extreme starburst. The merging galaxies must be pretty large."

Capak and colleagues are busy looking for more Baby Boomers "to see if this is a one-off case or a common occurrence." The theory of evolution of galaxies hangs in the balance.

Meanwhile... A star is born. A star is born. A star is born.

See more breathtaking Spitzer images at www.spitzer.caltech.edu/Media/mediaimages. Kids can play the new Spitzer "Sign Here!" game at spaceplace.nasa.gov/en/kids/spitzer/signs.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

Caption:

The "Baby Boom" galaxy loosely resembles the galaxy shown here, called Zw II 96, in this Hubble Space Telescope image.



My Back Pages

"Crimson flames tied through my ears
Rollin' high and mighty traps
Pounced with fire on flaming roads
Using ideas as my maps
"We'll meet on edges, soon," said I
Proud 'neath heated brow.
Ah, but I was so much older then,
I'm younger than that now."



Club Notes: News of the Mobile Astronomical Society

What's happenin' down yonder at your friendly, neighborhood astro-club? Some newsbytes from the MAS:

- It's almost time for another of our heralded **MAS Holiday Dinners**. Yay-ah, it's time to shake off the post-holiday doldrums, and what better way to do that than with food and drink in the company of your local astronomy colleagues? The place? **Ed's on the Causeway**. The date? **January 8th**. The time? **7pm**.

Surely...SURELY Santa hadn't brought those miserable miscreants, BEAVIS AND BUTTHEAD, anything but coal this year? Alas, in a fit of ironic whimsy he'd left two 800x60mm TRASHCO refractors under their spindly and denuded tree. My job: "Huh-huh, huh-huh, dillweed...show us the Horsehead with

our scopes...and we want COLOR, just like on the box! YEAH, YEAH, BUTTMUNCH, WE WANT COLOR!" What did I get for my efforts to school these incorrigibles in what's possible with 2.4-inches of glass? Another mayo jar (kept on Funk and Wagnall's back porch for a fortnight); one containing a delicious brew of...

RUMOURS

What's the latest in the Meade soap opera? They surprised everybody by announcing a new scope despite their apparent financial travails (Meade stock currently dithers between about .08 and 12 cents-a-share). Not just any new scope, either; a new SCT, the ETX LS. What do we know about it so far? Unlike the other ETXes, which are MCTs, Meade is returning to the small SCT for this one. It's a 6-inch with the company's ACF SCT optics. What else? It features a built-in CCD camera of some kind. One with a video output as well as the ability to save pictures on an SD card. Even more intriguingly, the go-to alignment for this one is *really* automatic. You do not have to center those darned alignment stars; the scope does a **plate-solve** and figures out where it is from that without human intervention. What does ol' AA think? Like Uncle Rod, he is a bit skeptical. I mean, if Meade couldn't get the much simpler MySky GPS to work well and consistently, how are they gonna get this

goin'? Still, all the Skywatch gang would ENJOY being proven WRONG for once.

In other Meade news the decline of the storied LX90 continues. The Newest 90s (which feature ACF optics) have been beset by a serious drive problem since production of the scope moved to Mexico a few Moons ago. When tracking in alt-az mode, the scope suffers from "jumps" in the declination/altitude axis that make imaging and high magnification observing impossible. How widespread is this drive problem? Author Mike Weasner (of *Weasner's Mighty ETX* site fame) went through *four* scopes and Meade was nevertheless still unable to get him one that worked satisfactorily. Shame. I loved this little scope.

In fact, if I had to go out on a limb and speculate, I'd say the LX90's days are numbered, anyway. If the aforementioned LS is a hit, I expect the company to put at least an 8-inch OTA on it, probably eliminating the need for the LX90 in the lineup (the LS advertising copy mentions the (single arm fork) mount is suitable for larger OTAs. I also have little doubt the smaller ETXes are gonna be goners for sure. Why else are they bein' sold for ridiculously low prices? **Anacortes Telescope and Wild Bird** had new and reconditioned 125s for less than 400 bucks recently. Will Meade offer the 90 and 125 on the LS mount? I can't see the 125, since it's only slightly smaller than the 6-inch. The 90mm? You would think this would stick around in some form--if not on the LS mount.

Celestron? They are active in a conservative sort of way, having just released their new CGEM German mount. It is just now getting into the hands of a few amateurs (not Uncle Rod, not yet, but he hopes to get his paws on a review mount "soon"). It appears the CGEM is going to be a hit, despite not being anything strikingly new. It's an EQ6 at heart, though with some nice improvements, including a Losmandy "D" type dovetail and a longer counterweight shaft. The company also did something we've wanted to see for a long time and added Celestron's superior servo motors and NexStar controller to the otherwise well-loved EQ6.

