

FRA7 90-mm Dollond Refractor: Restoration/Adaptations - Part 1

Comments:

All aspects of the original condition of this telescope begged for restoration or the trash pile. I decided on the former! What you will see below is a 12-year pictorial journey of restoration. Without this effort, I truly believe, this instrument would have been left in ruin and discarded by one or two owners down line from me. The old Dollond was in extremely bad condition, very unwieldy and difficult to move (still is, but much less so with casters) weighing in excess of 350 lb. The telescope has character beyond its usefulness; it is over-designed with elaborate massiveness that really has little basis for operating the 90-mm refractor. I assume that George (Huggins) Dollond had a client who wanted a unique showpiece telescope and he obliged handsomely both in design and in cost. I was able to augment this uniqueness with several special same period accessories including a candle-illuminated Troughton & Simms filar micrometer, a John Browning split-lens micrometer, and a John Browning/McClellans star spectroscope, all complete and all original. I also found a nice mahogany-cased 5-lens Dollond eyepiece set with a pancratic terrestrial eyepiece and star diagonal whose thread set was a perfect fit to the telescope. See Part 2. Lenses are excellent; finder exhibits cross hairs and even has a solar filter built into the eyepiece dust cover. Objective lens is signed in pencil "BC and Co." and is therefore likely a late 19th century Broadhurst Clarkson doublet replacement.

Original Condition/Repairs:

One of the finder mounting brackets was missing; a new one was machined from 360 brass using the existing one for design. All three brass casters were broken off and missing; after much searching I found suitable solid brass replacements. All three floor-leveling bolts were bent, broken or missing and the leveling adjuster was missing. Had to custom turn each bolt to fit each heavy brass faceplate on each tripod leg because they were not removable and with unique threads. Wentworth standardization was not in effect in the 1830s. The upper section of the optical tube had 5-inch seam split, which only widened* as Gary McCheyne attempted to braze it together. Mr. **Mc**Cheyne instead applied (soldered) a long thin brass strip section over the entire length of the tube seam on the upper tube section. The mahogany base was badly in need of restoration. The tripod was sanded down, re-stained and refinished. The massive brass spider, that weighs over 15 lbs, was corroded beyond any visible original brass color. Refinished/lacquered. Most of the weight is in the massive mahogany base and the heavy thick brass universal equatorial mount. It stacks a total of 5 separate, but operationally integral, heavy brass components on top of the mahogany base to support the telescope on a transit pivot mount resting on two tall brass trunnions 32 inches above the equatorial circle. Several of the large brass machine bolts were stripped; they were replaced. The oil lamp was badly corroded; it was cleaned and new oil and wick installed (see photos).

*Probably due to thin-film embrittlement caused by grain boundary diffusion of ammonia from cleaning compounds over the years - not a wise choice for thin-film brass.

