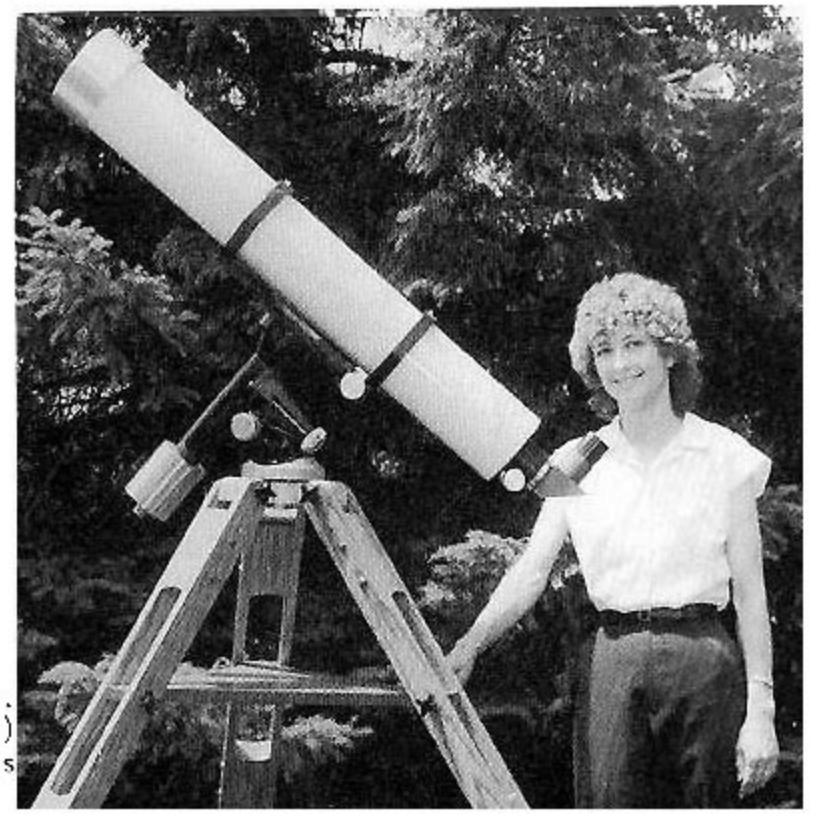
Astro - Physics

839 Brae Burn Lane
Rockford, Illinois 61107



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 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 2½x2½ 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.

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

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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SPECIFICATIONS FOR 4 INCH F6 TUBE ASSEMBLY:

Objective ---------- magnesium fluoride coated 3 element, cemented apochromat 24"+-1 efl.
Light transmission ---------- 96.5% over the visible spectrum
35mm Photographic field ---------- 2.3x3.2 deg @ F6, 3.4x4.8 deg @ F4
Secondary spectrum ---------- Less than +-0.008% from C to F
Light gathering power ---------- 210 times unaided eye
Focuser type ---------- Helical rack & pinion; 2.5" I.D.; 4.5" travel; 2", 1.25" adapter
Tube assembly ---------- Aluminum, 5" dia x 20" long, 7 lb, white epoxy, baffled, 5" dewcap

SPECIFICATIONS FOR 5 INCH F6 TUBE ASSEMBLY:

Objective ---------- magnesium fluoride coated 3 element, cemented apochromat 30"+-1 efl.
Light transmission ---------- 96.5% over the visible spectrum
35mm Photographic field ---------- 1.8x2.6 deg @ F6, 2.7x3.8 deg @ F4
Secondary spectrum ---------- Less than +-0.008% from C to F
Light gathering power ---------- 330 times unaided eye
Focuser type ---------- Helical rack & pinion; 2.5" I.D.; 4.5" travel; 2", 1.25" adapter
Tube assembly ---------- Aluminum, 6" dia x 26" long, 12 lb, white epoxy, baffled, 7" dewcap

