To my fellow Amateur:

"Why a Refractor?" A good question considering the abundance of low priced large diameter telescopes on the market today. Dobsonians with their large mirrors promise high performance for all observational needs, and the Catadioptrics with their short tube lengths and countless accessories are hard to pass up. However, no telescope can be an all purpose instrument. The Dobsonian is an excellent light bucket, but its thin mirror can never achieve the full definition and resolution that its size should produce. The Catadioptric with its unavoidably large central obstruction is severely limited in the ability to show fine low contrast detail.

It is in these areas where a good Refractor really shines. Certainly a clean aperture devoid of diagonals, spiders and other secondary obstructions will show the highest possible contrast. Add to that a properly baffled tube with high transmission optics, and a small aperture can be very efficient in showing faint objects against a dark sky background. Even a mirror used without obstructions shows less contrast than a lens because its metallic coating inevitably contains thousands of pinholes and microscopic defects, each one serving to scatter light and lower contrast. It is for good reason that coronagraphs have always used refractive optics. These instruments need to deliver the maximum attainable contrast to separate the faint coronal detail from the solar glare.

Contrast is even more important in lunar/planetary work. Here secondary obstructions, zonal irregularities and poor baffeling can lower the contrast drastically and destroy delicate detail. A good 6 inch Refractor will show many bands and festoons on Jupiter, will show the Cassini Division all the way around Saturn's rings, and will show a wealth of detail on Mars at opposition. On the Moon, at least 6 craterlets can be discerned on Plato's floor, the Alpine Valley shows craterlets embedded in its sheer walls, and jagged mountains are seen in stark contrast against the dark terminator. For lunar/planetary work, a 6 inch Refractor can shame mirror telescopes twice its size.

"Why a Christen Refractor?" Until recently the refractor was always a poor choice for a primary instrument. The large color error of the doublet achromat restricts its design to small apertures and large "f" ratios. The long cumbersome tubes were difficult to mount and transport. What is needed is a short tubed Refractor with a high degree of color correction and negligible spherical aberration for high resolution and definition. The new Japanese Refractors using Calcium Fluoride lenses seem to be the answer. But do these instruments really offer performance worthy of their high prices? Calcium Fluoride is a soft water-soluable crystal with a temperature expansion co-efficient some 5 times that of Pyrex. It is doubtful that it can be worked to a high optical tolerance, or that it can hold a good figure under actual observing conditions. In fact, all the new Japanese 35mm Supertelephoto Fluoride lenses have provisions for focusing past infinity because their focal lengths change so drastically with temperature.

The traditional triplet apochromat designs had very steep internal curvatures, and were sensitive to de-centering and other misalignment. This made them difficult to manufacture and thus were priced out of reach of the average amateur budget. The Christen Triplet design with its gentle surface curvatures eliminates most of these alignment difficulties. The cost of the glass materials, even in Objective Grade "P" quality glass, is a fraction of that of Calcium Fluoride. Therefore this design can be manufactured and sold at a reasonable price to the amateur community. The high color correction of the triplet design eliminates the necessity for long "f" ratios. The entire scope and mounting system can be lighter and more transportable. 6 inch refractors will no longer be long and spindly, perched atop their towering mounts.

The time has come for the Refractor to take its rightful place next to the Reflector as a viable instrument for the study of the heavens.

