REFLECTIONS AND REFRACTIONS

OF THE UNIVERSITY LOWBROW ASTRONOMERS

January 2005

Upcoming Events January 2005

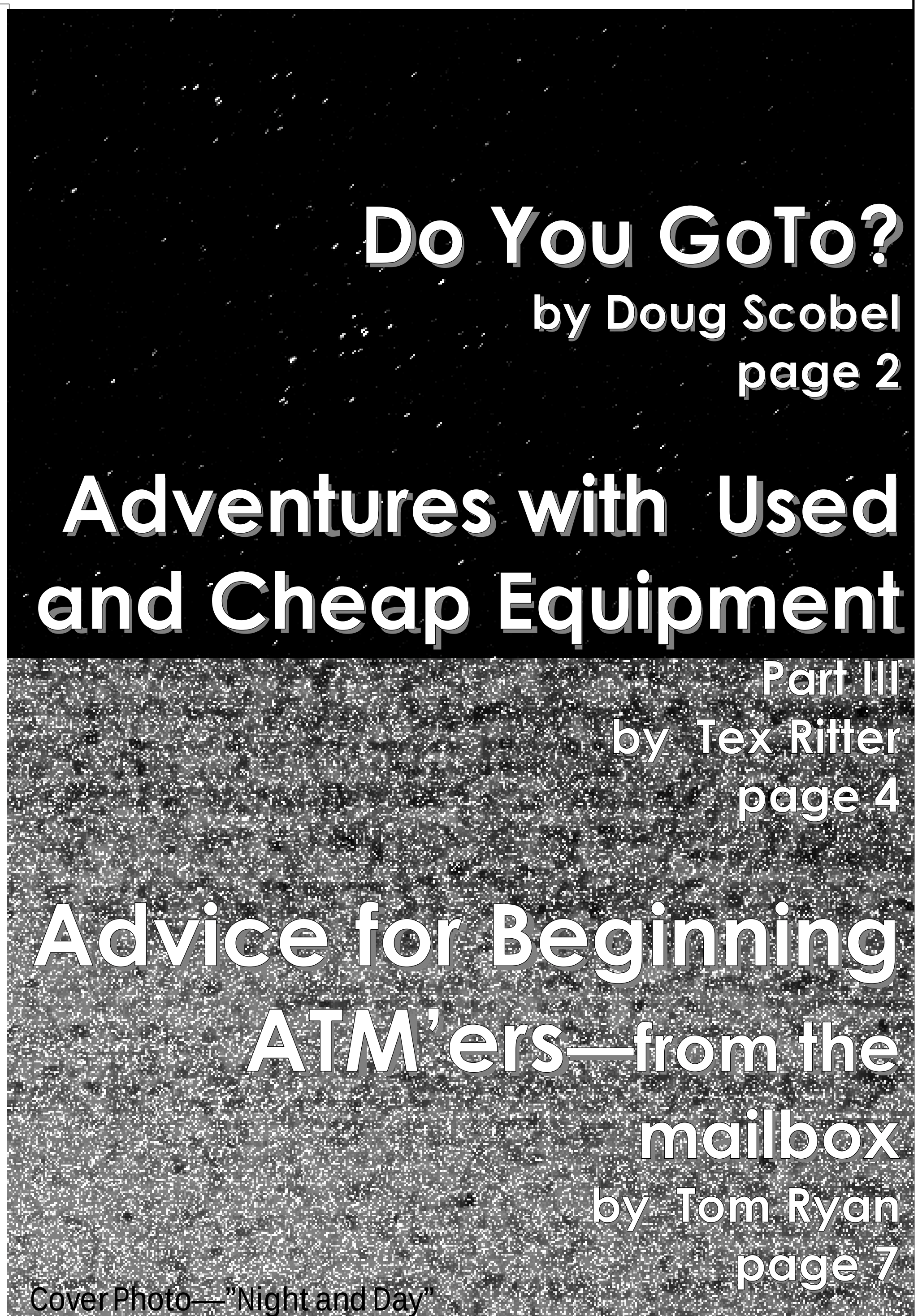
- **Saturday, January 15, 2005.** May be cancelled if it's cloudy or too cold. (Starting at Sunset). Open House at Peach Mountain.

- **Friday, January 21, 2005.** (7:30 pm). Monthly Club Meeting.

- **Saturday, February 5, 2005.** (9:00 am to 3:00 pm). The Second Annual FAAC Astronomy Swap Meet (co-hosted by the Ford Amateur Astronomy Club (FAAC) and Rider's Hobby Livonia). It will be held in Livonia, Michigan; admission required (see flyer more information). This year in addition to buying, selling, and trading of new and used Astronomy equipment, we will be featuring Astro Presentations throughout the day. Early registration closes on Thursday, January 27, 2005.

