



# The American Astronomer

THE QUARTERLY NEWSLETTER OF  
THE AMERICAN ASSOCIATION OF AMATEUR ASTRONOMERS

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## BASHING 60-MM REFRACTORS

Gene Lonak & Jack Kramer  
of the 60 Millimeter Society

Small refractors have their place in amateur astronomy. Even in this age of high-tech astronomy, a small, short-focus refractor can be a very useful instrument. In this article, we'd like to talk about some things that may be of special interest to those of you who are thinking of buying one as your first telescope. But some of these suggestions apply to instruments of all sorts.

The refracting telescopes normally sold in department stores are typically about 60-mm in diameter and come equipped with very high power eyepieces. As instruments go, not all of them are inferior, though most have some limitations. In the hands of a knowledgeable observer, they're capable of some good results, so we can't dismiss them as worthless. A person who knows how to use them is able to transcend their limitations by observing objects for which they're especially well suited.

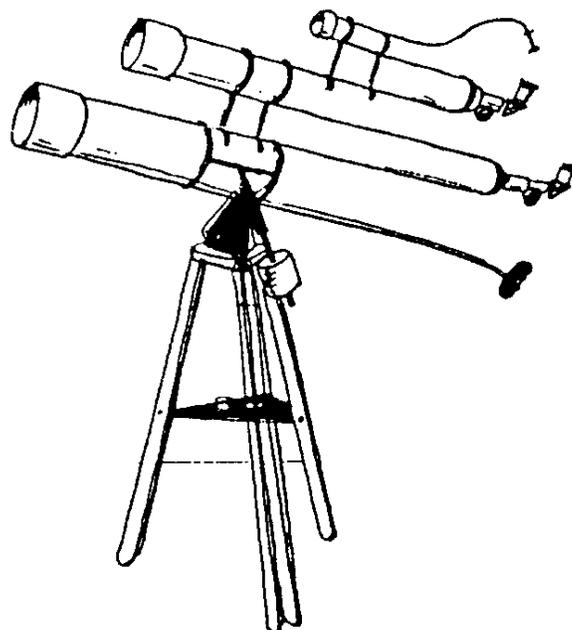
In a typical example of "niche marketing", manufacturers aim to sell to the newcomer, rather than the experienced amateur astronomer. When was the last time you saw a Jason or Tasco telescope advertised in the astronomy press? Yet it's simply unfortunate that these telescopes usually wind up in the hands of novices who become frustrated with the limitations. They expect to be able to use the high powers advertised ... and they can't. They want to find faint objects in the sky ... and they can't.

Experience suggests that those refractors probably aren't the best telescopes for newcomers to our hobby. But they can be improved upon. The title of this article doesn't mean that it's purely

a criticism of "department store" refractors. It comes from a term used in model rail-roading. To "kit-bash"

### John Braccili Receives Lunar Club Award

A hearty congratulations to AAAA member John Braccili, who recently received the Astronomical League's Lunar Club certificate and pin. John hails from Upper Darby, PA, and observed 100 lunar features in the program using his naked eye, 7x50 binoculars and an eight inch Schmidt-Cassegrain telescope. We all here at the AAAA just want to say, "Nice job, John. We're proud of you."



**Yeah, yeah, we know. You can't see anything with a 60-mm refractor. You can't see things like the Veil Nebula, the North American Nebula, the Pelican Nebula, the dust lanes in M-31, or the Horsehead Nebula. But with this 60-mm refractor drawn by Govert Schilling, would it be possible to see things totally invisible?**

means that you take something as it comes out of the box and make improvements on it to suit your taste and/or needs. So let's try the same thing with these refractors.

### Upgrade the Oculars

For an unknown reason, a few of these telescopes use non-standard eyepiece sizes. This means you cannot upgrade your eyepiece collection with better .965" oculars. If you'd like a wider field, in the typical 60-mm refractor a 32-mm ocu- *continued on page 3*

### Sky and Telescope Magazine

#### Calling All AAAA Members

Did you know that you can subscribe to *Sky and Telescope* magazine at a discount through the AAAA? A regular subscription to *S&T* is \$36.00 per year, but you can get it through the AAAA for only \$27.00 per year. If you would like to start a subscription to *S&T* through the AAAA, or if you want to extend your present subscription at the reduced rates, then send a check for \$27.00 made payable to the AAAA to:

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## President's Letter

In our March issue, we focused on observing programs for telescopes, especially the larger telescopes. In this issue, we want to focus on the lowly "60-mm department store refractor". You know the one. It has 760 power and can see primordial matter at the end of the known universe. You may know someone who bought one of these "losers" in an attempt to satisfy his interest in astronomy, or you may have one yourself.

Because of its often poorly thought out construction, people who buy this sort of scope generally become dissatisfied with it in short order and banish it to the back of the garage. But, actually, with a little love, attention, and care, these scopes can be quite useful. Even with their small aperture, they serve a purpose in life, just like binoculars. We hope that this month's lead article will rescue some of these scopes from oblivion, and put them back into service. I remember when we recently experienced a 90% total lunar eclipse, and my son brought out his 50-mm Meade refractor, propped it up on the hood of the car and viewed the moon. That little scope framed the eclipse perfectly, and gave us a wonderful view, one that I will remember for a long time.