Roland Christen

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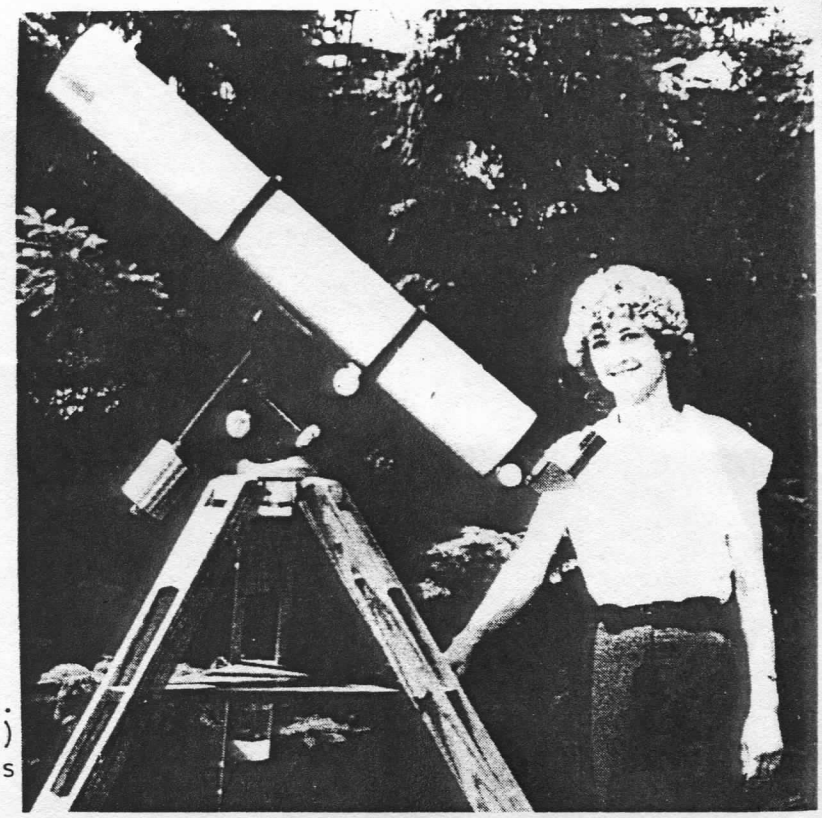


ASTRO-PHYSICS now offers an expanded line of Precision APOCHROMAT Refractors, Mountings, and Accessories to the amateur community. Our telescope optics are based on the award winning Christen Triplet, featuring very low residual aberrations and superb color correction in a short focal length design. The result is a highly portable refractor system with superior imaging qualities, ideal for a wide variety of astronomical work from high power lunar/planetary to deep sky astrophotography.

ASTRO-PHYSICS manufactures its telescopes and accessories in-house. Our optics are 100% AMERICAN MADE, and we use only precision "A" grade optical materials made in the U.S. All lenses are polished on pitch laps and hand corrected on a double pass interferometer. Standard accuracy is 1/16 wave pk. (1/56 λ rms) All our objectives are APOCHROMATIC which means that the images are essentially free of false color, both visually and photographically.

Our telescopes were developed with the active observer in mind. We have concentrated on those things that make observing a joy: sharp high-resolution optics, rugged vibration free mountings and easy to use effective accessories. Our telescopes are not loaded with frills and doo-dads. The tube assemblies are finished in a durable weather resistant epoxy coating. We offer a unique, unobstructed, highly corrected optical system designed to give a lifetime of observing pleasure. When choosing a telescope, we encourage you to compare, side by side, our optical and mechanical qualities with scopes of similar size.

6 INCH F8 TRIPLET APOCHROMAT - PERSONAL PORTABLE REFRACTOR

Our 6 inch Refractor uses three matched optical glasses to combine the colors of the visual spectrum into intense, sharp, concentrated images. High transmission glass free of striae and imperfection is used to make a clean optical system with superior resolution, contrast and light gathering power. When seeing permits, powers up to 600X are practical for lunar/planetary and double star work. The wide-field performance of this design is outstanding. Coma-free coverage extends to $2\frac{1}{4}$x$2\frac{1}{4}$ formats. Images on color film are crisp and sharp with no annoying blue halos around bright stars. Wide-field 2 inch oculars will show over 2 degrees of sky at low power. Deep sky objects stand out in stark contrast against velvet black skies.