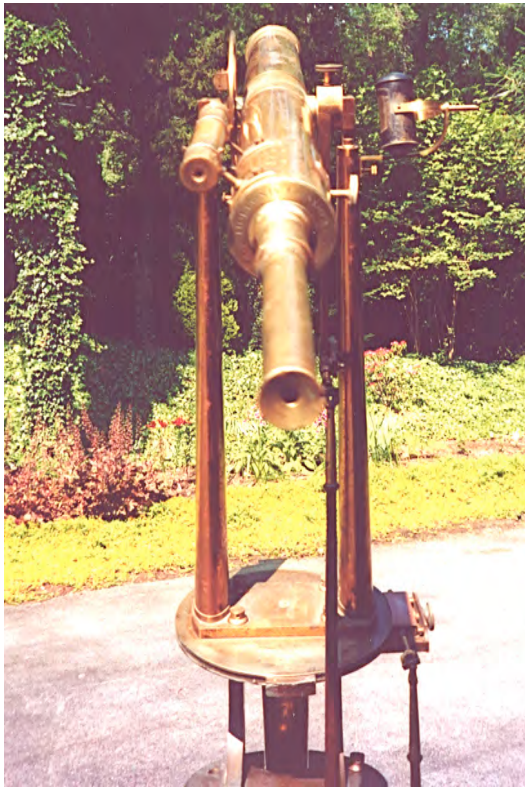


Before



After

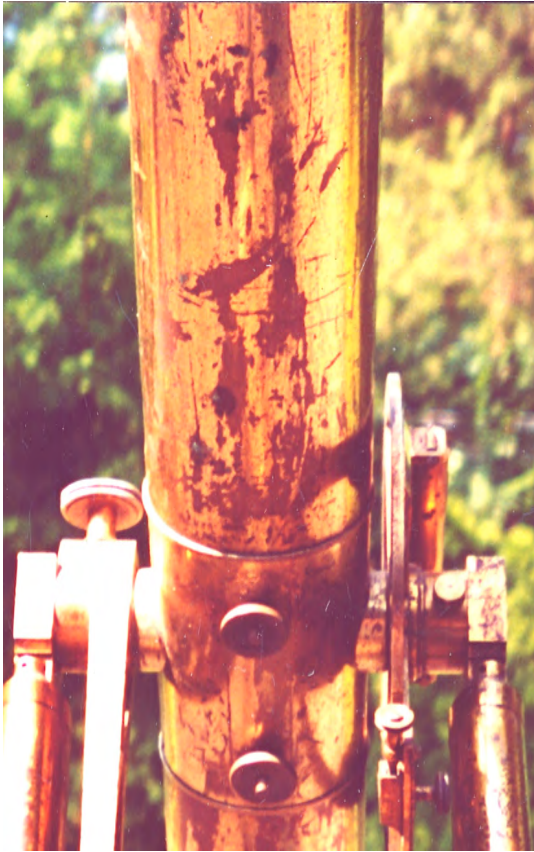
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Before

After

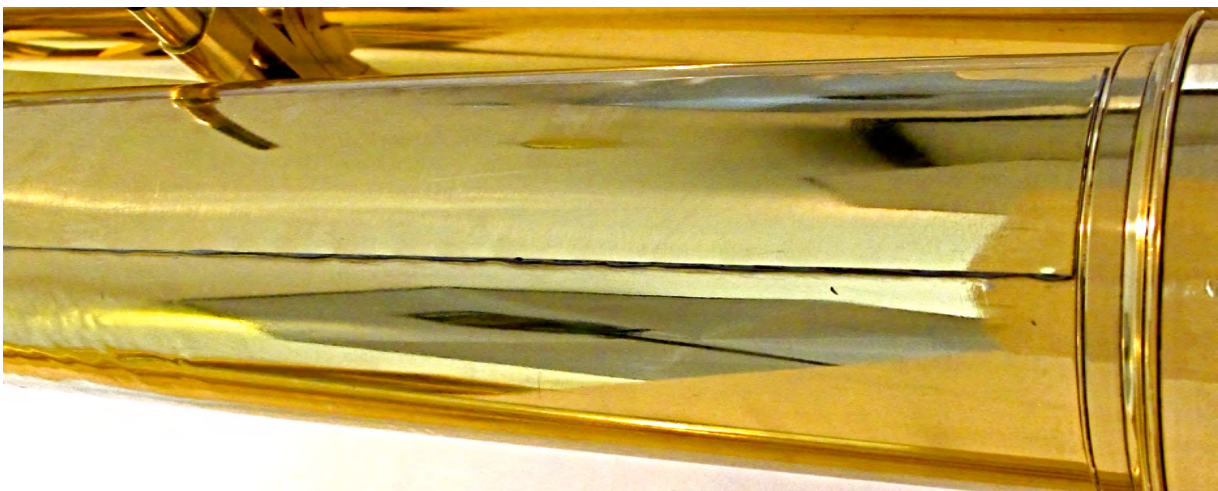
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Before



After - showing lower end of the upper tube with its full-length brass patch used to seal a 5-inch long (couple of mm wide) split in the tube seam. Also note the removal of the useless non-original mounting bolts and knurled fasteners



**After - showing upper end (objective end) the quality of the thin brass patch (20 mils x 2-inches wide) used to seal the 5-inch long split in the tube seam.
[Courtesy of Gary McCheyne, Owner Cayuga Music Shop, NAPBIRT Guild of American Luthiers]**