SPECIFICATIONS FOR 6 INCH F8 TUBE ASSEMBLY:

Objective ---------- 3 element, silicon oil-spaced apochromat, 48"+-1 efl.
Coatings ---------- Single layer hard magnesium fluoride, 450-650 nm
Light transmission ---------- 96.5% over the visible spectrum
35mm Photographic field ---------- 1.1x1.6 deg @ F8, 1.7x2.4 deg @ F5.3
Secondary spectrum ---------- Less than +-0.008% from C to F
Light gathering power ---------- 460 times unaided eye
Tube type ---------- Aluminum, white epoxy paint, fully baffeled, 10" dewcap
Focuser type ---------- Helical rack & pinion; 2.5" I.D.; 4.5" travel; 2", 1.25" adapter
Tube assembly dimensions ---------- 7" dia. x 45" long, 19 lb.

GUIDING TELESCOPE

Our guide scopes use the highest quality American made lenses for error free astrophotos. The 3 inch lens shows a clean Airy disc without objectionable color aberrations. With an overall tube length of only 25 inches, differential flecture is absent, assuring pinpoint star images on long exposures. Large mounting rings allow 5 degrees of motion for acquiring suitable guide stars, a real advantage over off-axis schemes. A 1.25" prism diagonal is supplied with the guide scope. This accessory accepts all 1.25" oculars.

3 INCH GUIDING TELESCOPE, with mounting rings and diagonal 245.00

6 INCH F12 TRIPLET APOCHROMAT

The F12 optics are designed for the most discriminating lunar/planetary observer. Color correction is essentially perfect for the entire photo-visual spectrum. Plantetary detail is crisp and contrasty. At high power, stars are points of light surrounded by one or two faint diffraction rings. This lens can also be used with our 2X Barlow Amplifier and our Telecompressor at F8 to obtain flat field coverage on 35mm film. Low power wide field views are possible with giant 2 inch oculars. Tube assembly includes lens in cell, baffled tube, focuser with 2" and 1.25" adapters. Diagonals and oculars are optional.

6 INCH F12 TUBE ASSEMBLY with coated optics, baffled tube, custom focuser, dewcap ... 1445.00
COMPLETE 6 INCH F12 REFRACTOR SYSTEM with Model 706 GERMAN EQUATORIAL, 60" pier, 1.25" prism diagonal, 8x50 finder 2550.00

ASTROGRAPHIC GERMAN EQUATORIAL MOUNTINGS

A good mounting is equally as important as the optics in a telescope system. Our mountings feature large thrust surfaces to transfer the telescope's mass to the tripod, thereby achieving maximum rigidity at minimum weight. Designed for astrophotography and high power visual work, this mount is steady even in gusting winds. Stainless ball bearings are used throughout, and solid stainless shafts guide the R.A. and Dec. axes. The declination axis features a precision tangent arm slow motion adjustment. The R.A. axis is driven by a synchronous motor and BRONZE worm for error free tracking. Both axes respond to fingertip pressure with no hint of backlash. Built in clutches can be disengaged for ultra smooth sweeping, or locked for astrophotography. The entire mount disassembles quickly for easy transport and storage. An optional electric declination drive is available for hands-off guiding in Dec. The D.C. motor can be driven from most dual axis drive correctors providing 9 to 12 volts output.

SPECIFICATIONS FOR MODEL 504 AND 706 MOUNTS:

Polar axis ..... model 504 - 4" dia. thrust bearing, model 706 - 6" dia. thrust bearing
Dec. axis ..... 4" dia. thrust bearing - both models
Drive gear .... Precision BRONZE ,+-.0002" backlash, model 504 - 4" dia., model 706 - 6" dia.
Motor type ..... 120 Vac. 60 Hz. 3 Watts, 230 Vac. 50 Hz. also available
Approximate weight (less counterweight) ..... 22 lb.- model 504, 29 lb.- model 706