This telescope is available as a complete system with matching German Equatorial, model 706. This mounting features large thrust bearings, stainless shafts and counterweights and precision BRONZE worm for error-free tracking. Both axes respond to fingertip pressure for velvet smooth sweeping with no hint of backlash. A beautiful handcrafted SOLID OAK tripod adds a touch of elegance while providing the solid stability demanded of a first class system.

PRICES

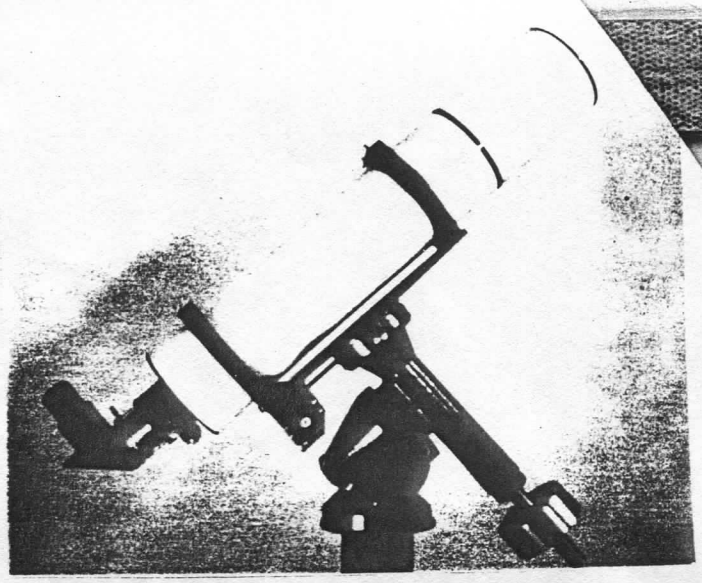
6 INCH F8 TUBE ASSY, with coated optics, baffled tube, custom focuser, dewcap 1295.00

6 INCH F8 with MODEL 706 GERMAN EQUATORIAL, hex rings, stainless counterweights 1995.00

COMPLETE 6 INCH REFRACTOR SYSTEM, with equatorial, oak tripod, 8x50 finder, star diagonal and 3 oculars 2595.00

We will be happy to quote other combinations to suit your needs.

FAST WIDEFIELD TRIPLET APOCHROMAT REFRACTORS



Our new F6 Triplets are perfect for wide field astrophotography and deep sky visual work. They also work surprisingly well for high power lunar, planetary and double star observing. The short tube and light weight makes them a delight to use in the field. Color correction extends from C to g wavelengths and the design is free of spherical aberration and coma. Photographic coverage is a 60mm image circle with star diameters of 12 micron (.0005") center, 35 micron (.0015") edge of field. Our Flat Field Telecompressor extends the performance of these instruments to F4 with 12 micron images over the entire 50mm circle of coverage. The matched Barlow amplifier converts these scopes to F12 for high power observing.

The tube assemblies listed below come with the same professional quality custom focuser as supplied with our larger 6 inch scopes. The fully baffled aluminum tube is finished with a tough epoxy coating. The optics are mag-fluoride coated and hand corrected to 1/16 wave pk. (1/56 rms). A high quality German Equatorial Mount, model 504, is available for these telescopes.

PRICES

4 INCH F6 TUBE ASSY, with coated optics, baffled tube, custom focuser, dewcap 795.00

4 INCH F6 with MODEL 504 GERMAN EQUATORIAL, hex rings, stainless counterweights ...1395.00

5 INCH F6 TUBE ASSY, with coated optics, baffled tube, custom focuser, dewcap 995.00

5 INCH F6 with MODEL 504 GERMAN EQUATORIAL, hex rings, stainless counterweights ...1595.00

We are happy to quote on your requirements for any adapters, oculars and accessories.

PHOTO-VISUAL BARLOW AMPLIFIER

This custom made accessory doubles the focal length of the objective for high power photo-visual observation. The 2 element design uses special glasses to preserve the fine color correction of the main objective. The optical elements are hand corrected and precision centered to insure that no aberrations are introduced into the system. The large optics are designed for 2 inch oculars and will cover a 2 inch photographic field with pinpoint images to the edge.