I just got back from the Texas Star Party, and, as usual, had a wonderful time, despite the fact that it was overcast most of the time. Much of a star party like this one is about people, and I got a chance both to renew old acquaintances and make new ones. I also got a chance to talk with AAAA member Lisa Andree, which was a treat. Your president (me) was elected to the Board of Directors of the Texas Star Party, so you now have a voice in what goes on at TSP. If you have any suggestions or comments, please don't hesitate to write or e-mail me with your ideas.

Finally, I would like to congratulate AAAA member John Braccili for receiving the Astronomical League's Lunar Club certificate. I hope to see more AAAA member's names on more certificates soon.

*John Wagoner, President  
American Association of  
Amateur Astronomers*

## Letter to the Editor

I didn't receive my March newsletter until April 10th. I don't know what the time table is on the mailing, but since the tape joining the pages was opened and the pages wrinkled, I can only suppose it was intercepted and read in transit. I encourage anyone's interest, but I wish they'd read faster.

Enclosed is a check for \$27.00 to start my subscription to *Sky and Telescope* through the AAAA. I like the new logo.

*Susan Montgomery  
Modesto, Ca.*

*Dear Susan,*

*Thank you for your recent correspondence. We try to mail the newsletter out the third week of the issue month first class, so that you will receive it by the end of the month. Thank you for sharing your newsletter with the postal workers. We hope that they enjoyed it, and if not, hope they don't show up on our doorstep with an Uzi. Next time, we'll use a staple.*

*Your subscription to S&T should have started by now. We're glad you like the new logo. We're pretty proud of it too.*

*Keep on writing. We love to hear from all our members, whether it's good or bad. And if it's bad, we get a chance to correct it.*

*John Wagoner*

## The AAAA's STARGATE BBS

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# Bashing 60-mm Refractors

continued from page 1

lar gives a field of 77' and a 40-mm gives 80'. To take advantage of the newer eyepiece designs, you'll need a focusing mount that accepts 1.25" oculars. That calls for change number one - remove the existing focusing mount and replace it with a 1.25" focusing mount. They're available from many equipment suppliers. If you have a telescope that already comes equipped for the standard .965" eyepieces, then you're in good shape; from this point, you can purchase some better .965" oculars or get an adapter for 1.25" oculars. If you opt for upgraded .965" eyepieces, stay away from those supplied by Jason and Tasco, many of which tend to be of the antiquated Huygenian design. Orion Telescope Center in California (408-763-7030) sells a high quality line of .965 eyepieces.

## Beef up the Tripod

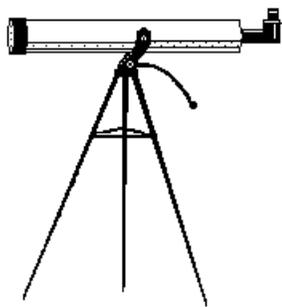
Rickety tripods are a constant annoyance, as are mountings that won't keep the telescope where you pointed it. Most of the tripods are made of wood, a material which does a good job of dampening vibrations. The only problem is that the wood generally used here is very light weight, so the tripods aren't really stable. Gene replaced the center struts with steel pipe filled with sand. (If they're made longer than the originals, that'll raise the telescope and make observing easier for the taller person.) Rubber doorstops on the bottom of each leg will absorb some vibrations. Strategic cross-bracing can markedly improve your existing tripod. The ultimate solution is to permanently affix the tripod legs in the open position, perhaps with a large accessory shelf. This makes the system very steady; however, it's hardly conducive to portability. You might also try the use of a centered weight hanging from the underside of the tripod; this is what Ladd Mazur did to stabilize the tripod of his Celestron reflector.

## Balance the Tube

Short of buying a whole new mounting, there are a few things that'll improve your existing one. You should verify that the telescope is properly balanced around both axes; if so, the scope shouldn't move on its own. This balancing should be done with the scope just as you use it - with an eyepiece and diagonal in place. Many scopes can be adjusted fore-and-aft so as to balance better around the declination axis. Small counterweights attached to the tube can help, but Gene prefers the method where a secondary weight is mounted parallel to the tube extending upward from the weight side of the head. Make certain the axles are clean and free of tiny metal particles where they rest on bearing surfaces. A coat of WD-40

oil and Vaseline helps smooth out the motion. Usually, there's a tension adjustment that will help stabilize the movements of the mounting, but rough operation may be caused by set screws that have scored the axles. Here you'll have to burnish the ends of the set screws and smooth out the surfaces of the axles.

Another minor problem with most mountings on these scopes is that you can't reach the zenith. The telescope tube will run into the tripod legs every time. You have to wait until an object is off the meridian before the scope is in a convenient position in relation to the tripod. Short of elevating the entire head off the tripod, we can't find a solution, except to scrap the tripod and use a pier.



If your mounting has flex-lines for the slow-motion controls, the RA control cable may extend off the east side of the tripod, but when you're on the west side, you can't reach it. Gene cut the cable and put the knob next to the head, so now it's at arm's reach at all times.

