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Rod Mollise's

# Skywatch



## DSRSG 2003

### The 2003 Deep South Regional Star Gaze!

Len Philpot

**D**isclaimer: This started as a simple observing report of a few things I saw while at October's 2003 Deep South Regional Star Gaze--I had to leave one day early, on Saturday afternoon. However, from what I've heard there was no observing at all Saturday night due to rain and clouds, so I guess I'm still qualified to give my unofficial report of the event in general rather than dwell on too many specific observations. I'm sure other attendees can add to this as well as correct my inevitable errors.

The 2003 DSRSG was one for the record books in my opinion, despite having clear skies only two out of four nights. However, those two nights were spectacularly clear in the context of the gathering's location, probably the best I've ever seen in my 16 years of attendance at DSRSG, which is held at Percy Quin State Park near McComb Mississippi, deep in the state's "pine belt." "The best," anyway, with the exception of the time in the late '80s when a tornado knocked out power and we enjoyed quite a dark sky for a while, but I digress.

First of all, kudos go to Barry Simon of New Orleans, without whose tireless efforts the DSRSG wouldn't be. He gets help every year from

individuals across the Louisiana / Mississippi / Alabama region, but as Director, he's at the center of and key to all the activities that take place. Although the last registration number I saw was 163, attendance was reported to be nearer to 150. We were fortunate to have dealer Rex and his Astro Stuff arrive late Thursday and stay through Saturday afternoon. As usual, the star gaze was a relaxing looonggg weekend of friends gathered together.

As is sometimes typical, a run of absolutely beautiful weather for several weeks prior to the event had me nervous. Were we using up our allotment of clear skies? As it turned out, "no," at least not totally. Although daytime temperatures in the upper 80s were a little warmer than typical, nights were mild. Both days and nights were crystal clear through Friday noon, but telltale cirrus started showing up Friday afternoon, just about the time our guest speaker, Phil Harrington, arrived. Although conditions were less than ideal Friday night, Phil was still able to conduct an abbreviated session on binocular astronomy on the observing field for a while.

I really appreciate Phil making the trip for our event. It was great to meet him, although I wasn't able to stay for his "official" presentation. Prior to darkness Friday, he was kind enough to offer some very useful collimation advice, as well as taking time to participate in an interesting conversation with Russell Whigham, Rod Mollise and myself on many of the astronomical products we've seen over the years (the good, the bad and the possibly ugly!

However, back to Wednesday. Deep blue skies greeted us as we setup

our canopies on the observing field. Aside from the "love bugs" that seemed to come out of the grass everywhere, it couldn't have been better. Later, day turned to night and we were off. Much of my time was spent with old favorites on that first night, and I only lasted until about 1am (typical for me on a star party's first night). In no particular order: NGC 6888 (The Crescent Nebula), M31/32, an unsuccessful search for comet Encke, M37, the Double Cluster, M1 and lots of other bright objects as I got everything up and running, equipment-wise. With a UHC filter, the Crescent Nebula was a pretty, round object in my Dob.

This year, I brought my Genesis and 14.5 Dob, in addition to an 8" Meade Schmidt-Newtonian. Between lots of visiting, scope tweaking, comparisons between the views in my Genesis and the TV102 Renaissance "next door", not too much serious observing took place, but it was lots of fun. Jack Huerkamp's beautiful 17.5 TeleKit on the other side of my location was performing great, driven by a wireless system (who's name escapes me at the moment) and the brain of SkyTools 2. He managed to maintain a line at his scope most of the evening. The Blue Flash nebula (NGC 6905) was a bright, beautiful sight in both my Dob and Genesis. It had a distinctly wooly look to it, IMO.

Thursday was bright, crisp and clear when I walked back to the observing field around 8am. Only Dave Halupowski was on the field at the time, drinking in both his coffee and the beautiful morning. During the day, the field continued to fill up and by 4:30, we had a large crowd leaving for our traditional Thursday catfish dinner at "Mr. Whiskers" just down the road from the park.

Thursday evening was even clearer and darker than Wednesday. Although the DSRSG location isn't (and never has been) exactly the Arizona desert in terms of sky conditions, it was good nonetheless. I was able to see naked eye stars

slightly below 6th magnitude in the "square" formed by alpha, beta, kappa and gamma Cass.

Using Brian Skiff's chart of stars surrounding M57 (from the September 2001 issue of Sky & Telescope), I was able to identify 15.3 and 15.4 magnitude stars, as well as one that appeared fainter than either in the photograph. Unfortunately I've been unable to find any information on that star. The observations were done with a 9mm Nagler in my 14.5 Dob, giving 185x. A friend and seasoned observer, Darian Rachal, was able to confirm the 15.3 observation a few minutes later.

Digging through some Megastar charts I printed a few years ago, I came across NGC 7027 and 7048 in Cygnus. 7027 was a nice little bluish circle in both my Dob and Jack's 17.5" scope, although expectedly it was brighter in his, as was 7048.

Another chart was of the area of Abell 4 (PK144-15.1), a fairly faint planetary in Perseus, just down the road from M34. By the way, doesn't M34 have the neatest star patterns in it? With my Dob at both 185x and 76x, I was finally able to see it with averted vision (only) AND an OIII filter. Take either away and it disappeared. I was soon back at Jack's scope and we went looking... There it was, this time just barely "holdable" with direct vision. SkyTools listed it as being magnitude 16.7 (!), which as much as I'd like to claim it, was a bit much to swallow. We thought that maybe we were seeing the 15.5mv edge-on galaxy CGCG 539-91... But why did it show up with an OIII and not without it? That didn't sound like a galaxy to me. So, I went down the field to Walt Cooney's 25" Obsession and we looked it up there. In Walt's 25", it was definitely a direct vision object, in the right location, definitely NOT the galaxy. Something wasn't right... After consulting Hynes' "Planetary Nebulae", Walt was able to pin down its visual magnitude at 14.4, which

at more than 2 full magnitudes brighter than the photographic magnitude, answered our riddle. Hynes is obviously a better observer than I, since his notes indicate he saw it in a 10"! I think Jack was questioning my judgement in looking for this object in the first place.

Around 1:30am Friday, Rod and I were able to see (albeit minimally) the Horsehead nebula at an altitude of about 35 degrees in my Dob, using an H-Beta filter. I've actually seen it better in my 10" under really dark skies, but there it was nonetheless.

Comet Encke was also finally located by Walt in his 25", looking at 250x much more like a faint face-on galaxy than a comet... No wonder everyone was having such a time locating this object in the (relatively brighter) eastern sky!

Friday dawned bright and crisp and before long, folks were digging through Rex's vast collection of "stuff". For probably the first time in my astronomical life, I managed to keep my cash outflow less than my intake, but I'm sure that will change at next year's TSP! In fact, I'm already looking forward to both star parties next year!

## Return of the Denkmeier

### Rod Mollise

As some of you may know, I had the opportunity to test the 2" Denkmeier Binoviewer some months back. I was suitably impressed, but due to the weather we were experiencing down here on the Gulf Coast at the time, my opportunities to use the Denk on a variety of objects were somewhat limited. Sure, Saturn looked great, the Moon looked great, M42 looked great, but that was just about the extent of it.



Recently, the good folk at Denkmeyer Optical <http://deepskybinoviewer.com/> asked if I'd like to borrow one of their demo units for some further testing. Since my initial experience with the Denk had been positive enough to make me something of a binoviewing convert, I couldn't help but say "yes."

By way of background, before I had the chance to test the 2" Denkmeyer, I was not much of a fan of binoviewers in general. I had never had much success using them. I couldn't ever seem to completely merge images, and the resulting eyestrain and headaches meant I avoided them like the plague. You can read the full story in my review, *How I Learned to Stop Worrying and Love Binoviewers*, available here: <<http://skywatch.brainiac.com/sw030403.pdf>>, but to make a long story short, I found it easy to merge images with the Denkmeyer, and the entire viewing experience was comfortable and rewarding.

In fact, the only criticism I had of the Denkmeyer was the friction-fit

eyepiece holders. None of my eyepieces ever dropped to the ground, and they would stay put when I slid them in and out for diopter adjustments, but they weren't as secure as they could have been. I also thought the O-ring arrangement that applied tension to the eyepiece holders detracted from the appearance and overall build-quality of an otherwise outstanding piece of gear. I had been told that in the interim that both the "Premium" Denkmeyer II (2") and Standard Denkmeyer had gone to twist-to-lock self-centering eyepiece holders, and I was anxious to see how these worked.

In due course the "new" Denk arrived here at Chaos Manor South. The binoviewer in question, a 1.25" unit, was, like the previous binoviewer, equipped with a black plastic case of sporting goods heritage that provides adequate protection for the unit and its accessories. What I received this time was basically Denkmeyer's "Standard SCT" package. In addition to the binoviewer itself, also included were the 2" Starsweeper, a 2x "multiplier" lens and requisite

adapters. The eyepiece holders, as I had suspected, were a major improvement. Smoothly threaded, they held the eyepieces securely and were easy to use and attractive.

On to the Chiefland Star Party. For those of you who've never attended this event, you *should*, the skies are D-A-R-K and the temperatures nice and warm (this year, anyway). The trip to this star party is a reasonably easy one for me, about 6 hours from Mobile to Chiefland, which is roughly 65 miles North of Gainesville in the Florida interior. I had done some limited viewing with the new Denk at the Deep South Regional Star Gaze in October, but the fact that I only had one good night meant that I used the Denk less than I probably should have.