2 INCH PHOTO-VISUAL BARLOW AMPLIFIER 165.00

FLAT FIELD TRIPLET TELECOMPRESSOR

Three elements of special optical glass are used to match the characteristics of our triplet objectives in this flat field design. The result is a telecompressor with diffraction limited performance and no vignetting over the entire 35mm format. The field is absolutely flat with no coma, astigmatism or distortion. Deep sky objects are recorded in a fraction of the time needed at prime focus. This well corrected accessory lens preserves the high contrast and superb color correction of the main objective. A must for the serious Astrophotographer.

TELECOMPRESSION RATIOS: 4" F6 to F4, 50mm circle, 7.1 degree sky coverage.
5" F6 to F4, 50mm circle, 5.6 degree sky coverage.
6" F8 to F5.3, 50mm circle, 3.6 degree sky coverage.

FLAT FIELD TRIPLET TELECOMPRESSOR, 2.5 inch barrel with 35mm adapter (specify camera) 165.00

ORDERING INFORMATION - When ordering by mail, be sure to include your complete street address. We cannot ship to P.O. box numbers. Illinois residents must include current state sales tax. Domestic orders are shipped UPS. Shipping charges will be collected COD.

METHOD OF PAYMENT - A check or money order included with your order is required for prompt handling. CANADIAN ORDERS must be paid in U.S. funds. In case of long delivery times, we require 1/3 down with the balance due prior to shipment. Personal checks require an extra 2 weeks to clear.

We have received many letters and phone calls from our customers concerning the quality of our telescopes. Here are just a few of their comments:

" On the last evening, observing the moon with some friends, we could see 5 small craters on the floor of Plato at 210x. All were impressed with the inky black shadows of the lunar features. The 6 inch Apochromat is all that I hoped it would be. My sincere thanks to you for making such a fine telescope available."
John Porter, Cotter, Arkansas

" I just thought you might like to know that I discovered comet Levy-Rudenko 1984E with the 6"F8 Refractor that you made for me. I am constantly amazed at the performance of this instrument, and look forward to many years of enjoyment with it."
Michael Rudenko, Amherst, Mass.

" It's really remarkable to have color free images in such a fast refractor. The contrast is outstanding."
R, Bernstein, Chicago, comments on 5"F6

" Thank you for the 5" lens and tube assembly. After careful testing and evaluation by Richard Brandt, we have determined that this lens has a wave tolerance of approximately 1/30 wave, and according to Mr. Brandt is equal in quality of figure to my best Alvan Clarke refractors. It seems as though your work is among the best in the field of lens making, and I compliment you on your efforts and innovations you have brought to this field of telescope making."
T. Campbell, Atlanta

" I had the pleasure of taking the 4"F6 out last night. The performance was remarkable. There was absolutely no color problem on epsilon Bootes at 206x and the diffraction patterns were perfect. Even though I anticipated good performance, I couldn't believe how good it was. I was jumping around the back yard like a kid on Christmas morning."
Robert Allen Buss, Dickinson, N.D.

" Your 6.5 inch objective has consistently outperformed much larger reflectors and catadioptrics at a host of star parties. Your claim that under good seeing your objectives withstand 100x per inch of aperture is not an empty one. At 425x the 6.5" has revealed minor divisions in the ring of Saturn and the delicate rille in the Alpine valley."
Tom Dobbins, Lyndhurst, Ohio

" Had a chance to use the 6"F12 last night in preparation for our upcoming public observing program. Looking at the double star Castor we saw two tiny dots separated by dark black sky. Each dot was surrounded by a very faint diffraction ring, as delicate as spider silk. On deep sky objects such as M13, the scope performed more like a 10 inch, judging by some of the commercial scopes and Newtonians we had with us."
Steve Dodson, Sudbury, Ontario

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