## Get a New Finder

A good finder is a real help in locating objects. If your scope came equipped with a 5X24 finder, you might consider upgrading to a 6X30, or better yet, an 8X50 (provided your mounting is hefty enough to support this added weight). Or how about the unmagnified Telrad finder? The larger finder scope can be used for variable star comparisons where a wider field of view is needed. Gene's 8X52 finder has an exit pupil of 6.5mm and true field of about 3.8 degrees. Jason makes a 10X60 finder with crosshairs, but with that magnification, the field is narrower.

When it comes to the optics themselves, Gene thoroughly tested the primary on his Jason telescope. He found that it resolves to the Dawes limit and reaches the theoretical limiting magnitude. It provides a textbook diffraction pattern both in and out of focus. (Of course, the f/15.3 focal ratio helps.) Gene has seen stars down to 10.6 magnitude, and he's confident that better sky conditions would allow even fainter

objects to be glimpsed with the 60-mm. The scope was purchased from Service Merchandise with a 30-day money back guarantee; you can be sure it was well checked out during that first thirty days! For Gene's purposes, he's fairly well pleased with its performance thus far.

## Realize the Limitations

The department store refractor isn't the ideal first instrument, but as long as the buyer realizes the limits of this aperture, it can be a useful instrument for the novice. Naturally, there's junk on the market. A prospective owner would be smart to bring along a more experienced amateur to get some insight into the purchase. But before you run off to Service Merchandise to buy a refractor, you may want to consider one distributed by the likes of Celestron, Meade, or Orion Telescope Center. Taking a look at a Meade 60-mm refractor and one made by Jason shows that they're virtually identical. We suspect that they're made by the same manufacturer. (Although we've used Meade as an example here, it looks like the same thing applies to the low-end refractors by Celestron, Parks, Orion and other "name" suppliers.) Of course, the Meade doesn't come with eyepieces that'll give 400X. And the Meade may cost a bit more. Probably the main advantage to getting the Meade is that generally it's distributed by a reputable telescope supplier who can provide some knowledgeable information about his products. We also hope that outfits like Meade, Celestron and Orion would demand tighter quality control from the manufacturer.

## Adjust Your Expectations

What this boils down to is the fact that a top-of-the-line department store refractor could be a decent scope, provided you don't expect more than it can deliver. The lower priced refractors usually have inferior mountings, and some of the cheapies even use plastic lenses. You get what you pay for!

If your budget limits you to around \$300, your choice in telescopes is also limited. If you don't want to build your own telescope from scratch, then you'll have to look for a good used telescope or do some smart shopping for a new one "off the shelf". You'll probably have to put up with some limitations or else spend some extra money and invest some sweat equity in improving the telescope and mounting.

A 60-mm refractor does a fine job on planets, variables, and double stars. For the fainter objects, you need more aperture to get a good view. One alternative is the 8" Dobsonian. Here again, there are some different limitations that you'll need to address ... but that's another story.

# Clusters in Scorpius

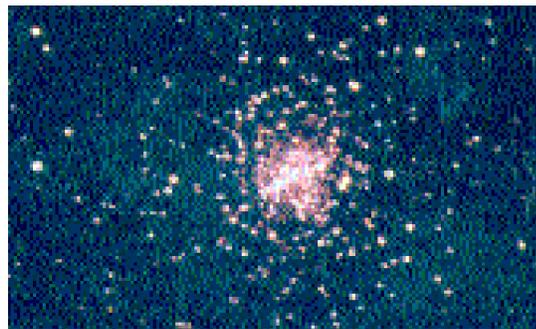
Heralding the beginning of the summer observing season, the constellation of Scorpius is a welcome sight. One of the few constellations which actually resembles what is supposed to represent, this large and sprawling area contains many open and globular clusters, as well as a wealth of nebulosity, particularly in the region of its brightest star, Antares. As large as it is, Scorpius actually used to be much larger. In ancient times, the brightest stars of the constellation Libra used to be considered part of Scorpius, representing the scorpion's claws.

**M-4** – As this fine globular cluster lies only about 1.5 degrees due west of the bright star Antares, it is one of the easiest of the Messier objects to find. This loosely concentrated globular is about 15' in diameter, and is easily resolved. Visually, this object is distinctive in that about 8-10 relatively bright stars appear to form a bar right through its center. These stars help in giving the appearance that the cluster is slightly elongated.

**M-6** – *The Butterfly Cluster*. This fine open cluster, upper right in the bottom photo, is large, about 25' in diameter, and contains over a hundred bright and relatively bright stars. It is called the Butterfly Cluster because some observers see the shape of a butterfly formed by the stars. This cluster is visible to the naked eye as a faint patch of light.

**M-7** – This beautiful open cluster, lower left in the photo, is almost a degree in diameter, so either very low powers or binoculars should be used to optimally view it. This loosely concentrated cluster is easily visible to the naked eye, but should you observe it through a telescope, be sure to look for NGC 6453. This is a small, faint globular cluster seemingly imbedded in M-7's western edge.

*Article by Rick Raasch  
Photos by Ed Flaspoeehler*



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