At any rate, my astro-buddy, Pat Rochford, and I hit Chiefland just right. It looked like we'd be favored with two excellent nights, and we were. I spent the first evening working my observing list and using the StarSweeper for single eyepiece viewing. As I reported in my earlier review of the Denkmeyer, I'm impressed with this gadget with or without a binoviewer. It provided a decent-looking field edge with most eyepieces, and I really didn't miss the f/6.3 reducer/corrector. This is far better than the f/5 reducers we used in the bad old days. An advantage of the StarSweeper, as before, was that it allowed me to use the big back of my C11 via an EyeOpener, something you can't do easily if you use a Meade/Celestron r/c.

I did break out the Denk for Saturn on this first night (Friday), and, once the planet had risen to about 40 degrees of altitude, it was amazing. Using two TeleVue 8mm Plossls, I was just blown away. The color variation across the ring system, from the dusky reddish of the Crepe Ring, to dirty yellows and snowy whites, was amazing. The disk itself was highly detailed, with the banding beginning to take-on the

detail you see in Jupiter's belts rather than the usual pastel smudges you can make-out on Saturn. I didn't trust intuition, but switched back and forth between binoviewer and single eyepiece to check myself. Yes, as I don't think many folks will dispute, you CAN see more with a binoviewer, with THIS binoviewer, anyway, on the planets than with a single eyepiece, no matter how good that single eyepiece (Naglers and Panoptics in my case).

Enough single eyepiece deep sky viewing! I declared Saturday night at Chiefland to be a "binoviewing night," and my scope a "single-eyepiece-free zone!" One thing I should mention is that using the 1.25" version of the Denk was not a huge hassle. Yes, the II *is* nice and has some advantages beyond a 2" barrel, including superior coatings and tighter optical tolerances. However, when it comes to using the "Standard" in a 2" diagonal with 2" accessories, I found that attaching a good 1.25"/2" adapter, my compression-ring-equipped Intes, worked very well indeed. The Intes, like most 2" adapters these days, is threaded for 2" accessories, so with it firmly in place, I stopped missing the Denkmeier II's 2" barrel fairly quickly. Please note that when I talk about the "2 inch" Denkmeier, I'm referring to the *barrel*. The Denkmeier II, like the Standard, uses only 1.25" eyepieces. Also, the adapters included in the Standard SCT package will allow you to use the 2" StarSweeper or insert the Standard into a 2" diagonal. I chose to use my Intes adapter because it simplified things when I was comparing views between the binoviewer and a single 1.25" eyepiece.

I suppose the most memorable view I had on this evening was NOT M42, though I did take a look at it once it cleared the horizon (duh!). No, the hit was M33. With a pair of 25mm TV Plossls in the Denk and the StarSweeper screwed-on, it was

perfectly framed. Big enough to show plenty of detail, but enough dark field around it to provide good contrast. The first thing I noticed was how *easy* the spiral structure was. Sure, I've looked at many photos of this amazing object (and taken a few myself) over the years, but I wasn't being fooled into thinking I saw something I didn't. The Pinwheel shape was *prominent*. Now, this was a good night, a very good night, so to evaluate the job the Denk was doing, I switched to a 22 Panoptic, a single eyepiece, and, yes, the spiral structure was less evident. Back to the Denk. This galaxy's huge HII regions were picked off one after another, but the treat was the tiny nucleus of M33 twinkling in and out.

Of course there's always the question of *brightness* when using a binoviewer on the deep sky. There is no doubt that a binoviewer decreases the amount of light reaching each eyepiece. How obvious and serious is this? With the Denk, it was really *not* a handicap. Yes, when you go back to single-eyepiece-viewing you can detect an increase in image brightness. But not as much as you might have expected. I don't know whether this is due to the Denk's construction, the fact that things are easier to view with both eyes, or, probably, both these factors. Anyway, the increase in detail that I noted with the binoviewer was well worth the small brightness penalty.

Did this decrease in brightness make some objects "out of bounds" for the Denkmeier? No. Not for me, anyway. If you're a real galaxy fanatic, things may be different for you, but I found that any galaxy I wanted to view was in range of the Denkmeier. I took particular care to check this, and looked at a variety of smaller galaxies in the 11.5 – 12 magnitude range. All were as visible in the binoviewer as with a single eyepiece. Dimmer than 12? I certainly don't push too much dimmer with a C11 (hey, I'm really a

Lunar/Planetary guy these days!), and I suspect that most committed galaxy hunters are using scopes in the 20 inch aperture range. Meaning there's more light available for the binoviewer.

The thing was, I had just as much fun with the Denkmeier on the deep sky as I'd had with it on the Solar System. And you can sure "wow" people with it. Being a recent convert to the binoviewing "religion," naturally I wanted to proselytize, but I didn't have to. The fact that I had the only Denkmeier on the field (as far as I knew/know) meant I had a stream of visitors wanting to check it out. Maybe initially on Saturn, but one look at M42 peppered with "3D stars" and I had plenty of converts.

There were, by the way, several other brands of binoviewers on the field, so I had the opportunity to compare their performance to that of the Standard Denkmeier, if not in side-by-side fashion. My opinion? For ME the Denkmeier worked better and was more comfortable to use. I do understand that "comfort" when using binoviewers is a subjective thing, and that what suits one person might not suit another, but I can only report what I experienced, after all.

Did I say M33 was my fave? Actually, my most memorable observation at Chiefland was *not* M33. Oh, that was great, but the *greatest* thing was the Denkmeier showing me the "Running Man" Nebula, that complex of reflection nebulosity in Orion's sword including NGC 1973-5-7. In the past, I'd never been sure I'd seen it. It's like the reflection nebula in the Pleiades; it's very easy to ascribe what you see to scattered light. But the Denk pulled-out the real deal. Not just around those bright stars, but fanning off into space, showing surprising size and detail.

What a night! Wish you'd been there!

# The Novice's Guide to Star Party Equipment

## Rod Mollise

Novice amateurs are understandably nervous about attending that first big star party. And usually their most anxious questions revolve around "what do you take?" Carloads of equipment? Enough scopes to stock an astronomy dealer's floor? Some amateurs do. However, while I'm a firm believer in taking everything you might need, as the years go by I've learned that there's such a thing as too much stuff, and that it can be as annoying as too little (just wait 'til your first rained-out star party where you have the pleasure of repacking the tons of gear you didn't even get to use. These days I tend toward the relatively light when it comes to packing. But what exactly do you take to a star party? How do you set-up on the field? These things seem like second nature to the old hands, but can be completely baffling for Joe or Jane Novice. Following is my take on equipment and set-up for the average star party. Customize as you see fit.

Some newbies worry about leaving that brand-spanking-new C8 on the field all by itself. Wouldn't it be better to pack it back in the car after finishing observing for the night? Nope. I always leave the scope on the field, even if it's a relatively light and portable C8. That is the only way to fly! I mean, who wants to keep unpacking and setting-up, especially since some star parties can last a week or more. I've never worried about security issues at any

non-public star party (that is a star party for amateur astronomers rather than a public "star gaze").

But let's not put the proverbial cart before the horse. Where does the scope go? When I arrive at a star party, I try to take a good look at the layout of the field despite my excitement and desire to get hopping. If there's a significant tree line, I choose a spot that makes the horizon I'm most interested in best seen. Location in regards to bathrooms, cabins, etc., is also a consideration. Please note that if you arrive after a major star party is



underway, it'll be catch as catch can as far as field position goes!

OK, up goes the scope. I always set-up the telescope on a plastic tarp. This is vital. In the middle of the night, you'll often drop small screws and other things that will be lost in the grass (or dust in the case of Texas Star Party) never to be seen again. A tarp saves you from this and provides a little insulation from the cold, cold ground for your footsies, too. Some people use things like a piece of carpet or Astroturf, which can really keep your feet warmer. I usually just use a vinyl tarp from Big Lots. \$3.99 means I can throw it away at the end and not have to worry about cleaning off a grass/dew/dirt covered plastic sheet. I stake the tarp down

at its four corners with landscaping nails. These are flush with the ground, so you won't keep tripping over them as you would with tent stakes. Bring a hammer to pound them in and remove them when you leave.

I ALWAYS stake down my telescope's tripod with at least three tent stakes. ALWAYS. It's not just advisable out west. I've seen a wind gust come through on a spring day at Georgia's Peach State Star Gaze and send a beautiful C5+ crashing to the ground. Since I'm throwing the tarp out anyway, I don't mind driving stakes through it. If you're a dob owner, leave the scope as horizontal as it will go and make sure it's free to turn in azimuth—to "weathervane" with the wind. On the scope goes a good Desert Storm style cover that is secured with an elastic cord. This will keep your scope dry in the worst rain and cool in the hottest sun. If you don't have a telescope cover of this type, one can be improvised with

garbage bags to keep the scope dry. Cover these with an aluminized "space blanket" to keep things cool, and fasten everything down with bungee cords. If you own a large dob, an appropriately sized plastic tarp can cover the scope (be sure the scope is still free to turn in azimuth as above, though).

If permitted, I set up a dining canopy type tent next to the scope, both to provide shade in the daytime and to furnish a little protection from dew at night. Under the tent goes a table. I don't like the small observing/camping tables that can be rolled up and put in a bag. They are not secure, being made of thin slats, nor large enough. I get one of the large camping tables sold at Wal-Mart and sporting goods

discounters. These fold in the middle, are light, reasonably durable and secure, and offer the area of two card tables while weighing less and taking up the same space in the car as one. On the table go eyepiece cases and a red table lamp I made out of a little battery operated Coleman toy lantern. Also under the canopy is an ice chest with cold water (you'll get much less tired while observing if you stay hydrated) for use during observing, and ice (for use with whiskey for afterwards). I also usually have a chair or two with me for use when it's time to take a break. I used to use lawn chairs, but now use folding camp chairs that store in bags.