- **Saturday, February 5, 2005.** May be cancelled if it's cloudy or too cold. (Starting at Sunset). Open House at Peach Mountain.

- **Saturday, February 12, 2005.** May be cancelled if it's cloudy or too cold. (Starting at Sunset). Open House at Peach Mountain.
- **Friday, February 18, 2005.** (7:30 pm). Monthly Club Meeting.



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Do You GoTo?

by Doug Scobel

I'm glad I'm not just now entering into the astronomy hobby. With the bewildering array of equipment that's available in today's marketplace, trying to choose a telescope and accessories would be a little daunting. Take a look through a recent issue of Sky and Telescope magazine and you'll see what I mean. You'll see a lot of very high-end equipment showcased there, with corresponding high-end price tags. And the amateur-produced astrophotos in the back rival those created by the world's largest observatories as little as 15 years ago. When I was a fraction of my current age, most folks had either a 6-inch f/8 reflector (that they likely made themselves), or a 60mm refractor. Larger and more capable instruments were few and far between. Things sure have changed since then!

Unfortunately, today's environment can sometimes elicit one of two responses. The first says "Gee, I can't afford all that. Don't you need a $4000.00 apochromatic refractor, with a GPS-equipped, motorized, go-to mount that can locate one of 10,000 celestial objects with the push of a button? Oh, yeah, and don't you also need a handful of those ultra-wide angle, multiple element eyepieces that cost more money and have more glass in them than some entire telescopes, and would break your foot if you were unfortunate enough to drop one on it? And don't forget the filters, sky charting software, the laptop computer on which to run it, and the CCD camera. I'll never be able to enjoy the night sky, or create such images, as those guys. What could I possibly do on my meager budget?". Some of these folks get intimidated and decide that perhaps amateur astronomy is not for them.

Perhaps worse, some folks, often the old-timers like me (did I really just call myself that?), wonder if those lucky few who can afford such equipment are somehow "cheating", that they haven't really "paid their dues", and that astronomy done the "old fashioned way" just doesn't measure up in this day and age. "Why, in my day, we had to observe in the snow, barefoot. We couldn't afford eyepieces, we just cut the bottom out of a Coke bottle and looked through that. Our telescopes didn't have a tube – or even precision mirrors, we had to prop a shaving mirror against a fence post. Why, we were so poor we didn't even have stars! And we were *thankful!*".

OK, maybe I'm going to extremes, but some folks do get a little rankled about how "easy" it is today. I've seen plenty a post to the online forums on this very subject. Some actually think it's somehow bad for the hobby.

Now, I would say that it's neither good nor bad – it just is. People have more disposable income now, and so at the high end you'll see the results of those who have the most to spend. But in no way does that take anything away from those who have to do everything with less. In a sense it's true – our results depend on what we spend, but it has little to do with money.

Like me. All of my equipment is homemade, the 6-inch f/8 (w/ homemade primary) I made while in my teens, the 13-inch f/4.5 dob that I've used now for nearly 20 years, a homemade barn-door camera platform, and the 8-inch f/8 (also with homemade primary) I just completed a couple summers ago. No drives, no equatorial platforms, no thru-the-scope long-exposure photography, no go-to, no digital setting circles, all visual. Yet I've logged nearly 800 deep sky objects (not counting double stars), observed all the planets, observed sunspots, observed lunar and solar eclipses, observed, sketched, and photographed several comets, made several observations and sketches of Mars, photographed auroras, done wide-field sky photography, and finished the Herschel 400 list using only finder scope and star charts. And I'm sure that there are many of you reading this that have done as much, if not more.

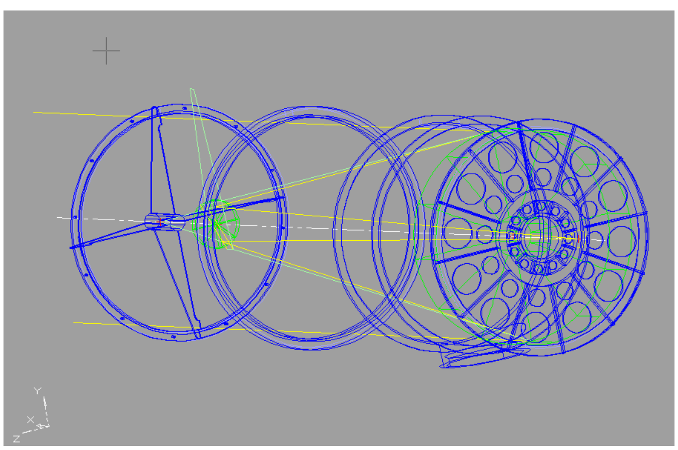
But does someone posting fantastic photos made with expensive equipment that they purchased rather than made somehow diminish what you or I have done by more modest means? No way. Yes, they can do things that I can't do, but I can say the same about them. Frankly, I enjoy immensely the amateur images seen recently in Sky and Telescope – they are truly amazing in many cases!