In somber news...we have learned that **Sonja Rukl**, wife of Antonin Rukl, author of the famous Lunar atlas, has passed away.

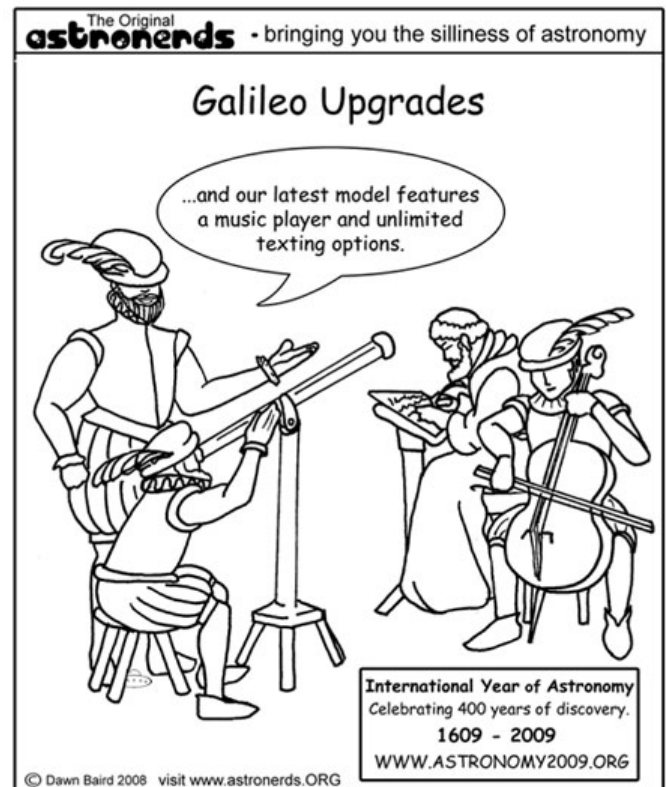
What else have I heard? *This and that.* But I say let's save that for next ish when the hangovers (hopefully) have finally worn off.

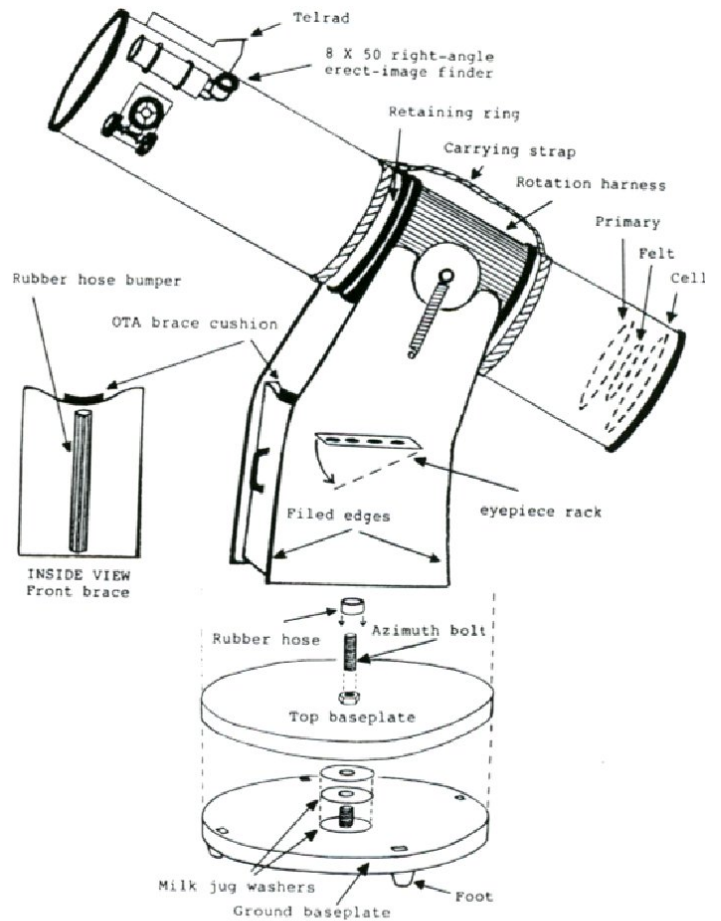
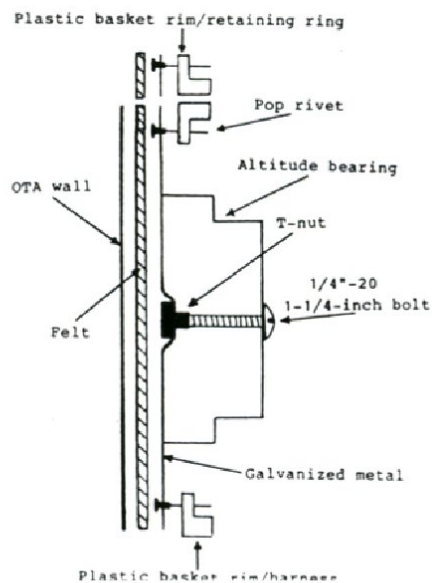
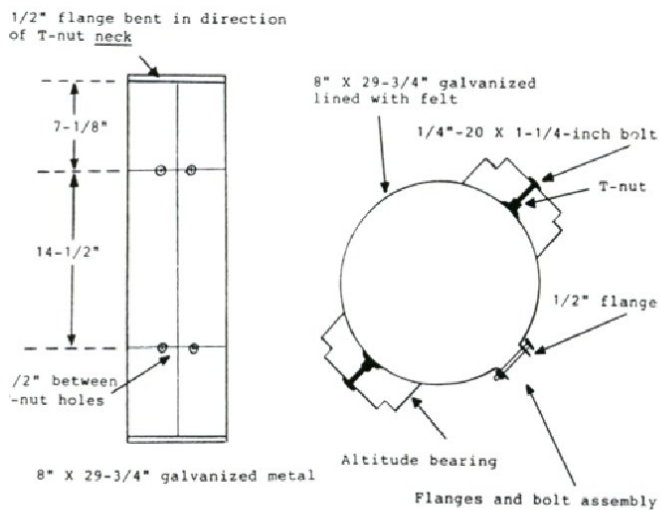
--The Anonymous Astronomer