*What else?*

Tent. I don't like to tent-camp much anymore, and will stay in a cabin or motel room if at all possible. Maybe I'm just getting' old, but I feel better and more rested that way and am more able to pull all nighters. In a pinch I might consider a tent again if there's no alternative. My star party tent isn't overly fancy. Its important features are that it's BIG and easy to erect. Actually, the most important characteristic for a tent is not its square-footage, but its height. The closer you can get to standing up, the happier you'll be, especially when dressing/undressing.

Sleeping bag. I use one in lieu of sheets and blankets even when I'm in a cabin. It's easier and more efficient to pack a sleeping bag rather than sheets/blankets. If you're tent camping, be sure to get a sleeping bag that's warm enough, but don't overdo that, either.

Nice pillow. You'll get more rest that way. Don't expect to find ANY pillows in typical camp cabins.

Dew shield, dew zapper, DewBuster or Kendrick. If you've heretofore observed from the typical tree infested backyard, you've probably not had much of a problem with dew. You're somewhat shielded by

the vegetation, which acts as a giant dew cap. And you're likely not observing all night, either. If you're east of the Mississippi and own an SCT, MCT, MNT or refractor, you *must* use a dew heater of some kind, even a 12 volt hair drier, in addition to your telescope's dew shield. If you don't, you'll probably be limited to an hour or *less* out on an open field under the expansive night sky.

Insect repellent. Deep Woods Off for me. The only thing that keeps mosquitoes away reliably is a repellent containing the chemical DEET. You'll hear stories about Skin-so-soft and other alternatives to DEET based repellents. Uh-uh. They simply do not work.

Red flashlight. I like the rectangular red-LED ones. They're adjustable and easy on batteries. Dorothy has one that has blue LEDs as well as red, so she can switch to brighter illumination to walk back to the cabin with once she's off the field. Have a death wish? Star fooling around with a white flashlight in the middle of a crowded observing field. Even one covered with a red-cellophane filter is probably too bright. Adjustable LED lights are the best choice.

Star Atlas. Sky Atlas 2000 is the minimum. Without a good atlas you won't get anywhere. Even if you use a goto scope, an atlas is very helpful for orienting yourself,.

Magnifying glass/reading glasses. If you need 'em don't forget 'em or you'll have a real hard time with charts under a dim red light.

Snacks. Candy and jerky are what I usually pack. A nice snack and a drink of water can, surprisingly, do more to restore you at 2am than a cup of coffee.

Towels and washcloths. Soap and shampoo, too. You won't find any of these things in most star party camp cabins.

Nylon line. As Sam Gamgee said, don't leave home without some rope.

Bungie cords. Ditto.

Knife. I like the big survival knives you can buy in flea markets or at gun/knife shows. Your friends will be duly impressed when you pull one out at their request to borrow your "penknife"!

Warm clothes and shoes. Dress in layers and always bring more than you think you'll need. You'll never be colder than you will be while observing—even in the middle of the summer. You're standing nearly still out in the middle of an open field in the middle of the night, after all.

Batteries. Bring spares. And make sure that the battery you use to power your scope has sufficient reserves to power your telescope for as long as necessary. Most star parties will have some kind of AC available to recharge in the morning. Get one of the jump-start portapacks from Wal-mart or other, as they're lighter and easier to carry back to the cabin for recharging that other batteries. Check/charge battery BEFORE you leave home.

Something to read. Bring a few paperbacks in case of clouds or to help you drift off after your observing run.

Ditto a CD player. Some folks like to listen to music while observing, too (not me, usually, not at a star party, anyway. I'm more interested in talking with the people I meet). Earphones *only*, of course.

Emergency eyepieces. Check and double-check all required items--scope, tripod, battery, counterweights, eyepiece cases. But also do what I do and throw an extra star diagonal and a couple of extra eyepieces in the scope case just in case the eyepiece case does ever stay at home! Otherwise, you'll find

yourself paying a vendor 50 bucks for a used 25mm Kellner and be happy to get it!

Duct tape, electrical tape and a small tool kit, ESPECIALLY to include small allen wrenches. I've lost count of how many times folks have come up to me needing to borrow a small allen.

Logbook, pencils, and notebook of chart printouts if you use any of these things. I've taken to recording my observations with a little Sony Pressman tape recorder. If you use a laptop for charting and telescope control, remember to bring everything you need for it, including interface cables, red gel to preserve night vision and an outboard power supply--a battery, that is, The internal batteries are useless for long hours out in the cold. The most cost efficient way to run a laptop is with a jump-start battery and a good-quality inverter. Make sure you figure out how much power your laptop will need over the course of the evening. If a jump-starter won't get it, look at a deep cycle marine battery.

Camera/camcorder. You'll treasure pictures or videos of your star party outings years from now.

You may find that you don't need everything on this list, or that you want/need a few things I've left off. A couple of star parties under your belt will allow you to fine-tune your packing, but this list will get you going.

## The Alpine Valley

### Chuck Taylor

The July 1974 cover of Sky & Telescope showed a fireball heading over the Grand Tetons in the middle of daylight. But what was more unusual than being sighted in daylight, is that apparently the meteor missed the earth, coming within 60 km of the surface

somewhere over Montana, before continuing its orbit around the sun. Of course, the admission in the article that a previously unacknowledged military satellite had tracked the meteor was also surprising --- especially since the cold war was in full force.

If the meteor had descended to a lower altitude, atmospheric drag would have slowed it down more. At some point, deceleration would have kept it from hurtling back into space. But what if the earth didn't have an atmosphere? Or to bring it back to our usual target of observation, what if it had impacted the moon at that shallow angle? What kind of impact scar would it have made? At one time it was thought that the shape of an impact crater was determined by the angle of impact. Meteors striking at right angles to the surface would produce circular craters. Meteors striking at other angles would produce oval craters. The absence of oval craters was even cited as evidence for a volcanic origin for the moon's craters. In fact, a grazing impact was considered as a possible cause for what was then known as Messier & Pickering --- with a tunnel connecting the two. The idea was that the impact had gone in one, and out the other. But as exciting as that would have been, Orbiter photos did not show a tunnel between them. Later research showed that a crater is formed by the explosion when the meteor is largely vaporized by its own kinetic energy. And this almost always leads to a circular impact crater no matter what the angle of impact.

But what about a grazing impact that skids along the surface? We see lots of scars like this that are radial to the Imbrium basin. Could this be the cause of the Vallis Alpes? At first glance, it certainly looks that way. But before we go on, let's stop and look at some of this month's views of Vallis Alpes.

We'll start with Naoyuki Kurita's page at [\[/moon\\\_e/moon\\\_a23.htm\]\(/moon\_e/moon\_a23.htm\) Scroll down the page and you will find a labeled version of the area, helping you to identify the surrounding features. You may notice that he has done this with a number of photos. <http://www.ne.jp/asahi/stellar/scenes/english/moon.htm#moon> will give you an index to the areas he has covered. This is a good url to add to your favorites, when you want to have the photo and the atlas on the same web page.](http://www.ne.jp/asahi/stellar/scenes</a></p></div>
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Matthew Russell has a good shot here, showing the relationship to Plato and Mare Imbrium. As you can see, it does appear to radiate outward from the Imbrium basin, which led to an early suggestion that whatever created the Imbrium basin also created Vallis Alpes. (We'll come back to evaluate that idea a little later). <http://www.telescopes.cc/moon2large.htm> John Sussenbach's 2<sup>nd</sup> and 3<sup>rd</sup> photos from the top at: <http://home.hccnet.nl/j.sussenbach/C11moon.htm> show the relationship between Plato and Vallis Alpes. The second photo from the top also shows an apparent ghost crater to the South of Plato. Mons Pico forms part of the south wall and a wrinkle in the Mare forms most of the south and east portions.

Paul Thompson's photo at: <http://homepage.ntlworld.com/mpris/m/cdas/images/M1.gif> <http://homepage.ntlworld.com/mpris/m/cdas/pictures.htm> shows a different orientation. Here you can clearly see the circular form of the Imbrium basin. Plato is at 3:00 and Vallis Alpes is at 4:00. You can again see how some would say that Vallis Alpes is radial to the basin and could be a gash caused by a large chunk of material thrown out during the formation of the basin. Additional overviews are:

<http://www.arksky.org/cgi-bin/atlas.cgi?lat=30&long=90> by Bernard Fournier at ASO ([www.arksky.org](http://www.arksky.org)) The area from Plato to Casini shows up clearly here.



destroyed by the impact that formed the Imbrium Basin. And, the mare flooding came much later since it fills both the Imbrium Basin and Plato. The fact that a number of craters show flooding indicates there was a significant time gap between the formation of the Imbrium Basin and the subsequent flooding that formed Mare Imbrium.

Andrea Tasselli has some great shots at <http://www.geocities.com/andreatax/moon.htm> The 3<sup>rd</sup> and 4<sup>th</sup> photo show the valley and the rille. Additionally, not quite half way down the page is a great shot of the valley and Plato. The rille shows quite clearly here. More shots of Plato follow.

So, with that introduction, what exactly are we looking at and what caused it? That of course has been debated for decades. And, since we never landed anyone there to look around and bring home samples, some are still debating it. The first idea we mentioned is that the same impact that created the Imbrium Basin created the valley. Of course, there were many who argued against an impact origin even for the basins.