MODEL 504 GERMAN EQUATORIAL MOUNT, two 8 lb. counterweights and telescope rings 795.00
MODEL 706 GERMAN EQUATORIAL MOUNT, two 10 lb. counterweights and telescope rings 995.00
DECLINATION DRIVE for electric slow motion guiding 78.00

SOLID OAK TRIPOD

This handsome tripod is built for ASTRO-PHYSICS by American craftsmen from solid oak. The hand made legs feature laminated bracing for high stiffness and strength. The tripod is finished with a beautiful protective lacquer. A sturdy shelf provides more stiffness, and will hold all your observing accessories. The shelf removes easily with large hand knobs and the entire tripod collapses for transport and storage. Tripod height is 56 inches at the base of the equatorial. Dimension when folded is 11"x 61". Weight is 37 lb. for the tripod, 5 lb. for the shelf.

SOLID OAK TRIPOD with removable shelf 495.00

PORTABLE PIER MOUNT

This pier mounting features a unique tension design that combines rugged construction with light weight while eliminating flecture and annoying vibrations. Legs attach without hardware, allowing field assembly in seconds. Tension rods are designed not to interfere when the telescope is pointed at the zenith. Two sizes are available: the 46" pier with a resulting cradle height of 58", and a 60" model with a cradle height of 72" for long refractors. Both our models 504 and 706 will fit these piers. The 46" pier weighs 38 lb., and the 60" weighs 42 lb.

46" PORTABLE PIER 275.00
60" PORTABLE PIER 295.00

Reviews

6-inch f/8 Apochromatic Refractor
Model 706 German equatorial mount
optical tube assembly, $1295
equatorial mount, $1995
Astro-Physics Corp.
Rockford, IL

Every decade or so, there is an innovation in telescope technology that alters the whole field. The Schmidt-Cassegrain telescope, two decades ago, was one such invention; the Dobsonian mounting was another. The latest such development is the perfection of the apochromatic refractor by Roland Christen, head of a small company named Astro-Physics. Although refractors have long been held in high regard, Christen's new line of color-free apochromatic systems provide unparalleled performance at a price competitive with conventional achromatic refractors.

Conventional two-element lenses, and many three-, four-, and five-element lens systems, fail to satisfactorily reduce chromatic aberration in refractors. The remaining color aberration, or "secondary spectrum," places severe limits on the shortest focal ratio capable of producing well-corrected images for a given aperture. For a conventional doublet with a 3-inch aperture, the focal ratio must be f/8 or greater; for a 4-inch, f/10; and for a 6-inch, f/15. Although they perform reasonably well despite their shorter focal ratios, achromatic refractors suffer from color error.

Enter the apochromatic refractor. By designing a refractor lens using three glasses (one having "abnormal" optical properties), it is possible to significantly improve on the two-element lens. This does not mean "the more elements the better" — the glass used must be the right type. Roland Christen, who has spent some 10 years designing apochromatic refractors, has now brought these exceptionally fine and versatile lenses within the reach of amateurs on an average budget.

I had a 6-inch f/8 Astro-Physics apochromatic refractor and model 706 German equatorial head and pier on loan for three weeks. During that time, I managed to put it through its paces quite thoroughly. For an instrument of this aperture and such short focal length, the performance was little short of stunning.

The telescope arrived in a large box, complete with dew cap, mounting rings, a massive focuser unit, and 1.25- and 2-inch eyepiece adapters. Construction quality was excellent — the solidly-made 2.5-inch focuser being the latest refinement in a steadily evolving design. Finished in white, the instrument had a spare, almost utilitarian, look about it but its performance was extravagant. At less than 20 pounds and a bit over 4 feet long, it was hard to believe this compact unit was a 6-inch refractor. Doublets of this aperture typically require eight-foot tubes.