At the same time, while I have to admit that the "new school" methods are often "easier", I'm not sure that they are therefore invalid. After all, all of us stand on the shoulders of the giants who went before us. I certainly didn't figure out how to make a precision mirror by myself. I didn't draw up my own star charts. When I was making my first six inch scope, my dream was to someday own a 10-inch. Today my 13-inch is considered mid-size at best. None of us figured out how to do all this by ourselves. We all have Galileo, Isaac Newton, Leon Foucault, Jean Texereau, Wil Tirion, John Dobson, Al Nagler, and countless others (including some Lowbrows!) to thank.

Truth be told, when my financial situation is such that I can choose to afford more advanced equipment, then I'll be "moving up" myself!

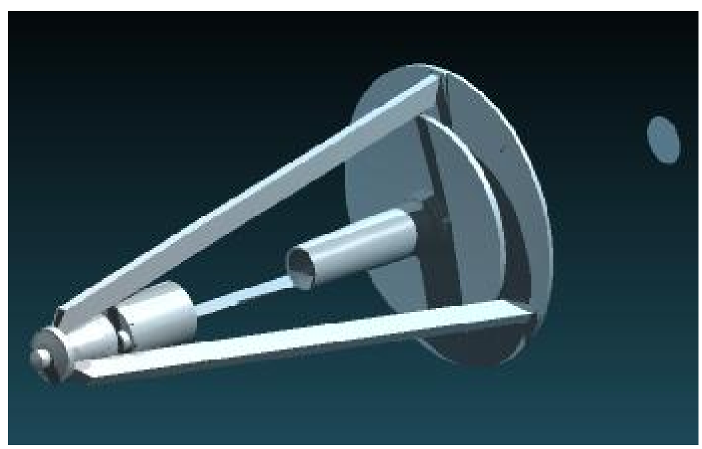
I guess what I'm trying to say is that no matter the era in which one starts, the state of the art is what it is. No one suggested to me when I made my first mirror that I ought to make it out of speculum metal or it's not real mirror making!

I think there's room in this hobby for everyone – old or new school. It's still the same subject. And I think that's good! ♦



Old School—circa 1984

The Lowbrow 24" telescope on Peach Mountain imagined as 24" f/4 Newtonian. It would need a 5" minor axis diagonal, a field corrector, and a CCD camera, considering the eyepiece position.



New School—circa 2004

A 14" space-based ultraviolet imaging telescope, which also has an inaccessible eyepiece position. Designed in Solid Edge, software from a UGS company. The tools move on, thanks in part to Doug. *-Ed.*

Adventures with Used and Cheap Equipment Part III

By Tex Ritter

Tex was thinking about the 5P's as he switched on the Astromaster. "Prior Planning Prevents Poor Performance", he could hear his mother saying to him. "Get there first with the most", he rejoined. Sometimes there just wasn't enough time to prepare for every possible thing that could go wrong.

The Astromaster was taped to the C-8's fork arm so it wouldn't drop on the ground in the dark, and that also kept the tiny wires which went to the encoders from flexing too much. He had already broken the solder connections on the encoders twice while mounting them. Turning on the Astromaster caused its display to light up with tiny red characters. It announced that it was produced by the Celestron Corporation. Tex knew that this wasn't true, but he watched the start up sequence anyway. He had once reverse engineered the code inside the thing to better understand its operation, and the source code was written by a company that was not the Celestron Corporation. Reading the code had been tricky because the data lines going to the EPROM were scrambled and that made the downloaded source code itself apparently incomprehensible, but Tex was unusually adept at analysis. What he had, he thought, were selective abilities. He knew what the code did, but he didn't remember at all what the buttons did.

Now the display was asking him to set the Dec to zero. Tex did, and hit the "Enter" button. It next told him "Mode align star". With four buttons on the Astromaster to choose from, and no instruction manual to guide him, it took Tex some time to get to the point where he figured out that he could pick a star from the menu, point the C-8 at the star, and hit "Enter" in order to move the processor's tiny brain toward some realization of where it was in relation to the universe. Tex hated this. He positively hated every microprocessor based interface that he had ever encountered, with its layers and layers of hidden choices and infinite options. He fervently wished that he could have every software engineer design a microprocessor interface to a parachute's rip cord, and then have them use it on their way out of an airplane. "If a software engineer designed a gun, pulling the trigger twice would make it change stations". Tex realized that this kind of thinking probably condemned him to the sidelines in the big football game of the future, but he didn't care. "Four score and ten and I'm out", he thought.