In *To a Rocky Moon*, Don Wilhelms tells of Dai Arthur's project to use a 36" blank globe to better view moon photos. Photos taken from the earth could then be projected on to the globe (yes, I know I told this in an earlier LFM, but we've picked up over a hundred new people since then!). Projecting a photo of the limb area would allow a person to then walk around and view that area from directly above, removing most of the effects of foreshortening. In "Rocky Moon," Wilhelms relates how Charles Wood told him that it was Gerard Kuiper's son Paul who first recognized the ring structure. (Same Kuiper as in "Kuiper belt objects")

There are a couple of interesting sidenotes to this story. The first is that "Dai" Arthur was not a professionally trained astronomer or geologist. He was a self-taught

[http://www.psi-az.com/Schur/astro/ccd\\_moonplanets/platoalpine.html](http://www.psi-az.com/Schur/astro/ccd_moonplanets/platoalpine.html) is by <http://home.planet.nl/~onielsen/cam/alpes.html>

Chris Schur. This angle also shows the ghost crater and begins to show some of the detail within the Valley. And for those who think that making your own telescope is a dead art --- Chris shot this through a homemade 12.5" newt!

These shots also show some of the craterlets in Plato. (If you post a report of Plato, the first question you'll be asked is how many craterlets were visible on the floor of Plato). Make sure you also look at the index located at:

Dave Dockery has a nice shot at: <http://www.zianet.com/dave.dockery/plato.htm> showing some of the differences in the Mare surrounding this area.

<http://home.planet.nl/~onielsen/cam/moon.html>

Continuing on to Mike Brown's shot at: <http://www.mikebrown.free-online.co.uk/index-page39.html> we begin to see there is a rille running the length of the valley. This of course complicates matters as concerns the creation of the valley. This rille also is becoming visible in Ole Nielsen's photos at

Alwyn Botha adds another view at: <http://www.moon-phases.com/moon-pictures/3.html>

Greg Konkel has a good overview photo at <http://www.nwgis.com/greg/images/m082100a.jpg> (and others at: <http://www.nwgis.com/greg/astimage.htm>) Here we can see some of the sequencing of events. First the Imbrium Basin was formed. Plato (and other flooded craters) came later, since they would have been

mapper, working with the British government. He did not have the college education of his coworkers. His is a good story to remember on those days when you feel that the lack of a PhD prevents you from really enjoying or understanding the moon.

The second sideline is similar. Kuiper's son Paul would have been only 20 or 21 years old at the time, meaning it was the less experienced and less knowledgeable Paul who first recognized what more experienced observers had missed. Once the ring structures were recognized, they were seen throughout the face of the moon. They had always been visible, but never recognized. Now they clearly seen in other impact basins as well. Additionally, the scars or "sculpting" that are radial to Imbrium were also recognized. These can be clearly seen in the top two photos on Andrea Tasselli's page at <http://www.geocities.com/andreatax/moon.htm>

Altogether, this evidence helped form the conclusion that the Imbrium Basin was excavated by an impact. Walter S. Kiefer, Staff Scientist at the Lunar and Planetary Institute has a very interesting article on basin formation at: <http://www.lpi.usra.edu/expmoon/orbiter/orbiter-basins.html> Of course, all of this leads us back to Vallis Alpes. Could a chunk of excavated debris have been hurtled by the Imbrium impact and gouged out the valley?

Dr Wood's site at <http://www.space.edu/moon/atlas/News/AlpineValley.html> contains an Orbiter photo that clearly shows the rille found at the bottom of the valley. And, as he points out, the valley runs through the debris that was excavated by the Imbrium impact. To me, this is a critical point.

[I need to stop here and point out that the following critique of the Imbrium Impact theory for Vallis Alpes is my own, which means the

mistakes I make here are my own, and not those of the people whose web pages are linked here. I was unable to find historical analysis of the impact theory for Vallis Alpes and am inserting my own analysis]

If we go back to Matthew Russell's photo at: <http://www.telescopes.cc/moon2large.htm> we can see again that the valley does indeed cut through the ring of debris piled up by the Imbrium impact. And if we stop to think about the sequence, we see that we have a problem. The debris forming that huge ring around Mare Imbrium was formed by slower moving material that surged out and was deposited there. There was also a rebound effect. The point is, that this was a slower process. But for a chunk of excavated material to gouge out the Vallis Alpes, it would need to be moving very quickly, which means it would have already cleared out before that ring of material had settled in its present location. At least that is how it appears to me. Other may want to weigh in here with their own analysis.

More recently I have read claims that Vallis Alpes was gouged by ejecta from Copernicus or Aristarchus. Copernicus does not line up well and Aristarchus seems small for this kind of ejecta at this distance. And both are probably too recent for the mare-like flooding that lines the bottom of Alpes Vallis.

The current understanding is that Vallis Alpes is a graben, a geological form well known on Earth. A graben is caused by two parallel fault lines. The ground between them drops, producing a long valley, which is what we see at Vallis Alpes. A quick google search for grabbens on earth turned up the Rift Valley in Africa and the Red Sea. Graphics illustrating what is taking place can be seen at:

<http://www.bartleby.com/61/imagepages/A4graben.html>  
<http://www.utexas.edu/students/geo/ggct/figs/fig.45.gif>

[http://geography.sierra.cc.ca.us/booth/California/1\\_lithosphere/graben\\_horst.jpg](http://geography.sierra.cc.ca.us/booth/California/1_lithosphere/graben_horst.jpg)

Obviously there would be some adjustments after the Imbrium impact.

How (or if) those contributed to this particular grabben is unclear. You might even conclude that after the Imbrium Basin flooded with lava, it subsided from the new weight and this movement caused the valley area to drop. However, this overlooks the fact that the valley floor is covered with that same lava flow. Therefore it is possible for the grabben to have sunk down during the last stages of flooding, but not after the lava flows had stopped.

So, since it cuts through debris deposited by the Imbrium impact, The valley was formed after the Imbrium impact, but before the Mare lava flows which also cover the floor of Vallis Alpes. Additionally, as we have seen, there is a thin rille which meanders the length of the valley. The rille is believed to be a lava channel, similar to the lava tubes at Craters of the Moon or Hawaii.

Jack Kramer has a nice article on this at <http://homepage.interaccess.com/~pucellm/lcas/Articles/moonnav.htm> Bill Dembowski has a good article on rilles at <http://members.evansville.net/slk/rilles.htm> He also publishes the Lunar Observer, which can be found at [http://www.third-wave.com/dembow/tlo\\_001.htm](http://www.third-wave.com/dembow/tlo_001.htm)

And again, Maurizio Di Sciuolo has a good shot of the rille, 7 pictures up from the bottom at <http://www.starlight-xpress.co.uk/gallery> David Strange at the Worth Hill Observatory has a shot at <http://www.dstrange.freemove.co.uk/9daymoon.htm> This shows the rille but not as clearly, and brings up one of the problems with spotting the rille. There are shadows and narrowings that can make it look like

you are seeing the rille when in fact you are not. Good seeing is as important as a good telescope.

Jacques-André Régnier's site is in French, but as he pointed out to me, "Explanations are in French, but

craters as well as the floor of Vallis Alpes. Finally, those craters in the Maria which are not flooded, were formed last. As you observe, notice which craters formed before the mare lava flows and which formed afterwards. You may also notice different colors in different parts of

what size and type of scope it was and what the sky conditions were!

3. The ghost crater south of Plato.
4. Pico, which forms part of the southern edge of the ghost crater.
5. Montes Recti to the west (the Straight Range --- I did like it better when the names were in English, but it's about time we realized there are observers all around the world with different languages)
6. Casini with its complex shape.
7. Others may want to track down Trouvelot (9 km crater near the north end of Vallis Alpes)
8. The magnificent line of the Alps (ok --- Montes Alpes).
9. Farther south, Archimedes and Aristillus form a nice pair showing formation before and after the mare lava flooding.
10. And of course, Mons Piton to the south. IIRC, Pico and Piton were both in the story "The Sentinel," an Arthur Clark short story which grew up to be 2001--Space Odessey.



images are international." His photo can be found at [http://www.regnier-schmit.net/astronomie/photos/vallis-alpes\\_20020928/](http://www.regnier-schmit.net/astronomie/photos/vallis-alpes_20020928/)

<http://www.regnier-schmit.net/astronomie/photoindex.html> Again, parts of the rille are clear, while other portions are not --- which is how it may appear in your scope. Good seeing is vital. Of course in this lunar orbiter photo, it is extremely clear:

[http://nssdc.gsfc.nasa.gov/imgcat/hires/lo5\\_m102.gif](http://nssdc.gsfc.nasa.gov/imgcat/hires/lo5_m102.gif)

So, to sum up, there was the Imbrium Impact which piled up the mountainous area of the valley. Following this, the land between two parallel faults dropped. Plato and other craters that are now flooded were formed during this time as well. Then the area flooded with lava flows, creating Mare Imbrium as well as flooding Plato and other

the Maria, pointing to different flows.

**SIGHTS TO OBSERVE:**

1. The craterlets in Plato (I won't write anymore on Plato since we will eventually come back and have a full LFM on just Plato)
2. The rille at the bottom of Vallis Alpes. There is some debate on what is the smallest scope it can be sighted in. A number of observers have seen it with 8" while some have reported it seeing it in 6" and even down to 4" or smaller. Obviously it could not be resolved if it were a double star split by the width of the rille. But long lines of contrast are easier to resolve. Seeing will be critical in this endeavor. No matter what size scope you use, please post a note if you have seen it and tell

There are more, but I have to shut this off and get it posted, so I will stop here.

## 2003 Illinois Dark Skies Star Party and My Best Mars

**Wade Calvert**

The **2003 Illinois Dark Skies Star Party** was held at Jim Edgar Panther Creek Park, near Springfield, IL, September 25 through September 28. This annual event is sponsored by the Springfield-based Sangamon Astronomical Society. All the details about this star party are available at their web site:

<http://www.sas-sky.org/2003StarParty.htm>

This was my second year for this event, the site being about 150 miles south of my home and an easy 3-hour drive. The park is a "wildlife and conservation" reserve, comprised of 16,550 acres of forest, wetlands and lakes. There are several campgrounds, some primitive and some with electricity and very modern shower facilities. They even rent cabins! There are a myriad of activities available to the outdoor enthusiast, as described on the Illinois DNR web site at:

<http://dnr.state.il.us/lands/Landmgt/PARKS/R4/jepc.htm#Camping>

I arrived with my carload of astro-junk on Wednesday afternoon, too early to register for the star party and a little late to set up camp, so I found a motel room in Springfield, which is about 35 miles to the southeast. While in the Springfield area, I indulged in one "last supper" which consisted of a 14 ounce rib-eye with all the trimmings, washed down with a couple (three) bottles of "Killian's Red" beer. That night I slept like a baby.