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Before



After



Mahogany tripod base supporting transit trunnions mounted on a large tiltable universal equatorial plate



9-Inch diameter transit vernier wheel with spirit level



Oil lamp is gimbaled-mounted at the pivot on the transit mount and mid-point on the OTA

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Note the bent, broken, and missing leveling bolts and missing brass casters and floor-leveling bolt adjuster



Three new caster blocks, casters, leveling bolts and 1 adjuster



One leg detail



one leg detail



Pieces of original caster block, receiving sleeve for caster pin and one wood screw for holding the caster block

Before



New solid brass casters mounted on heavy mahogany mount blocks required for the 350 lb. load (> 100lb./caster)

After

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Before



After



Restored Dollond oil lamp is lit. It burns brightly behind its old original mica window with its new rope wick

FRA7 Restoration/Adaptations - Part 1



Gary McCheyne

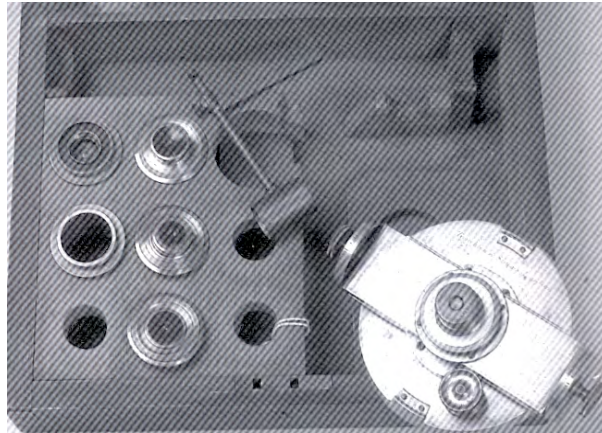
Ed Wolf



After

FRA7 Restoration/Adaptations - Part 2 (Adaptations)

From Part 1: I was able to augment this uniqueness of the big Dollond with several special accessories including a candle-illuminated Troughton & Simms 3-wire filar micrometer (required considerable restoration and adaptation), a John Browning split-lens micrometer, and a John Browning/McCleans star spectroscope, all complete and all original! I also found a nice mahogany-cased 5-lens Dollond eyepiece set with a pancratic terrestrial eyepiece whose thread set was a perfect fit to the telescope.

