

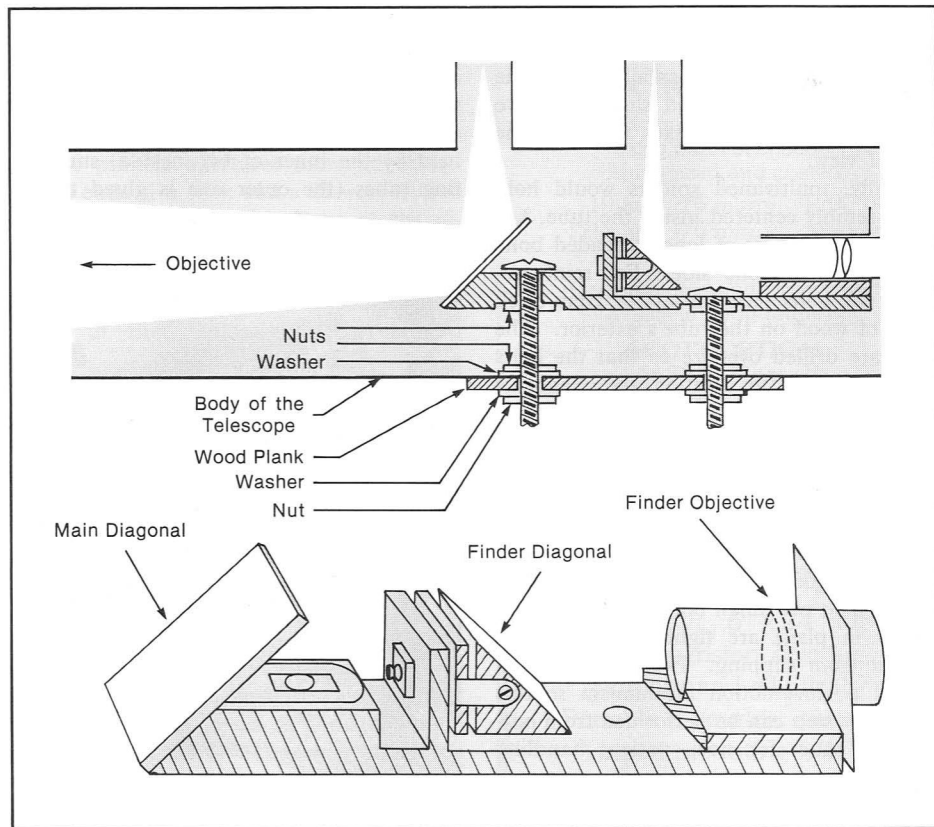
AN EASY-VIEWING NEWTONIAN FINDERSCOPE

NOVICE telescope users quickly learn that the finderscope on a conventional Newtonian can be, literally, a pain in the neck. It certainly seems innocuous enough there on the side of the telescope. But in the worst case observers have to twist halfway around the tube to reach it, craning the head back and forth repeatedly before getting the telescope aimed.

To eliminate this inconvenience, I have designed a way to mount the finder *inside* my 6-inch $f/9$ Newtonian. Not only is observing now more pleasurable, but the telescope has a more compact appearance as well.

In a Newtonian some portion of the incoming light is blocked by the diagonal. My plan makes use of this light by placing the finder lens and a second diagonal in front of the first, pointed at the sky. As seen in the diagram, the light is directed to a second eyepiece mounted beside the normal one. The two eyepieces are 62 mm (2.4 inches) apart, corresponding to the spacing between my eyes. By looking through both eyepieces, I can see the fields of the finder and the main telescope simultaneously.

The two diagonals and my finderscope's 1-inch $f/7$ objective are mounted on a common platform. I used a block of teak,



These two diagrams show details of M. Lahiri's coaxially mounted Newtonian finderscope. The two eyepieces are set 62 mm apart to match his interocular distance. Separate adjustments are provided for both diagonal mirrors and the finder's objective lens. Photographs and diagrams were supplied by the author.

but surely cast aluminum would have been the proper substitute. The finder diagonal, which is a little smaller than the main one, can be rotated slightly on two mutually perpendicular axes to adjust the field of view.

Ideally, multivaned spiders would hold this assembly centered inside the tube, but I settled for a pair of long, threaded bolts coming in from one side. For reinforcement, the bolts pass through a 1-cm-thick block of wood on the tube's exterior. The holes are drilled oversize so that the bolts can be shifted to position the diagonals under the eyepieces.

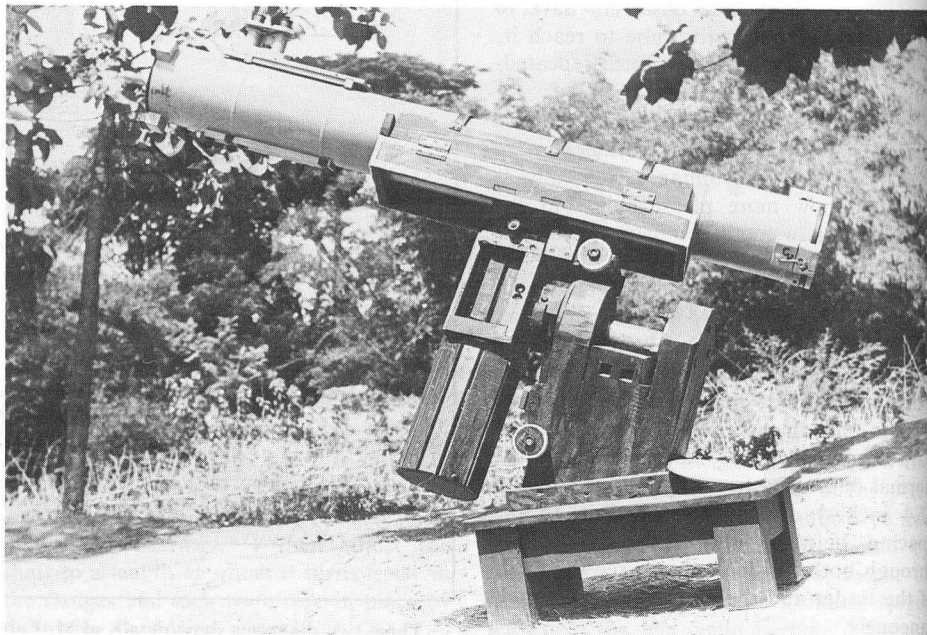
First the primary mirror is collimated, along with its diagonal (nuts on the long bolts can be turned to adjust the platform as well). Then the second diagonal is rotated and tilted until the finder's view corresponds precisely with that of the telescope. The two small bolts holding the diagonal in place are tightened enough to keep it from slipping. Eventually, I plan to add a slow-motion mechanism so this alignment step can be performed from outside the tube; for now, patient handling suffices.

For greatest viewing comfort, the two eyepieces should be at the same level. In my version, both are mounted in a single sliding base like that used in some binoculars, though a common base is not a necessity. Focusing is a little complicated but

need be done only once. I first focus the main telescope by means of a thumbwheel at the base of the paired eyepieces (see the photographs). The finderscope is usually out of focus at this point. Its objective is held by the inner of two nested, snug-fitting tubes (the outer one is glued to the

diagonal platform), and I focus the finderscope by sliding the lens back and forth. Minor adjustments can be made with the eyepiece's slide-fit housing. This twin-eyepiece arrangement works best when the exit pupils are at the same height.

All parts inside the tube have been



The author's 6-inch f/9 Newtonian, fitted with the binocular finder described in the text. Except for the 2-inch-diameter declination shaft, 3-inch right-ascension shaft, and some metal fittings, the mounting is entirely built from wood.