Thursday morning I made a quick pass through the motels' continental breakfast bar for coffee, fruit and muffins, and I was off to the site. I arrived at about 11 AM, and chose a campsite near one of the many port-a-potty facilities available. Two of the larger, primitive campgrounds (the East Campground and the West Campground) sites, actually were quite commodious. Each had a large shelter with rest rooms and running water, and both were freshly mowed, for which I am always grateful. The grounds keeper assured us that the rangers were instructed to turn off the security lighting for this event. They also kept the gates closed, which helped keep out the occasional drive-through with headlights from disrupting the viewing.

I found a spot in the East Campground near the road, and

near one of the many port-a-potties. I had my tent up, my scope set up and rigged, table and laptop ready to go by about 2 PM so I decided to go exploring. This is one beautiful place. Next year, I'll bring my fishing equipment.

*What does this have to do with Mars, anyway?*

Here in the upper Midwest (Latitude 41N – Longitude 90W) Mars never rose much higher than 33 degrees. Seeing was never really good either, and images suffered from atmospheric diffraction, where the lower viewing angles cause the atmosphere to act like a prism and create blue and red edges on the planets disk. I had played around with Mars all summer, gathering a few mediocre images with my webcam, and the object of this trip was to be Saturn. The plan was to observe visually until midnight or so, get a couple of hours of sleep, then get up and image Saturn. At least I had a plan. At dusk, the sky was that deep purple color which indicates a great night for astronomy. The rangers had, indeed, turned off all the lights because it was truly very dark. Before I could really see the stars well, I warmed up a jar of beef stew on my Sterno stove. That, and a fresh cup of really good coffee from my 12VDC camp coffee pot, really hit the spot. After rinsing out my dishes and clearing the decks, it was on to astronomy. The milky way was stunning, the stars "pinpoint", and I enjoyed many DSOs, including the Double Cluster (Caldwell 14), M13, M31, M45, M51, M57 as well as the very beautiful double, Albireo.

It was only about 10PM, and I had run out of stuff to look at, so I stuck the web-cam into the scope and got four 2-minute AVI's of Mars just to get things warmed up. *Never hurts to have a few more Mars AVIs does it?* Then, I set my travel alarm for

4AM and hit the bag. It wasn't long before it began to get cold. In the distance, I could hear coyotes howling. It doesn't get much better than this, I thought.

Around 3AM I got up to go to the Porta-Potty, and noticed a few high clouds. When I came back, the cloud cover had gotten heavier until finally, it was quite overcast. That was it for this night, no Saturn this time. The weather forecast didn't hold out much hope for any good seeing for the next couple of days, either. Since I had things I could do around the house before winter, I started tearing it down at daybreak.

When I got home and processed the Mars AVIs, I discovered that one of them contained my best Mars picture ever! So, in the end I was truly glad I'd captured the 4 additional AVIs'. In summary, I'll plan on attending the SAS Illinois Dark Skies Star Party again next year. The weather completely washed me out the previous year, but this year I got one great night of eyepiece viewing. The site is great, and it's worth the trip just to go camping there, if a person is into that.

## A Brief History of Astronomy Software

Rod Mollise

Page through *Sky and Telescope* or browse the Internet, and it seems obvious. Amateur astronomy and computers are made for each other. But it hasn't always been that way. You young whippersnappers don't remember the dark days 15 years ago when a program was hot stuff if it could display *the whole* SAO star catalog. Join me now for a walk down memory lane past all those ancient computers and software that

so impressed us back in the days when you bragged to your buddies if your 'puter could plot a couple of NGCs!

Me? I started out with the venerable Radio Shack Model 1. I didn't really begin with the idea of using it for astronomy. There wasn't any astronomy software around for TRS-80s, anyway, not for a while. The reason I wound up with the Model 1 was that ol' Sgt. Rod was strolling through the barracks one sunny day in 1978, and ran into good buddy. This worthy said he needed 50 bucks in the worst way (something to do with his girlfriend, I suspect). Said he'd let me have his Trash 80 in return. For you young folks, it was a system unit/keyboard combo, not unlike the VIC 20s and C64s to come later (assuming you've even heard of those classics). The Model 1 came with a monochrome monitor, an amazing 4K of RAM (KB NOT MB, sonny), and was able to display crude character-based graphics. I had fun playing Star Trek with it, and even got ahold of some small BASIC astronomy programs to type in and save on cassette tape. But I realized that *real* astronomy software, software that actually did something useful, would require much better graphics.

From the TRS80, which I used for quite a while, upgrading memory and adding a disk drive with the expansion unit, I went on to the Atari 800, a brilliantly designed computer, but one that never had enough software written for it other than games, the C64 (had to have one of those, everybody else did), and the Apple II (a solid computer that worked well and was actually a lot more like our modern PCs than it was like the next Apple, the Mac). I had astro software for all these machines by the mid 80s, but nothing that really blew me away--even though I was easily impressed. Silicon Sky, for example, would actually draw constellation stick figures and a few bright DSOs on your monitor!

All good things come to an end, and so it was with the 8 bit Z80 and 6502 microprocessors. Like just about everybody else, I finally wiped away the tears, put the IIe, the C64 and the Atari in the closet, and bought a brand new and overly expensive IBM (in 1993). This was actually my second PC. I'd bought one of Tandy's PC clones in, oh, '88 or so, but it was really a piece of Junque.

The first astro-program I ran on the IBM was a little DOS app, Skyglobe. MAN WAS IT BEAUTIFUL! Tiny stars and pretty colors (I had a VGA graphics card)! I recall turning off the lights and admiring the display. This program lived on the hard drive of every PC I owned for years. There's still nothing better for quick "what's up" checks! It's tiny and quick, something you just don't see these days. Not very good at printing star charts, but it was the first astro program that I found genuinely *indispensable*.

I think the first program that really impressed me for use at the scope was David Chandler's Deep Space 3D for the IBM. It started out as a very simple little program that could chart/plot comets against fairly detailed star fields. But Mr. Chandler (of planisphere fame) rapidly took it to a whole 'nother level, adding tens of thousands of DSOs and the GSC before long. The most impressive thing about Deep Space, though? It was the first astro program to print charts that approached the quality of a "real" printed atlas. DS3D is still around, and hasn't really changed much. It's still a DOS app, and doesn't even use a mouse. On the other hand, it's FAST, relatively small, and has a good user interface once you get used to using the keyboard rather than Mr. Mouse. I keep hoping that it'll be updated one day, but I guess that ain't gonna happen. At any rate, I used it almost exclusively for observing up through 1994.

I played with a couple of other astro-programs during this period, naturally. Even then I was an astroware junkie. Stargaze, which is probably (best) forgotten, was the first program I owned that included some of the Hubble Guide Star Catalog (for selected regions of the sky only). It was an interesting program--for 1993--but its downfall was that it really didn't print very well at all. The user interface was kinda wacky, too.

In the summer of '94 I heard about a new program, RedShift, that would be delivered on CD. CD ROMs were new, relatively speaking, that summer, and were certainly new for astronomy. RS was the prettiest astronomy program I'd ever seen. Unfortunately, like Star Gaze, it didn't print very well, and was no competition for Deep Space for actual use at the scope.

1994 was also the year I got **Megastar**. I'd been admiring it in its small magazine ads for about a year, but was not ready to buy a program that came on 54 (yes, **fifty-four**) floppies. But by Christmas it was on one of those new-fangled CD ROMs and I got going with it. Miss Dorothy called Megastar's author, Emil Bonano, to order it for me on our first Christmas together. Emil said, "OK, but let's play a little trick on Rod. I'll ship it in the box that comes with Expert Astronomer" (a simple if usable planetarium that was popular at the time). You can imagine the hilarity that ensued on Xmas morning, with me trying to convey HOW MUCH I appreciated getting Expert Astronomer for Christmas!

Megastar is a fine program. One of the best, and I still use it to this day. Emil has recently updated it, and it's competitive with anything out there. He's always avoided "pretty" in favor of "useful" for working observers. And I really like that. Sometimes, though, I do find that it's not quite as easy to use for some purposes, like getting a quick idea of what's over

the horizon, as a "traditional" planetarium.

Yes, planetarium programs are still the mainstay of computer using amateurs, but this has begun to change in recent years. Many deep sky observers now favor *list-based* database-centered programs instead. I'm thinking of Deepsky 2003 and Skytools 2. The latter, especially, shows that it really makes sense to start with a list of objects rather than a sky simulation. Skytools 2 has become the program I turn to more than any other when I'm planning a deep sky run.

What do I use other than Skytools 2 these days?

**Cartes du Ciel.** It's free and can do anything you'll need an astronomy program to do.

**Megastar.** Best object selection. Thousands of thumbnail images that can be superimposed on the charts. Nothing better for the hard-core deep skyer.

**The Sky.** Sorry Shawn Grant, this is a SOLID program. When I want a look at the virtual sky to see what's up, I usually bring up The Sky. It's faster than CdC (though the forthcoming Cartes du Ciel 3.0 may change that) and has the features you'll need to do *anything*.