Tex found three stars from the menu, found them in the sky, and hit the "Enter" button for each of them. By now he was familiar enough with the interface to be able to scroll to the point where the display would read out the telescope's position in right ascension and declination. He moved the telescope through 90 degrees. The display told him he moved 44. "OK", Tex thought, "time to set the globals". But where were they? Tex examined every permutation of the menu, and there was no way to set the scaling factors of the encoders.

It was still not yet 5:00 PM on the west coast. Tex called Celestron, and asked a technician how to set the scaling factors. The technician didn't know, of course. Tex was undecided as to whether this was due to the age of the Astromaster or the age of the technician, but ultimately it really didn't matter. The technician told Tex he could download a manual for the Astromaster from their web site. Tex thanked him, and did that.

The manual claimed that the mode for setting the encoder's scaling factors, "Mode Setup", was right there on the menu, between "Mode Encoder" and "Mode Align Star". Except that it was not. Not there, or anywhere else. Tex started to laugh. It beat crying any day. He sat down for a minute to think. This Astromaster was old, yes, and used. It was made by a total software geek. Where would a total software geek hide the setup variables to keep them out of the way, but still have them accessible?

He would access them from a routine that was activated if the user was pressing a button down when the Astromaster powered up. Tex did this, and there they were. Equatorial mount scaling factors, with the first decimal blinking, ready to be changed.

Tex changed the scaling factors to what he guessed they should be, after comparing the actual and reported motion of the scope. He pressed "Enter" until he was back to the "Align stars" mode. He aligned on three stars again, and the Astromaster gave him totally erroneous results for finding a fourth star. He switched to "Encoder" mode, and got a readout of where the Astromaster thought it was. The equator was still the equator, but the north pole was now at –90 degrees. "Uh oh," he thought. "I've put the declination encoder on the wrong fork arm."

Tex thought about remounting the encoder. He thought about cutting into the encoder wires to rewire them and flip the phases. He thought about the resolution and accuracy of the encoders, the uncertainty of the polar alignment, about the Astromaster's reported gigantic warp errors, and he thought about the sun coming up in a few hours. Really, he thought about a lot of things.

When Tex finally realized that the Astromaster was just not going to be made to work in the time he had left, he started to get a little worried. He was forced for the first time to admit the possibility that this whole thing might not be ready for the meeting with his customer. Finding a star in the daytime sky with the equipment he had available required that the star be located by reference to some clearly visible object. Once the scope was zeroed in on a known object, then a known offset could be applied. He had counted on the Astromaster to do both things, but now he needed to reconsider. He felt he could still do offsets, even with the Astromaster reading upside down, but how was he going to precisely locate his reference object? For one thing, swapping the eyepiece for a camera was a very bad idea, because the C-8's point spread function, never very good, got bad enough with just a little defocus to make the star vanish entirely.

The camera that the customer had available for this test had a viewing area that was much smaller than the field stop in the Celestron's eyepiece. That meant that the area within which the star (or planet) had to be acquired by the camera was very small. Much smaller, in fact, than the one degree resolution of the setting circles. The camera also had a very long readout delay, so whatever was displayed on the monitor was what the C-8 was looking at about 40 seconds ago.

Tex's thoughts drifted back to a discussion he had had with a project manager several years earlier. The objective of that project had been to use a telescope to track a laser beam spot that was about the size of Jupiter across the sky. Unfortunately, and for reasons which Tex never discovered, the field of view of the telescope had been designed to be about twice that of the spot. Furthermore, both the laser beam and the telescope had many, many points of adjustment (read "opportunities for misalignment"), and the beam was not in the visual part of the spectrum. Tex had argued for a feedback loop to keep the spot in the telescope's field. The project manager felt that that wasn't necessary, and why didn't Tex just align the scope to the spot in the first place, keep it there, and stop complaining? Tex then did a back of the envelope calculation for the guy which showed that scanning the sky for a spot the size of Jupiter, with a telescope whose field of view was twice that of Jupiter, using a detector that required so much time to acquire an image, would result in a sure sighting in about four months.

