

Re: Simple telescope design question

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Robert Maxwell Robinson wrote:

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> pppp.....S
> ppp ... S
> pp ... S
> pp ... S
> p ...
> p...../= Eyepiece
> p ...
> pp ... S
> pp ... S
> ppp ... S
> pppp.....S
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Ooh. ASCII art. I like it. (Honestly.)

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> The obvious fact of this design that makes it look worse than Isaac
> Newton's design is the large, heavy flat mirror instead of a small,
> light one. But here are the advantages I see that make me ask:
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It's not the large that concerns me; it's the flat. Much less expensive to create a flat secondary a couple of inches across than one that's 40 percent again as large as the primary (and that's assuming you only want 100 percent illumination at the center of the field of view).

Trouble creating the flat is why most Newtonian manufacturers would rather use spiders than optical windows—especially in large sizes.

And it's not true that the secondary doesn't steal light. It most certainly does—but instead of being an obstruction that steals the light, it has a hole in it that steals the light. The light that would have bounced off where the hole for the eyepiece goes is missing from what gets sent on to the primary. That creates essentially the same light loss and (more importantly) diffraction effects. You *could*, as you suggest, put a finderscope (my recommendation) or a detector beneath the hole, so to speak, but the diffraction effects are why you do not want to just "add the second image" back in to the principal image.

Incidentally, using the finderscope reintroduces the precise alignment requirement that was taken out of the collimation process. If you

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change the orientation of the steering mirror, you will also remove any alignment you had between where the main telescope and the finderscope are pointing. (Unless you have some fancy mechanism for halving the angle of steering.)

As far as the balance issues are concerned, if you were to mount it on a German equatorial mount, say, the issue is not the weight distribution along the length of the scope. That is corrected by putting the rings (or whatever the support mechanism is) further up or down the telescope. The counterweight is to balance out the scope around the fulcrum that turns in right ascension—which will still be a problem with this design.

This can be solved for either design by putting the telescope in a Dobsonian mount and using an equatorial platform.

- > 5. *The prime focus would be somewhere after the light had passed*
- > *through the hole in the steering mirror. This presents a golden*
- > *opportunity to use an iris to eliminate the farthest off-axis*
- > *light and enhance contrast when viewing the moon or other bright*
- > *objects, does it not?*

How is that different from a set of baffles?

- > 5. *A Maksutov or Schmidt corrector could still be used, placed*
- > *in the light path before the diagonal mirror and out of the way*
- > *of the light reflected from the parabolic mirror. If one is*
- > *willing to place the corrector even farther from the flat mirror,*
- > *I think a less curved corrector could be used; mightn't that make*
- > *them cheaper (at the expense of ending up with an even bulkier,*
- > *L-shaped telescope)?*

Those correctors are there to correct for a spherical, rather than paraboloidal, primary. I don't see how your design makes manufacture and alignment of the correctors any easier or less expensive.

I don't mean to be discouraging. You're thinking about these issues, and ways to solve them, and that's the right thing to do. I hope you'll continue to try ideas out, and I for one am happy to act as a sounding board.

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The Astronomy Corner at <http://astro.isi.edu/>

Unofficial C5+ Home Page at <http://astro.isi.edu/c5plus/>

The PleiadAtlas Home Page at <http://astro.isi.edu/pleiadatlas/>

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