**RedShift and Starry Night.**

Being an astronomy teacher, both of these come in handy. I wouldn't use

either in the field, but they both work nicely when I project them for a class with an LCD projector. RedShift is currently in a new version, 5, which is being offered for about 50 bucks (initially, the maker was going to charge 100 dollars for the U.S. version, but it became apparent that RS's audience wasn't going to pay that much for it).

What would I have on a hard drive if I couldn't have anything else? That's tough. I'd at best be able to narrow it down to three. SkyTools 2, Megastar, and The Sky. This is no slight to Cartes or Deepsky, either. I've enjoyed and use both of those program a lot. And there are plenty of other programs I've tried but don't own like Guide and Skymap. Those two are excellent, but, despite my penchant for astro-software-collecting, I couldn't justify them since neither really does anything I can't do with Megastar or The Sky.



# The Apogee SCT Crayford

Ed Moran

Many Schmidt-Cassegrain telescopes suffer to one degree or another from a phenomenon known as "mirror shift". This manifests itself as a small amount of movement or "image shift" of the object being observed in the field of view of the eyepiece during focusing. This is caused by clearance or free-play between the primary mirror carrier and the baffle tube on which it slides. This is usually not a big concern during visual observations, but can be troublesome when trying to photograph objects, especially when using a CCD camera. Another focusing-related difficulty arises when focusing at high magnification. The depth of field or "sweet spot", where the image is the sharpest, is very shallow and a small fraction of a turn of the focuser knob will move you away from that spot. Precise focusing at high power can be difficult.

Crayford-style external focusers can eliminate or minimize these problems. By using the external Crayford focuser mirror shift is eliminated, and high power focusing is more precise because the focuser is "geared" lower (although they don't use gears, it's a roller/bearing mechanism).

There are several manufacturers/retailers of Crayford focusers, such as Feathertouch, JMI, Van Slyke Engineering, Williams Optics, Apogee, Inc. and, like many other telescope accessories, they vary in price and quality. For example, the Van Slyke Engineering focusers are robust, precise, high quality devices able to support heavy cameras and are very expensive. The Feathertouch focusers are exquisite, jewel-like machines and are priced accordingly. JMI offers a Crayford

focuser that can be configured with motor drives and is more reasonably priced. Williams Optics and Apogee offer Crayford focusers that are even more affordable, and look identical. They are not as heavy duty as the other focusers mentioned, and may not be the best for photographic purposes but are more than adequate for visual use. I chose the most affordable offering, the Apogee unit. It's commonly available for \$129.00.

The Apogee SCT Crayford focuser has a drawtube with a 2" inside diameter, equipped with a brass or copper clamp ring to hold your diagonal securely without scratching. It comes with a 1.25" adapter, setscrew style. The Williams Optics version includes a clamp ring style 1.25" adapter.

The focuser attaches to the standard SCT threaded visual back of your telescope. Once attached to the scope the focuser can be rotated to any position desired by loosening a thumbscrew and rotating the body of the focuser. There are thumbscrews to adjust the drag of the drawtube and to lock it in position.

The fit and finish of the Apogee focuser is very good, with no slop or looseness evident anywhere. The "feel" of the focusing action is as smooth as glass, with no notchiness or backlash. My TeleVue 2" diagonal fit snugly into the drawtube and the clamp ring holds it securely in place. The weight of large 2" eyepieces can cause the drawtube to slowly drift when the scope is aimed high, but the drag adjuster can be snugged up enough to hold it in place and still allow smooth focus adjustments. In any case, I only use the Apogee when observing the Moon or planets at high power, and those eyepieces are lighter, requiring less "drag" and allowing fine focusing with a very light touch.

The Apogee focuser has helped me to get the most out of my scope,

especially at high power, and brings precise focusing at a modest price.

## A Field Review of Celestron's 9.25" Advanced Series GT

**Tim Crawford**

I started looking for a new travel scope this past spring after the Rose City Astronomers (Portland, OR) Messier Marathon party. It was clear that my Meade ETX 5-inch was not adequately up to finishing the Herschel 400 list, at least for my tired old eyes. My faithful Meade five-inch did, however, let me finish up my Messier list at the August Oregon Star Party this year. Being over 60 with a bad back I wanted the largest Goto scope that I could afford to purchase that would break down into manageable components; suitability for imaging was not an objective (but nice to have if possible).

My observatory has a pier mounted 12 inch LX 200 classic, which has excellent tracking and pointing functions, but is a monster for me to lift. The smaller Mead LX200 10 inch scope was also simply too heavy for me to consider lifting the fork/scope portion up on to a tripod, especially if using a wedge.

While there is nothing-wrong with the 8-inch fork mounted scopes (either Celestron's or Meade's), as the component weights are comfortable, I was still hoping for something with a larger aperture. Celestron's fork mounted 9.25 models were tempting but the component weights were still a bit heavier than I really wanted to deal with.

I first learned of the Celestron 9.25 advanced series, on a GEM mount, on one of the Yahoo news groups. I checked the Celestron website to see what the design and

specifications were and then I contacted Celestron on the phone and asked for the exact component weights, which I was provided. The price was also very attractive and hard to resist. My decision was made; this was going to be my next traveling scope.

At the time I placed my order with Sean's Astronomy, Battle Ground, WA, in July Celestron had yet to ship one of these units and some participants in one of the Internet news groups were questioning the suitability of the Celestron CG5 mounting for the 9.25. Trusting in Celestron to deliver what they promised, a beefier CG5 mount, I was not deterred.

While I had hoped that the scope would arrive before the well attended Oregon Star Party (about 950 folks) the last week of August it did not arrive at Sean's until the 18th of September, where I was able to pickup it up the next day. The following day I unpacked the three cartons that everything is packaged in and set the scope up; clouds prevented any viewing that evening.

First light was not until the next evening but as I had neighbors over to the observatory for some DSO observing through the larger scope, I was not able to start with the 9.25 until about 11:00 PM. I did a rough polar alignment of the mount, through the central alignment "hole" in the RA axis and used the index marks to set the DEC and RA axis. You should understand that the DEC index mark results in the tube being off center rather than parallel with the RA axis. The index marks are simply markings that Celestron has placed at a certain position on each axis as a "home" position.

I entered the date, time, and my longitude and latitude and then let the hand control guide me, via the Auto Align feature, to three alignment choices; if a star was not visible, then a quick press of the

undo button would bring up another star until three were able to be centered in what I judged to be the center of the eyepiece. This initial setup did not result in good pointing (objects in eyepiece and reasonably centered) and the tracking was poor (ability to keep image in the field of view). As subsequent events demonstrated, this was not the Nexstar's fault, but only the result of my poor Polar positioning and probable failure to use a cross hair eyepiece for centering. As it was getting late I finally stopped for the first evening after visiting some old friends (DSO's)

As an experiment, the next evening I centered the DEC axis with the mount (off of the index mark). The RA was placed on the index mark and then I did a polar alignment with the scope and mount, using an illuminated, double crosshair, eyepiece (which eyepiece, by the way, was used for all future centering of alignment stars).

Wow, what a difference this made! Pointing accuracy was excellent as was the tracking. Visited many old friends then retired to my Observatory so I could get some Variable Star observing in before calling it a day. The next evening it was foggy and I spent more time reading the manual. I discovered that the Nexstar controller had a Polar alignment option that could be used after the initial three star alignment from the index marks.

The following evening was clear, however, another neighbor arrived for a DSO tour in the Observatory but I was able to get to the 9.25 by 10:30, this time.

I started up the 9.25 with both axes on the index marks as required by the controller, did the three star alignment and then choose the Polar alignment option. The scope slews to where it believes Polaris to be and you then have to manually adjust the scope, in both axis's, to

center Polaris; this does cause the loss of the original alignment but the computer takes you back to the Auto Align option screen when you have finished with the Polar alignment so you can do a fresh 3 star alignment. I noticed this time that the alignment star slews were very close to the center position of the those chosen, anywhere from 1/2 degree to around 2 degrees off; where previously the chosen alignment stars were typically off around 15 degrees (although by the third star this gap generally lessened).

Again, pointing was what I would have to call excellent and the tracking was good. I challenged the Nexstar program to find NGC, M and IC objects. Most were close to the center of the 16 mm eyepiece that I was using at the time; only occasionally did I have to bother centering an object. About 11:30 I centered M13 and took a short break; when I returned, 15 minutes later, M13 was still almost perfectly centered; had only moved a slight amount off center. This is excellent tracking that would probably require a solid drift alignment to see if any improvement was possible.

The scope was not used again until I traveled to Indian Trail Springs in the Ochoco National Forest, on September 25th, in Central Oregon (this is also the site of the Oregon

Star Party in August each year). Take down and packing went quickly.

I probably made a mistake by not insuring that the mount alignment "hole" in the Polar axis was reasonably centered on Polaris the first evening. I figured that if I was close to North with the tripod "north"



leg it then I would try the Polar alignment feature after the initial three star initialization and see what happened. Finding and tracking did not go well for a while. In fact I had to do a total of four Polar alignment sequences before I achieved the desired tracking accuracy and finding accuracy. After this was done then it was pretty well setup for the remaining two nights. A lesson learned for the next time that I take the scope on a trip; I will endeavor to center the Polar axis alignment "hole" on Polaris prior to the initial startup; this will save a lot of time and anxiety (I actually had installed, that day, a Polar Axis

Finder showing the correct offset from Polaris but as the directions were not clear to me, I did not want to loose time figuring out how to calibrate it and had not bothered to even center it up. The last day of the star party, a fellow astronomer showed me how to set it up which I will do on my next trip).

The Second evening I started up with the Auto Align, then used the Polaris Align feature (for a control check); very little adjustment of the mount was required for a perfect centering of Polaris. Pointing and tracking then went well all evening. I also centered the scope on M30 and took a 20-minute break. When I returned it had just barely moved off center; another sign of a good alignment and good tracking.