Tex's rule of thumb for an effective customer demonstration was 40 minutes, twenty slides, max. After that, their attention started to drift. Hey, if they liked studying, they'd all be teachers, right? Four months to acquire an image was not an acceptable situation. Tex needed a way to zero in on his reference object better than the one degree marks that the setting circles permitted. Then, he could interpolate between the marks to make a move, or use the Astromaster, while trying not to make it obvious to the customer that the Astromaster was reading north for south. But first, to zero in on his reference object, Tex needed a finder scope with an illuminated reticule.

Unfortunately, he didn't have one.

He did have an old Telrad finder, though, which he had, of course, bought cheap many years ago. It had everything he needed; good resolution and a virtual image of a reticle projected onto the sky. (A neat optical trick. Tex had seen the same optical layout used in helicopter gun sights and F-16 heads-up displays). He had never used the Telrad, but he knew where it was. He ran to get it, and was surprised to find that it actually was where he thought it would be. He was less surprised to find that it had a battery in it, dated ten years ago, and that it had been left on.

He quickly replaced the battery with a new one, turned it on, and found that it still didn't work.

Tex tore into the Telrad with a little more speed and a lot less thought than he usually displayed. Part of that might have been due to the very late hour, and part due to Tex's acute awareness that even if the Telrad could be made to work, it wasn't mounted yet, the drive might or might not work during the demonstration, the Astromaster's offset was backwards, and he had not, actually, seen stars in the daytime with this equipment yet.

Whatever it was, Tex checked the wiring for breaks, checked the electrical connections for corrosion and cold solder joints, checked the battery for power, and the mirror for alignment. He used a razor blade to shave the plastic reticle target off the LED mount to see if it had darkened to the point of obscuring the LED's light. He repeatedly turned the switch on and off to get a good connection at the contacts. And he concluded that the LED was burned out.

LEDs never burn out. Tex knew this, but he thought he might be the first person in the world to experience an LED failure at low hours. What Tex knew at this point was that he had more LEDs on hand. Red, yellow, green, blue, and white. He could fix it. If he could get it out of the case. It was completely encased in silicone in its alignment bracket, and the bracket was not easily accessible. Tex got out a sharp knife and a pair of needle nose pliers and cut the bracket out of the Telrad. He cut the silicone away from the LED and its leads, expecting to find a corroded solder joint. (After all, silicone gives off acetic acid when it cures, and that might have corroded the connection.) However, the solder joints were perfect. Tex connected another power source to the LED through clip leads, and the LED lit up.

Tex took a moment to consider. He looked at the parts of the Telrad he had tested, and his eyes fell upon the previously overlooked carbon rheostat that was used to adjust the LED's brightness. He checked it electrically, and sure enough, the wiper wasn't making contact with the resistor. After spinning it back and forth about twenty times, it started working. Ten years of disuse had not made it any better.

The Telrad was now in more pieces than it had been in before the factory assembled it. The sun was due to come up in an hour. Tex felt like he was made of solid glass from the shoulders on up. "I'm a dead man", he thought. This isn't going to work, and it's not going to work because it was assembled from too many pieces of used equipment. From one or two or three, it would have worked. But when everything is used, and untried, and unintegrated, it's too much to expect that all of the problems can be overcome.

Tex decided to get some sleep. If he had to face the music, he might as well be coherent for it. He set the alarm for ninety minutes, and as his head hit the pillow, he noticed that his jaw muscles were locked somehow.

When the alarm went off, Tex felt even less human than he did before going to bed. But he got up and staggered to the window. Light was coming in, but not bright sunlight. Tex managed a smile. "Looks like I got a break", he thought. The sky was completely overcast.

Epilog

After some days had passed, Tex was able to correct all of the equipment's problems and show his customer stars during the daytime with it. Not well and not many, but the ones he could see provided the hard data he needed to design a much better system which actually could see stars in the daytime as well as you or I can see them at night. Tex's customer was very pleased. (Several well-known companies had previously tried this and failed, although Tex will tell you that they really had bigger fish to fry). And because, at the time this series began to be published, Tex believed that specialized technical knowledge should not be left in the hands of a small elite group, and that the very best way to spread Truth, Democracy and the American Way is to export Nike tennis shoes and McDonald's franchises, he was going to tell you how to do it, too. At least, generally.

However.

A week or two after the first installment of this series was published, Tex received a short communication from his customer which advised him of the need for non-disclosure of any and all details of the device. And because Tex values his freedom and honor as much as anyone, and because he came to realize, Truth to Tell, he favors the side of the Nation-States over that of the Corporations on most issues anyway, he's now decided to keep the details of the device between himself and his customer. Tex knows that you will all eventually, probably, find out about the details, and he hopes that it will be because you wanted to know, rather than for any other reason. However, you won't be finding out about them from him. ♦

Editor's Note: If you readers would send in some real articles, we wouldn't have to fill up the newsletter with this stuff.