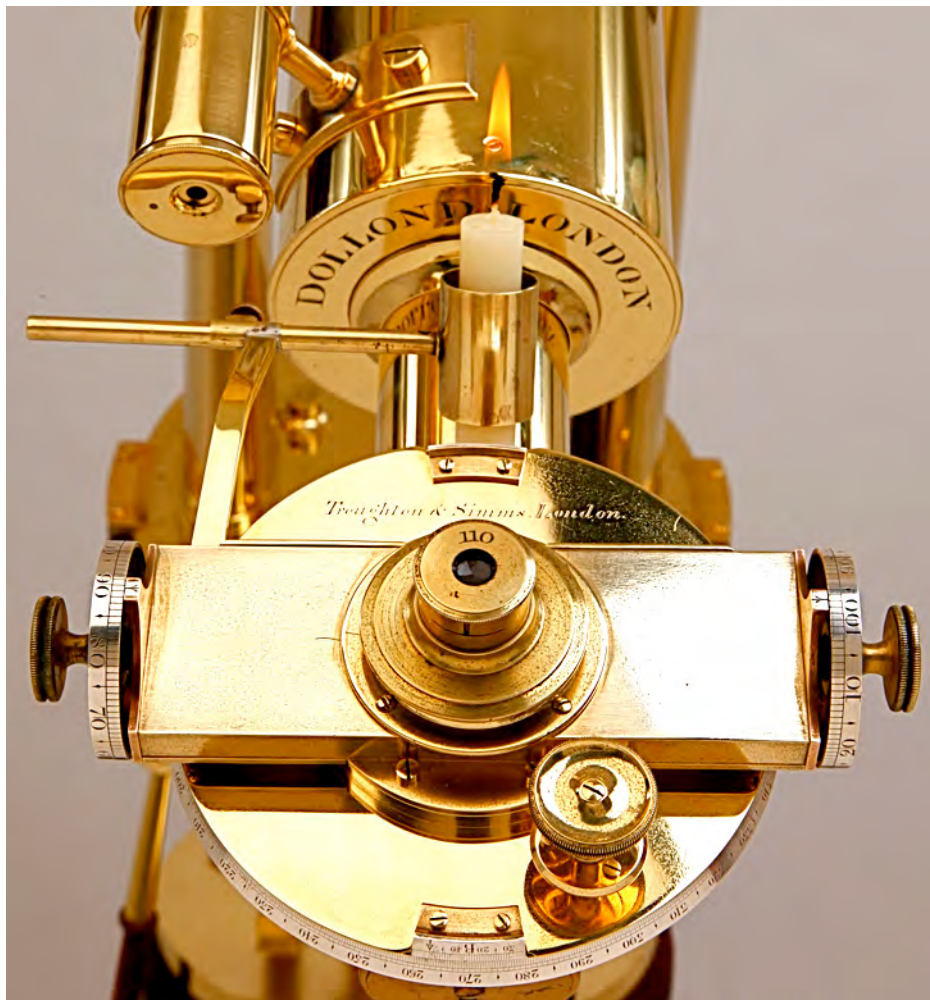


Before: Photo Credit: 2001 Premier Scientific Instrument Auction, 4 August 2001, Lot # 234, Don Yeier, Yeier Optics, Candor, NY



After: A Dollond terrestrial tube w/2 eyepieces and adapter flanges were added and the candle holder was mounted securely below the terrestrial eyepiece in the refitted mahogany case.

FRA7 Restoration/Adaptations - Part 2 (Adaptations)



After



After: Note glass windows on front edge of the T&S micrometer for the candle illumination to enter Single wire (left), double (right)

FRA7 Restoration/Adaptations - Part 2 (Adaptations)

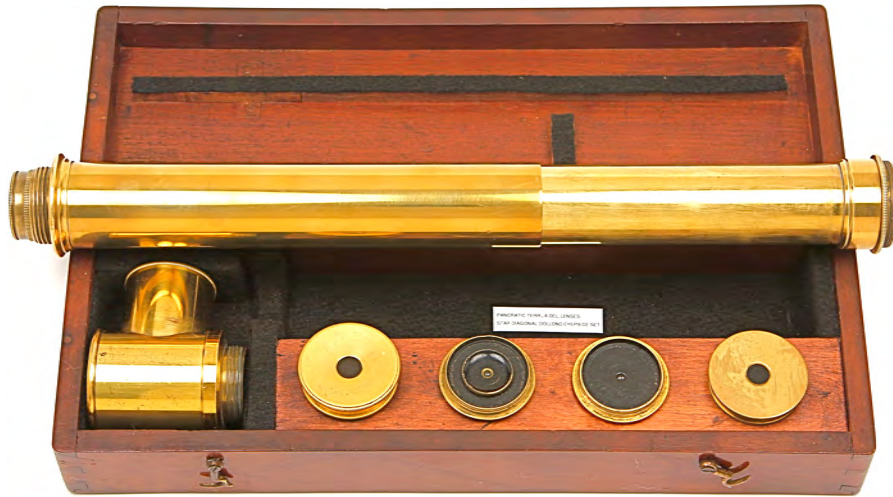


John Browning Split-lens Micrometer



John Browning/McClellan Star Spectroscope (Before and after - no restoration or adaptation required!)

FRA7 Restoration/Adaptations - Part 2 (Adaptations)



5-eyepiece Dollond lens set (4 celestial and 1 pancratic terrestrial) and a star diagonal mounted in beautiful mahogany case.



Storage case open without telescope: accessories cases left to right across the bottom of the case include John Browning McClean's Star Spectroscope, Troughton & Simms filar micrometer, Dollond lens set, and John Browning split-lens micrometer



DOLLOND FRA7 Restoration Case Closed and Locked.
[Within is a restored important telescope previously destined to the "dustbin of history".]



FRA7 Restored: Strikingly impressive in black and white as well.