The Wrap-Up...

It's a pleasure to get another issue of good, old Skywatch out the door. Yeah, yeah, with the blog providing me most of the outlet I want and need for my scribblin', I probably don't devote as much time to this here li'l rag as I ort to, but I still like it, and as long as y'all continue to send me your wonderful articles and pix, I will keep 'er goin'. What will the frequency be? When I have enough material from y'all to warrant it, 89 will hit the streets. Till then...

--Uncle Rod





This is an exploded view of the mechanical modifications to Adam's Dob (Page 19)

(ABBREVIATED VERSION OF:)
 "CHERN-RIGGING"
 A TUBE-TYPE DOBSONIAN TELESCOPE FOR ROTATION
 USING THE ORION SKYQUEST XT-8
 (11 FIXES)

1. Support the center 70% of the primary mirror with a circular piece of carpet padding or felt insulating material to avoid astigmatism.
2. Cut large "washers" from a milk jug, placing them over the azimuth bearing to establish optimum smoothness of rotation.
3. File all laminated edges of the base assembly to eliminate safety hazard.
4. Reposition the left-hand screw (only) of the eyepiece rack, lowering it to an angle that doesn't spill eyepieces when carrying or when observing.
5. Cut the azimuth bolt so it is flush with the hex nut. Cushion the nut by sliding a short section of rubber hose tightly over it.
6. Install a piece of high-density foam or other rubber at the top of the center brace of the base to avoid dents to the optical tube.
7. Install a vertical length of black rubber hose in the exact center of the inside of the brace of the base to cushion and protect optical tube assembly.
8. Add a telrad, positioned to cover two of the holes where the original finder scope's bracket was attached.
9. Add an 8X50 erect-image right-angle finder for easy use of Sky Atlas 2000. Use two of the original finder's bracket holes and drill two more.
10. Using sheet-metal lined with felt, establish a rotating optical tube harness by enlarging the insides of the holes in the altitude bearings that hold them to the OTA. Make the holes large enough to hold the collar of a T-nut plus 1/8" around it to allow for countersinking it flush. Enlarge only as necessary. Use shorter (1-1/4") bolts and the T-nuts to reattach the bearings. Provide flanges at each end of the harness assembly that can be tightened as needed with two bolts and hex nuts. Reinforce both flanges with a 1/8" thick piece of mending plate. From an appropriate-size basket of rubber, plastic or nylon, cut the rim to fashion a retaining ring to support the OTA, using clamps or flanges as used with the harness. A matching ring on the harness will hold the OTA at the chosen height as they rotate against each other. The retaining ring must have an inside surface that will create enough friction not to slip, but will not damage the OTA finish. We used high-density foam rubber with contact cement on one surface only. (See drawings for dimensions.)
11. Using 1" nylon black strapping material, fashion a carrying handle. Circle the OTA at each end of the harness, overlapping by enough material to attach velcro or snaps. Protect the OTA with felt if using snaps. Bridge the two encircling Pieces with a double-thickness handle sewn by your local shoemaker.

Pop-rivets, appropriate glues, waterproofing spray, etc. will be needed.

Parting Shots:

Alan Waldo caught the ISS rising with Jupiter with his little Canon Powershot...