Telescope Topics

By Tom Ryan

"Advice for Beginning ATM'ers From the Mailbox"

"I acquired a mirror and I'd like to make a telescope with it. It is an 8 inch mirror and has "F-8.5" written on its back side. A quick check would seem to show its radius as being about 138 inches; very close to the 136 inches a true 8 inch F-8.5 mirror would in fact possess. That would make its focal length 68 inches. Am I correct??"

It is true that a mirror's focal length is exactly one-half of the radius of curvature, but I'm concerned about the 2" difference in measurements. It is really worthwhile to measure this distance correctly, either by making a radius of curvature measurement, or by making a focal length measurement (perhaps by sticking a tape measure through a 4"x4" piece of cardboard, aiming the mirror at the sun on a semi-cloudy day, placing tape over the end of the tape measure so as not to harm the mirror coating, and, with the tape measure held against the center of the mirror and the mirror pointed at the sun, slide the paper along the tape measure until the sun is in focus.) The measurement should be good to within 1/8". Otherwise, you could have problems that result in your needing to drill extra holes in your telescope tube to get everything spaced correctly.

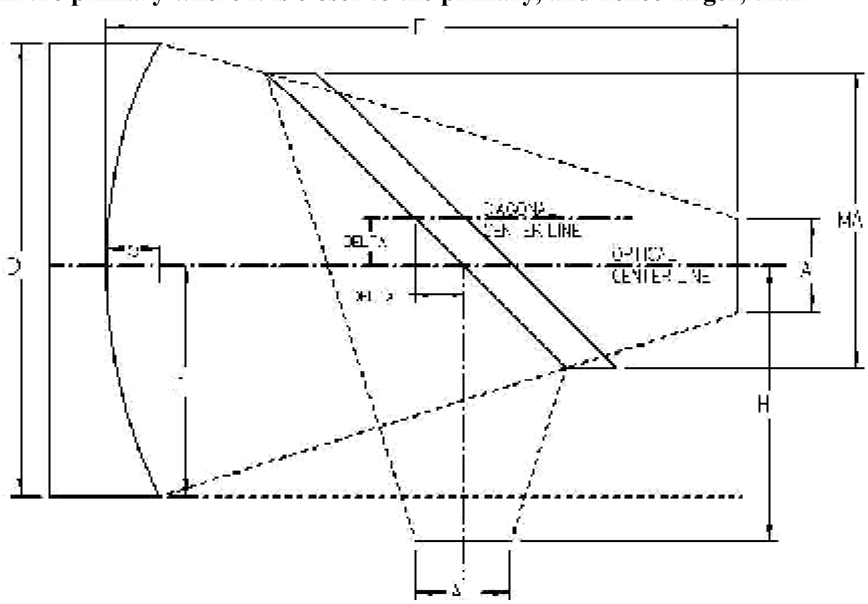
"From my notes from some years ago, my diagonal mirror size starts at a minimum of 1.5 inches (minor axis) to about 1.7 something inch (minor axis) depending on how large I want the 100% illumination circle to be. Do you agree, or disagree??"

The exact formula for finding the diagonal size appears in "How to Make a Telescope" by Jean Texereau, on page 375 of the second English edition, and is:

Diagonal's Minor Axis Length "MA" = (L/M) + (L/N)

The diagonal Offset "Delta" = [(L/M)-(L/N)]/2

(Note: For 8" mirrors f/6 and longer - your mirror, in particular - delta can be assumed to be zero. This "delta" is the distance between the scope's optical axis and the diagonal's center (offset because the diagonal's lower edge intercepts the converging light cone from the primary where it is closer to the primary, and hence larger, than where the top of the diagonal intercepts it), but is only important on very fast scopes.)



where L, M, and N are calculated as follows:

L = A(F-e) + H(D-A)

M = 2(F-e) - (D-A)

N = 2(F-e) + (D-A),

where "e" is the mirror's maximum depth, calculated from the formula:

$$e = r^2 / 4F$$

"Parks sells some nice looking fiberglass tubes & end rings that would look to match the telescope shown on the cover of the Novak catalog I have dated 92-93 edition. They also list some kind of "rotation rings". I assume that allows a person to rotate the telescope tube in the cradle mount for easier access to the focuser and eyepiece. Would you recommend those choices, if I am indeed correct?? -or- should I just buy some sonotube for now, as it is a lot cheaper when I have an "oops" the first time around??"

Sonotube is good. Fiberglass looks terrific, but my own Parks fiberglass tube, made in the early '60's, still smells like fiberglass. It's your choice.