The Model 706 mounting and pier were equally solid. The turnbuckle and rod-braced pier is, for all its simplicity, exceedingly rigid, supporting the equatorial head better than just about any other design I've seen. The pier weighs 40 pounds and the mount weighs another 50 pounds, including counterweights.

The equatorial head is machined from heavy aluminum castings. It worked very well: the slow motions were smooth and backlash-free, and the drive tracked well even at high magnification. It did not disappoint us once during testing. However, I would like to see a better way of setting the equatorial's latitude. In the unit evaluated, adjusting the polar angle required using a box-end wrench and "fussing" until the polar angle was set within a fraction of a degree. Once set, though, it stayed in adjustment. The total setup time, including polar alignment, was about 15 minutes.

As noted above, the optical performance of the Christen 6-inch f/8 apochromatic objective is little short of stunning. The objective is available in two different "color corrections" — visual and photographic — and in two different focal ratios — f/8 and f/12. Each color correction is optimized for its purpose; the visual correction is fine-tuned to give the best images in the yellow-green light our eyes are most sensitive to, while the photographic version is best in blue light. As with achromats, apochromats perform their best at longer focal ratios. The f/8 version is intended for all-around use, while the f/12 version is made for those who demand the very best color correction available. Although the lens evaluated was the photographic version of the f/8 lens and theoretically the "worst" of the four possibilities, it still delivered outstanding performance.

I carefully compared the Christen 6-inch f/8 apochromat to a high-quality 6-inch f/15 achromatic refractor, an 8-inch SCT, and a 10-inch Newtonian with an excellent mirror. Of the four instruments, only the 10-inch Newtonian, which had 60% greater aperture and nearly triple the collecting area, compared favorably in resolving power and overall image brilliance. There was no contest with the 8-inch SCT — *both* of the refractors beat it hands down.

The most telling comparison came between the two refractors. Six-inch f/15 achromatic refractors have long been a standard of quality that few amateur instruments can match. A 6-inch f/15 doublet is, however, handicapped by significant secondary spectrum. Around a bright star image, the observer sees a halo of purplish light nearly one minute of arc across. The saving grace of doublet refractors is that they form a crisp, contrasty star image in yellow-green light.

The 6-inch f/8 Christen photo-apochromat, while not perfect, displayed considerably less secondary spectrum than the f/15 doublet. This version of the lens, which has minimum focus in the blue, still combines the violet, green, yellow, and orange quite well. Red light, however, focuses farther from the lens, forming a slight crimson halo around bright objects. Epsilon Lyrae, for example, was cleanly split, but each star was surrounded by a faint ruddy halo of light.

ASTRONOMY

January 1986

4-inch f/6 Apochromatic Refractor
Optical tube assembly, $795
Astro-Physics Corp.
Rockford, IL

Very rarely does a new product immediately impress me as truly outstanding, but the recently-introduced line of apochromatic refractors from Astro-Physics has succeeded in doing so. I had nearly a month to put their 4-inch f/6 apochromatic refractor instrument through its paces, not only by testing it on close double stars and planets, but also by testing it against a precision optical test flat using the Foucault and Ronchi tests. Overall, the lens rates as one of the finest — if not *the* finest — commercial objectives I have had the opportunity to test. The telescope is an outstandingly versatile instrument for the beginner or advanced amateur.

The telescope that I evaluated (unfortunately, Astro-Physics apparently does not put serial numbers on its telescopes) was optimized for photographic work, so the objective had its shortest focus in blue light. Although visually corrected lenses usually have their shortest focus in the yellow-green part of the spectrum, the instrument had sufficiently good color correction for critical work at high magnification.