As a reminder, except for first light, all alignment stars were centered using an illuminated, double crosshair, eyepiece; which I strongly recommend for anyone using a goto scope.

The few times that objects did not appear in the eyepiece (or I did not think they were--working on finishing the Herschel list) I simply used the "Precise Goto" function which takes the scope to a star near the DSO and has you center it before slewing over to the DSO. This appeared to work quite well and removed any doubt about whether or not I had the correct field of view. The names of some of the stars that the precise goto presented on the hand controller were occasionally unknown to me; however, I let the scope slew anyway and the stars chosen were usually the brightest in the eyepiece or within a degree or two at most according to my Telrad, so there was little doubt as to the correct star.

Actually there are also quite a number of useful functions and options within the Nexstar hand controller including: Sidereal, Solar or Lunar rate; Anti-backlash, Filter Limits, Autoguide rate, Calibrate

Goto, Home Position, Light Control, Reset to Factory condition, Hibernate, Identify Nearby Objects, and a number of others. I did not take time to explore all of these options on this trip. A total of 15 goto lists/catalogs are also available including the IC, NGC, SAO, Caldwell and Messier catalogs

I found the unit to be friendly to travel with; I did use the original cartons for the scope optics and the Polar mount on this trip (a scope case would probably be a better choice). Individual component weights are as follows (using a bathroom scale): Polar Mount, 12 lbs; Tripod, 16 pounds; Optical tube, 19 lbs and the Counter weights w/attaching bar, 24 lbs. Setup went quickly although I did not time it.

While at Indian Trail Springs I also had an opportunity to view the older G5 Mount with the same 9.25 scope and there is no doubt that Celestron has beefed up the tripod quite a bit for the newer CG5 Mount. While my original objective was for a visual scope I am confident that this mount and tripod would be a good imaging platform; the mount also has an autoguider port for those whose interest is imaging.

I used the instrument a total of around 12 hours over the three nights that we were at the Indian Trail Springs site. Power was provided by utility car starter battery packs using the included 12V connector. I think the batteries are around 18 amps each (meaning approximately 9 useable amps each). I did switch to the second unit, halfway through the second evening but the first still had life to it and when I left the second one still had a reasonable voltage level left. Celestron recommended, to me, power consumption availability of at least 1500 milliamps (which I assume is the maximum slew speed draw) and preferably 2000 milliamps.

Optics? Well, the last night I had the most exquisite view of Saturn that I have ever seen as well as, the previous evening, a beautiful image of NGC 253, the very large (almost 1/2 degree in length) Sculptor Galaxy, with many dust lanes resolved. I am happy.

Problems, if any: Several times, the motors started up and moved the scope on their own; aside from a minor annoyance a quick press of the undo and a new go to kept things squared away. Previous early evening startups always resulted in Vega as the first of the three alignment stars; until the last evening this was pretty much straight forward. The last evening I needed to catch some Herschel objects that were not going to be visible until about 3:30 AM. I therefore took an early nap and got up at 1:00 AM. When I started up the scope it went looking for Vega, as the first star of the initial three, in the wrong part of the sky; in fact it did this twice at that time; I just did an undo and let it choose another star which it went to, the second time and successfully completed the alignment, whereas the first time I simply turned the unit off; I did double check the time and location before that second search to make sure that no data had changed. Just before 3:30AM I turned off the scope and did another start up procedure; this time it found Vega with no problem; strange occurrence.

There is one feature that I did not like at all and that was the short cord on the hand controller; it really keeps you close in. The finder at 6x30 is a bit wimpy for the size of the scope and I do wish it was the larger 9x50; but then I can appreciate that Celestron is trying to keep the cost affordable; never the less I wish they would raise the price fifty bucks or so and lengthen the hand controller cord and replace the 6x30 finder with a 9x50 (hint, hint, Celestron).

It was also a bit annoying not to have a "below horizon" message prior to slewing to a few selected objects that were but then good planning can avoid this problem.

It appeared to me that the Nexstar memory would not retain any specific site information except the last one you entered the coordinates for; therefore you will probably need to know the coordinates of any intended travel site in advance; Celestron does include the coordinates for a number of cities, both US and International, in their manual and there are a number of websites with this information. I believe that Celestron actually also has an optional GPS setup for this scope but I had no reason to explore that option as I have a small hand held GPS unit already.

The balance weights were one short when I received the scope but Celestron did respond in a reasonable manner and sent me the missing weight; I am also satisfied with their Customer Service.

All in all I am very pleased with the optics, NextStar controller and the CG-5 mount. At \$1699 you get a lot of optical performance with good goto functions and reasonable component weights. My objectives were achieved for a travel scope. I would certainly repurchase this scope and mount again without any reservations.

I think this is a major sleeper and hope more folks learn about what a great value and performer this set up is.

Oh, and my Herschel List? Well I am down to 24 remaining objects.

Clear Skies & Happy DSO Hunting!

## A Cheap But Effective Dobsonian



Pat Rochford

My son Breandan turned eleven recently and for his birthday I decided to build him his own telescope. We die-hard amateurs all secretly hope and pray that the astro-gene gets passed down to our offspring. I am uncertain at this time if Breandan will ever be as passionate about stargazing as I am, but he has spent many a night out in the observatory with me, peering through my 24" Dobsonian at some rather incredible sights. At the very least then, I have planted the seed and we'll just have see what sprouts in the coming years.

With this uncertainty in mind I didn't want to invest a ton of money in premium optics and accessories, only to discover the telescope ended up collecting more dust than starlight. At the same time, I didn't want my son to have a scope sporting a cardboard tube and plastic focuser either. What has resulted is a truss tube Dobsonian that, if I do say so myself, looks and works just as well as one made by that guy in Kansas.

The first decision was to determine what size telescope to build. I have

come to believe (after about thirty-five years in this hobby) that 8" is about the minimum size aperture to consider, allowing for both planetary and deep sky viewing. Because of the good things I've heard about Chinese mirrors of late, I figured an 8" Synta or Guan Sheng mirror would be in order. After doing a little research, I found that a 10" could be had for not much more. The decision was finalized when my friend Rod Mollise ran into Bill Burgess (Burgess Optical) at this year's ALCON convention. Bill was offering a 10" F/5 primary and 1.83" secondary for \$260. This mirror is not quite the same caliber as my 24" Pegasus, but let me tell you, it's no slouch either. I believe the Chinese have gotten the small to medium Newtonian mirror thing down pat.

Once I had optical parameters to work with, I was able to determine actual weights and dimensions. This is the seventh telescope I've built since 1995, and consequently the seventh built using Randy Cunningham's (of Astro Systems) *Guide to Building Truss Tube Telescopes*. And since it was

published a few years ago, Richard Berry and David Kriege's *The Dobsonian Telescope* has also been indispensable in my projects. I can't think of a single issue that isn't answered between these two books.

trailer to work and worrying about a sudden downpour. I ended up spending \$50 in plywood. I did make use of a couple of scrap pieces left over from previous projects, so the actual cost may be

arrangement, there are only four tubes total - all parallel to each other. This arrangement seems to work quite well for a small scope, particularly if the tubes are slightly oversized. (the ones I used are 1 1/4" OD with .058" wall thickness.) The two upper tubes (when viewing below the zenith) are in tension, while the two lower tubes are in compression. The cost of aluminum tubes can be somewhat expensive if purchased at your local hardware store (\$10 - \$12 ea.), but if you watch AstroMart regularly there is a gentleman who occasionally sells 53" by 1 1/4" tubes for \$4 a piece. Rod purchased some of these a while back for a (now shelved) 16". My "cost" for four of these will be a small bottle of sour mash bourbon. Tube connectors can be had from McMaster-Carr (excellent service!) for practically nothing.

Now, according to Dave Kriege, mirrors up to 10" can be attached to a flat cell with three globs of silicone adhesive without causing any adverse effects. Trusting Dave on this, I built a cell using 3/4" diameter plywood cut 10" in diameter (to match the mirror). It is attached to the bottom board of the mirror box with 1/4" X 3" carriage bolts running through stiff springs. Threaded plastic knobs on the ends of the bolts allow for collimation. To facilitate ventilation, there is a 2 1/2" hole cut through the bottom of the mirror box and the cell. If I recall correctly, the cost of the bolts, springs and knobs was about that of two pints of Guinness. (Please pardon the occasional substitution of alcohol for U.S. dollars, as I often find the two somewhat interchangeable.)

Since I have little to no experience in working with metals (and haven't figured how to make them out of wood yet), I opted to purchase a spider, secondary holder and focuser. All of my other scopes use AstroSystems' spiders and secondary holders and have held up very well over the years. The cost



Most of the wood components are constructed of 1/2" birch plywood, the exceptions being the bottom of the mirror box and the ground board, both of which are 3/4" birch. I probably paid a little bit more by purchasing 2' by 4' pieces (on my lunch breaks), instead of a single 4' by 8' sheet, but in doing so I didn't have the hassle of bringing my open

closer to about \$65. I finished the outside of the wood with a golden oak stain and a few coats of polyurethane. The inside was sprayed with Krylon ultra flat black, so finishing ran about \$12.

I referred to this scope as a truss tube design, but technically it really isn't. Rather than using four pairs of aluminum tubes in a truss

of a set for the 10" was \$64. The focuser is from JMI and is referred to as a "reverse" Crayford design. The 2" kit version is \$79 and I honestly can't tell the difference in the feel of this from the JMI DX-3 focusers in my other scopes - at twice the price. I did manage to fabricate a pivot bolt (for the rocker box) by having a fender washer tack-welded to 1/2 nut after the nut had been drilled and tapped for a set-screw. This nut/washer assembly screws to the bottom of the ground board (two holes drilled through the washer) to hold it stationary. The pivot bolt itself (1/2" by 2") passes through a flat washer counter sunk into the bottom of the rocker box and screws into the fixed nut mentioned above. The bolt is tightened to allow just a tiny bit of play and then the sets-crew is run up against it. Now that the bolt is held stationary, the rocker box is free to pivot about it.