When I put my own first scope together and started looking at objects in the sky, I quickly realized that the eyepiece usually ended up in some awkward place, so I made my tube rotatable (it slides on felt glued to the cradle), and have continued to do so ever since. Most guys I know try to make all or some of the tube able to rotate. However, the very early rotation rings sold by Parks or Cave were too loose. They would rotate too freely, and wouldn't keep an object in the field when the tube was rotated. Maybe no reasonably priced rotation system will do this perfectly, or maybe Parks has improved the product since I last looked at it, 30 years ago. Call them and ask about this. A rotating tube can be a great convenience when you're using a Newtonian telescope on an equatorial mount.

Incidentally, my first homemade telescope, a 6" f/8, had a three-vane spider, a helical focuser, and a cork-lined aluminum tube which was closed off to ventilation at one end by the solid mirror cell. Obviously, I was trying to get every bad move out of my system at once, forever.

Whatever you decide, keep in mind that the Parks rotation rings will probably only fit the Parks fiberglass tube. You might want to take a look at the Lowbrow club's 8" F/8 Cave Astrola out at the observatory to get an idea of how the whole thing works, and whether or not those features are important to you, personally.

"My next "guess" is that my tube length will be close to the mirrors focal length of 68 inches. I would think that mirror cell construction would affect that. (How much distance from the mirror cell to tube mounting fasteners -to- the mirror surface; how far from the tube end to the cell mounting fasteners; how far from the secondary mirror centerline to the spider mounting fasteners; how far from the spider mounting fasteners to the open end of the tube?"

Yes, you are right. All of those things affect the tube length. Try to get all the parts together before you get the tube, but certainly before you start drilling holes. Take measurements, and remember to allow some tube length out past the diagonal. That not only shields the eyepiece from stray light, it also acts as a dew shield and keeps the diagonal from dewing up. A good amount to add past the diagonal is a length equal to the diameter of your mirror, which means your tube will end up being closer to 76" long. If in doubt, ask Parks for a recommendation. They've been doing this for a long time.

"It would seem to be a tough measurement to figure out without having most of your mounted parts to obtain measurements from in order to do some layout!! Am I correct, or am I just making it a lot harder than it really is?!?!"

No, you're not making it harder for yourself. You're just trying to prevent the "extra set of holes" syndrome, which affects about half of the first telescopes out there. Wait until you have all of your parts before you start drilling holes. Lay the whole thing out first on a full size piece of paper or a CAD system, if possible. It's even worthwhile to get some eyepieces first, too. I have a very expensive Nagler eyepiece which won't reach focus on my 8" Cave Astrola, because that particular eyepiece needs to be a lot closer to the mirror than do most other eyepieces. If you know this beforehand, you can better plan the placement of all of the components.

For specific eyepiece advice, I recommend you talk to Doug Scobel. He does a lot of observing, and he has tried a lot of eyepieces.

"The equatorial mount I have contains the word "Astrola" cast into the housing. As I remember it, that was a high quality product line for it's time, wasn't it??"

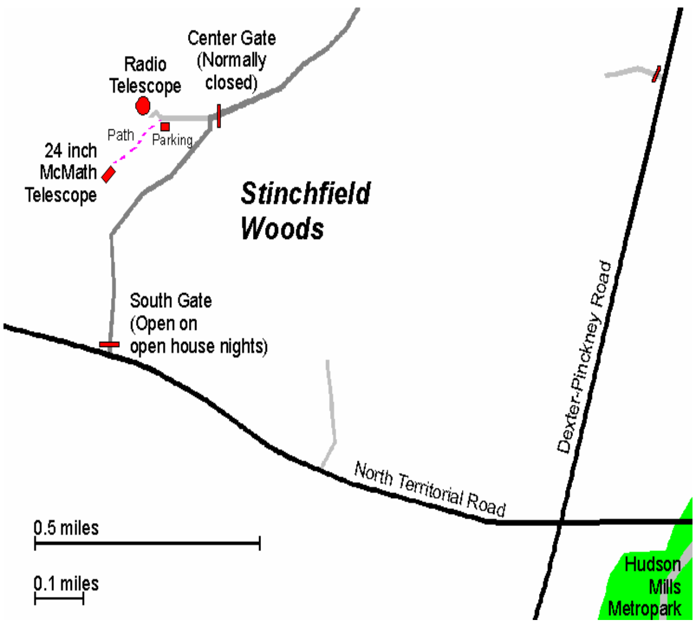
Astrola was one of the best manufacturers in its day. The mirrors were and are top quality, but the mounts are not as good as a really expensive ($4000) mount can be today. Still, they're light years ahead of anything that is a mass produced equatorial available today. Surprisingly, a Dobsonian mount is better (for just looking around the sky) than even an Astrola mount. The Astrolas had ball bearings on the shafts, which made them easy to move, but ball bearings don't have enough friction to dampen vibrations, and the Astrola mounts without gear drives tended to oscillate too much for my taste. If you're just looking around the sky, you want to have big Teflon or Delrin bushings, like the Dobsonians. If you're taking pictures, you want to have a big, heavy mount with ball bearings, like the Astrola. The Astrola mount, combined with a modern gear drive, like a Byers, would be a great instrument for imaging. Heavy, but great.