Using a 4mm eyepiece, the apochromat provided a superb view of Saturn. It split the unequal double star Epsilon Boötis as cleanly as I have ever seen it split with any 4-inch telescope, and better than I have seen many 6-inchers manage. Epsilon Lyrae was so perfectly and cleanly split that it looked like two tiny pairs of diamonds resting on black velvet. With a 9mm Nagler eyepiece, the view was stunning. Stars were rendered absolutely crisp and sharp to the extreme edge of the field, making the rich starfields in Cygnus impressive even from my rather badly light-polluted backyard. With a 32mm Erfle, the instrument could act as its own finder or as an RFT for sweeping the Milky Way. Few instruments offer such low to high power versatility, and no other I have seen even comes close to the Astro-Physics apochromat in combined versatility and optical quality.

I star-tested the apochromat on the Astro-Physics model 706 equatorial mount. This mount is intended for larger instruments in the Astro-Physics line, so it was great for the compact 10-pound 4-incher. The pleasure of testing a fine optical system was doubled by the ease of using this rock-solid equatorial mount. The out-of-focus star image was very nearly the same inside and outside focus, testifying to excellent centering and overall correction of the lens. However, testing on a bright star (Vega) just inside focus, the image had a slight reddish halo; outside focus it had a pale greenish fringe. The color fringes disappeared at the best focus. These rather subtle effects just inside and outside focus were the only visible remnants of chromatic aberration which destroys fine definition in a conventional 4-inch f/6 achromat.

After critical star-testing, I tested the apochromat against a high-precision optical flat (i.e., in autocollimation) in blue, green, and red light using both the Foucault and Ronchi test. These tests revealed weak spherochromatism, accounting for the color fringes seen in the star test. Although hardly enough to harm the image, the objective appeared slightly undercorrected in red light; in blue light it was slightly overcorrected. In green, the Ronchi bands were straight, indicating no residual spherical aberration. The Foucault test in autocollimation revealed some faint zones in the figure of the lens, but it was free of significant optical defects. Very few commercial optical systems stand up this well to critical examination.

In sum, the 4-inch f/6 apochromatic refractor from Astro-Physics is an outstanding value, providing unparalleled optics in a fine mechanical assembly at a price below that of its competition. As a versatile first telescope or as an advanced amateur's go-anywhere telescope, the Astro-Physics 4-inch f/6 apochromat is unsurpassed. *Richard Berry.*

Saturn — crisp, clearly defined, and showing Cassini's Division in sharp contrast — was also subtly red-rimmed. It bears re-emphasis, however, that the f/8 photo-triplet's images were considerably better than those of a high-quality 6-inch f/15 visually-corrected refractor.

A month after I returned the apochromat to Astro-Physics, I saw one of the 6-inch f/8 visually-corrected triplets at Stellafane. The visual version of the lens is virtually color-free with no trace of the red halo characteristic of the photographic version. Unless astrophotography were a determining factor, I would certainly prefer the visual version of the f/8 instrument; better yet, I would get the f/12 version, in which chromatic aberration would be almost non-existent.

One interesting side effect of the Christen triplet's superb image quality is that the faintest stars visible are roughly half a magnitude fainter than for doublet refractors or reflectors of the same aperture. The reason for this, presumably, is that all the light entering the triplet telescope ends up concentrated in the image, whereas in the doublet, considerable light is spread into the purplish halo surrounding a yellowish image core. Reflectors suffer from lower "throughput" due to the 88% reflectivity of aluminized and overcoated mirrors, the obstruction of the secondary, and the larger diffraction pattern caused by the obstruction. The same probably holds true of SCTs, but I did not have a 6-inch SCT on hand for direct comparison.