The finder, from Apogee, Inc., is the newest entry in zero-power units used on so many Dobs these days. It's father was apparently a Telrad, as it projects three red circles like the Telrad, but covers two degrees of sky, rather than four. At five ounces, it is much more forgiving when mounted on the upper cage assembly - particularly on this relatively small (by today's standards) scope. Oh, and the cost is half that of the Telrad or Rigel Quickfinder.

Besides having some scraps of wood left over from previous projects, I also had pieces of Ebony Star Formica and Teflon (for bearing surfaces) and Kydex (for the upper cage) lying around as well. By the way, these often difficult to locate materials can frequently be found on Herb York's wonderful internet site, AstroMart, by someone advertising their leftovers.

Finally, I purchased foam rubber tube insulation (again from McMaster-Carr) to give it a finished

appearance as well as dampen any vibration that might result from the aluminum tubes. (It's also handy on very cold nights when grabbing the struts with bare hands.) At this time I don't see the need for a shroud, as the mirror box sufficiently blocks stray light from the primary. Same goes for the upper cage assembly. If I should decide that I want a shroud at a later date, a yard and a half of light weight black material and some Velcro will take care of that.

In actual use this scope handles exactly as I had hoped. Movement in altitude and azimuth is very smooth and free of backlash. Eyepieces can be removed without it tipping up or down (it is balanced for up to a one pound eyepiece) and the optics are held rigidly in place, with very infrequent need of collimation. The total weight is 50 pounds - the optical assembly at 30 pounds and the base at 20. Orion states in their catalog that the 10" XLT has a total weight of 58 pounds, so Brendan's is noticeably lighter. The upper cage and mirror box can be separated from the tubes by the removal of eight bolts, but I shouldn't think this would be necessary very often, as the length of the optical assembly is only 52". It is designed to be used from a sitting position, having an eyepiece height at the zenith of 52".

Bill Burgess told me I would be astounded at just how well this mirror would perform. I would expect him to make such a statement, since he was the one selling the mirror--but he wasn't really exaggerating. Once the mirror has had a chance to warm up. That's right, *warm up*. That's life here on the Gulf Coast in August with a pre-menopausal wife who keeps the thermostat on 65! It shows very similar star images on both sides of focus. Globular clusters (M22 & M13) resolved all the way to their cores and planetary images (Mars & Saturn) have been

very sharp and contrasty. I have been able to view Mars on steady nights at 470X (8mm TV Plossl with 3X barlow) without any image breakdown. Panning through Sagittarius and Scorpius with my 31 Nagler one night (I added some temporary counterweight to handle that bad boy) was quite impressive, providing a true field of view at just a hair under two degrees. Talk about rich field viewing!

Well there you have it. A simple and affordable (one fourth or less than the cost of a custom 10" Dob) scope that can be built with three electric tools (drill, rotary and jig saws) for about \$575. If you're anything like me, you won't stop with building just one. And the only real problem you're likely to encounter, is thinking up an excuse for building yet another.

## Eggs in the Air

**Patrick L. Barry**

The sky will be filled with flying eggs on May 10, 2003, when a thousand students converge on The Plains, Virginia, for the first-ever national high school rocketry competition.

Called the Team America Rocketry Challenge (<http://www.rocketcontest.org>), the competition sets the goal of flying a custom-built, two-stage rocket carrying two raw eggs to a height of exactly 1,500 feet, and then returning the eggs to the ground unbroken. The team that comes closest to 1,500 feet without breaking their eggs will win the national title.

The competition is being organized by the Aerospace Industries Association and the National Association of Rocketry (NAR). NASA administrator Sean O'Keefe will attend the final event.

"The idea is to get kids interested in

the world of aerospace," says Trip Barber, director of the competition and vice-president of the NAR. "And they will learn some important lessons about the power of math and science-and cooperation and teamwork-along the way."

To develop their designs, the students first used computer simulator software provided by NAR. Then they had to apply old-fashioned ingenuity and craftsmanship to bring the design to life and flight testing to refine it.

Students constructed rocket bodies using a combination of hobby-store rocket kit parts and custom materials. A typical rocket might consist of cardboard tubes from paper-towel or wrapping-paper rolls, a pre-made nose cone, rocket-kit body segments cut to size, and light-weight, balsa wood fins. But the greatest challenge for many was designing the compartment for the eggs.

Some used plastic Easter eggs as casings, padding the inside with bubble wrap, foam peanuts, or even gelatin. Others decided not to "reinvent the wheel," making a cradle from the egg-crate material used for shipping eggs. Some chose to make larger, more powerful rockets big enough to carry the eggs inside, while others made smaller, more efficient rockets that have a bulging egg compartment mounted on top.

A hundred unique designs will be put to the test in Virginia. Only one will win. But for the students, the real prize has already been won: Learning an approach to problem-solving that works, whether you're launching eggs over a field or sending astronauts to Mars.

In the end, it's all about the future: Future technologies and the kids who will grow up to create them. Many advanced technologies are being developed now by NASA's New Millenium Program



(<http://nmp.nasa.gov>). Who will do that work in the future? Perhaps some kids who spent their weekends launching eggs in the air.

Are you a kid? Would you like to build your own rocket? Visit NASA's Space Place and learn how to make a bubble-powered rocket! (<http://spaceplace.jpl.nasa.gov/rocket.htm>.) It won't take you to Mars, but it's a good way to get started.

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

*Caption:  
A Boeing Delta II (7326) rocket launched the New Millennium Program Deep Space 1 spacecraft on October 24, 1998.*

# 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."



*HO, HO, HO and mistletoe and PRESENTS to PRETTY GIRLS! But for those two numbskulls, Beavis and Butthead? Wal-Mart's best 60mm 900x Meade "Jupiter" refractor! Not very charitable or in the spirit of the holiday season? Bah, humbug! You'd feel that way too if you'd been awakened at 0 dark-thirty by the sound of a mayo jar (hermetically sealed and kept on Funk and Wagnal's porch for a fortnight) hitting your front door, even allowing for the fact that said jar contains this issue's allotments of those ever-lovin'*

## Rumours

**The big, big buzz** of late is a little email that esteemed astro-merchant Gary Hand let fly on the day after Christmas. His s.a.a. missive contained the following predictions for the new year. All these things, I presume, are Chinese imports.

### Full Computerized GoTo Dobsonians, not just PushTo.

*I assume Gary is talking about "popularly priced" import dobs like we've seen from Guan Sheng and Synta.*

### 80mm 90mm 100mm 114mm and 120mm ED scopes out of China

*IF...the larger apertures are as good as the Synta-made 80mm ED (optically comparable to the TV76 for 500 bucks) being sold by Orion right now, man, a lot of the amateur landscape is gonna change. True, these scopes will not have the mechanics of AP or Tak or TV, but my humble ST80 has held up well over the years. Many people do not need battleship build quality.*

**GS Dobs sold only by one company, and not by who you think.**

*Not too sure what Gare means here...not Hardin?*

### 1/40th wave Newtonian mirror scopes.

*1/40<sup>th</sup> wave? Measured how? At any rate, the current Chinese mirrors are amazingly good, so this would not surprise me.*

### Quality long focus refractors

*Wouldn't have thought there'd be much of a market for these. Still, it would be a cheap way to get a good performing 6 inch refractor...until you have to buy the mount for an f/15 6 incher, that is.*

### Easy to use Digital camera adapters.

*Well, those Jordan Blessing sells at Scopetronix are pretty easy to use as it is.*

### Zero Expansion mirrors at the cost of Pyrex.

*Astrosital or similar?*

### GoTo Freeware that interfaces standard encoders

*Not sure about this one, either. Without a B-Box?*

## The Wrap-up...

### **Stressed reflector optics.**

*This can be done. But, why? With Chinese mirrors dirt-cheap, what would be the advantage?*

### **Dedicated Solar Prominence Telescope under \$600.**

*I have little doubt this will happen. Now, as to whether I'd want one, I'm not sure. I AM sure these will sell like hotcakes, however.*

### **100 degree eyepieces**

*Now, that would be cool. IF the outer thirty or forty degrees is decent. The current Chinese widefields, 65 – 85 degree AFOV jobs, are OK, but even in long focal length scopes things get pretty iffy the closer you get to the field edge. But I'm willing to be convinced.*

### **Dielectric thin film Jupiter and Saturn filters.**

*Being a Solar System nut like Uncle Rod (who's a card carrying ALPO member), I'm intrigued.*

### **Rent to Buy Scopes**

*Ok. Good idea. The concept of time-payment plans for telescopes used to be pretty common in amateur market, but for many years it's been cash on the barrelhead or a credit card. RENT TO OWN, huh?*

What do I think is potentially the most earth-shaking of these bullets? Probably the one about the inexpensive APOs. Not sure it can be pulled off, but, on the other hand, I didn't think the Chinese could do a scope near to a TV85 for a third the cost. So what do I know? Let's come back at the same time next year and see how many of these panned out!

*--The Anonymous One*



American Airlines pilot and SCT-wielding amateur astronomer extraordinaire Tom Wideman took the above *amazing* shot of noctilucent clouds while in flight. Being a flyboy is much more fun than being a cubicle-dweller like yours' truly, I'd say!

If you didn't tune-in last time, you have missed the news that *Skywatch* has gone to a quarterly schedule. I do hope that all the issues will be nice and fat like this one, but that depends on y'all--my contributors!

See you all in March!

--Yer Old Uncle Rod