"If you have any comments that would address issues I am not even thinking to ask about, please mention them!!"

I really can't think of any particular issues, but there are probably more out there. Because of that, I highly recommend that you attend an astronomy club's Star Party or an Open House on Peach Mountain, and spend some time talking to the Lowbrows there and using both their scopes and the club's scopes. There are guys out there who have used just about every kind of scope there is. They can give you very good advice on the good and bad features of their scopes, and you can try the scopes out to see if you agree. "Try before you buy" is a great way to avoid unpleasant surprises, both in your scope and in how you end up using it. ♦

Places and Times

Dennison Hall, also known as The University of Michigan's Physics and Astronomy building, is the site of the monthly meeting of the University Lowbrow Astronomers. It is found in Ann Arbor on Church Street about one block north of South University Avenue. The meeting is held in room 130. Monthly meetings of the Lowbrows are held on the 3rd Friday of each month at 7:30 PM. During the summer months, and when weather permits, a club observing session at Peach Mountain will follow the meeting.



Peach Mountain Observatory is the home of The University of Michigan's 25 meter radio telescope as well as the University's McMath 24 inch telescope which is maintained by the Lowbrows. The observatory is located northwest of Dexter. The entrance is on North Territorial Road, 1.1 miles west of Dexter-Pinckney Road. A small maize-and-blue sign marks the gate. Follow the gravel road one mile to a parking area near the radio telescopes. Walk along the path between the two fenced in areas (about 300 feet) to reach the McMath telescope building.

Public Star Parties

Public Open House/Star Parties are held on the Saturday before and after each new Moon at the Peach Mountain Observatory. Star Parties are canceled if the sky is cloudy at sunset or the temperature is below 10 degrees F. Call 4332-9132 for a recorded message on the afternoon of a scheduled Star Party to check on the status. Many members bring their telescopes and visitors are welcome to do likewise. Peach Mountain is home to millions of hungry mosquitoes - bring insect repellent, and it does get cold at night so dress warmly !
Amateur Telescope Making Group meets monthly, with the location rotating among member's houses. See the calendar on the front cover page for the time and location of next meeting.

Membership

Membership dues in the University Lowbrow Astronomers are $20 per year for individuals or families, and $12 per year for students and seniors (age 55/+). This entitles you to the monthly REFLECTIONS newsletter and the use of the 24" McMath telescope (after some training).
Dues can be paid at the monthly meeting or by mail to this address:

Kathy Hillig
7654 W. Ellsworth Road
Ann Arbor, MI 48103

Magazines

Members of the University Lowbrow Astronomers can get a discount on these magazine subscriptions:
Sky and Telescope: $32.95 / year
Astronomy: $29.00 / year

For more information contact the club Treasurer. Members renewing subscriptions are reminded to send your renewal notice along with your check when applying through the club Treasurer. Make the check payable to "University Lowbrow Astronomers".

Newsletter Contributions

Members and (non-members) are encouraged to write about any astronomy related topic of interest. Call or Email to Newsletter Editor at: John Ryan (734) 662-4188 allegheny@mac.com to discuss length and format. Announcements and articles are due by the first Friday of each month.

Telephone Numbers

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Lowbrow's Home Page

http://www.umich.edu/~lowbrows/

Lowbrows,

Although I haven't had any time to do any astronomy in the last year, I took an evening (Dec 30th) to image the comet with Steve Peterson here in Tucson. Steve lives in Vail, a southeast suburb of Tucson. We used his equipment and I just helped with some of the driving. He has a top notch mount, 4 inch refractor, and a FLI dream machine for the camera. We managed to get an hour or so to image it before the clouds moved in. We took a series of images. This image is a LRGB color, that was DDP'ed in MaximDL and then the color stretched in Photoshop. We didn't do any color balancing, just did a quick process to see what we got. So the colors might not be anything like real. FOV is 2.25 degrees. The exposures were 30 sec Clear, 60 sec colors, times 5 sets.

That said, I thought you might be interested in this image. It shows a greenish coma, a blue ion tail and a green/yellow dust tail (faint).

\- Roger Tanner

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