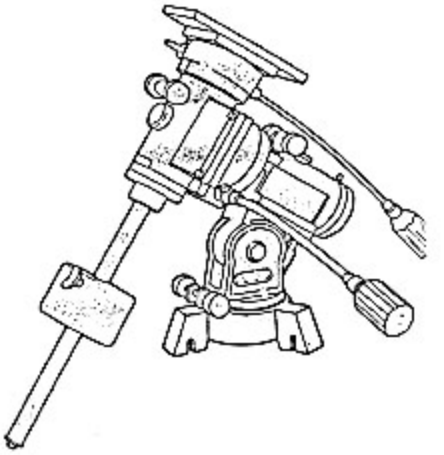
The Astro-Physics 6-inch f/8 refractor with its Christen triplet lens sets a new standard for optical quality in telescopes on the amateur market at a quality/price ratio that's hard to beat. With relatively minor cosmetic improvements and redesign of the latitude adjustment for the equatorial head — neither of which posed any real problem and which are now in the works, according to Christen — the model 706 equatorial mount will be tops in all categories. I recommend the visually-corrected lens unless astrophotography is an all-consuming passion, or the f/12 lens if you want the ultimate in planetary images. I found the f/8 focal ratio an excellent all-around compromise, suitable for low-power observing as well as high-power splitting of double stars and observing planetary detail. If I didn't already have a house full of telescopes, I would have placed my order for one. *Richard Berry.*

6" F8 with model 706
German Equatorial and
optional 3" guidescope

5" F6 with model 504
German Equatorial

NEW PRODUCTS

"Super Nova" Mount



We are importing this light weight portable mount as an alternate for our smaller scopes. The equatorial head is equipped with setting circles, fine slow motion controls on flexible shafts, worm gears in both declination and polar axes, 6.4 lb. counterweight. The mount is easily disassembled. The polar axis is hollow for an optional polar scope. An optional pulse motor drive is available for tracking the stars. Azimuth and latitude adjustments are standard. This mount features many of the goodies that some of our customers have requested and is a perfect match for our 4 and 5 inch refractors. Total weight is 24 lbs.

Super Nova Equatorial Head 495.00

Extra Balance Weight, 6.4 lb. 35.00
3.3 lb. 25.00

Solid Oak Tripod Legs for "Super Nova" mount 425.00
This custom tripod is a smaller version of the oak tripod available for our own equatorial mounts. Its beauty and stability are unparalleled. The height of the legs is not adjustable which assures a more solid base of support. The sturdy shelf provides more stiffness and keeps your accessories close at hand.

Adjustable Aluminum Tripod 220.00
This light duty tripod is fully adjustable and collapses for easy portability. While not recommended for serious astrophotography or extended high power viewing, this tripod is an excellent choice for wide field low power sweeping.

Polar Axis Scope 95.00
This accessory fits into the polar axis and makes polar alignment a snap. The illuminated reticle features a unique star field overlay for quick alignment.

Multi-Plate 85.00
The Multi-Plate may be used to expand the versatility of your Super Nova mount. The plate is drilled to accept a variety of telescopes, guide scopes and cameras. Perfect for astrophotography.

Pulse Motor with Push Buttons and Battery Pack 220.00
Following the motions of the stars is easy with the Pulse Motor drive. This portable accessory operates off its own battery pack with buttons for reversing, stopping and 4x speed increase.

Camera Piggyback Mount with 2 axis micro-adjustment for easy framing of star fields . 49.00
60 mm Guide Scope, 700mm fl. with .965 rack&pinion 150.00
Diagonal Prism, .965 ..... 35.00
Guiding Eyepiece, .965, with illuminator, circular reticle 120.00
Guide Scope Micro Adjust Mount, adjusts 12 deg in RA and Dec for locating guide star. 120.00
Telescope Tube Mounting Rings, inside dia: 2.5 inch (63mm) for imported refractors 33.00
3.55 inch (90mm) " " " 35.00
4.33 inch (110mm) " " " 75.00
Modified Hexagonal Mounting Rings, 5.0 inch (127mm) for Astro-Physics 4" scopes 48.00
6.0 inch (153mm) for Astro-Physics 5" scopes 55.00

NEW 9x63 Deep Sky Binoculars 195.00
Of prism type with fully illuminated exit pupil and sharp 6 deg. field, these superb binoculars are brighter than ordinary porro prism types. Perfect for finding dim objects or just zooming around the night sky.