

# East Meadow Public Library

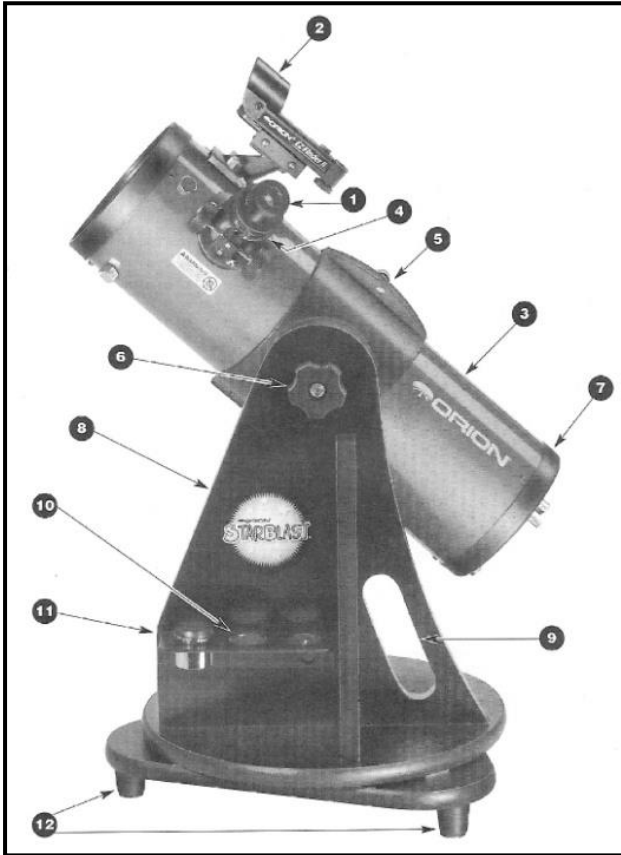
516-794-2570

## *Orion 4.5" StarBlast Reflector Telescope* INSTRUCTION MANUAL

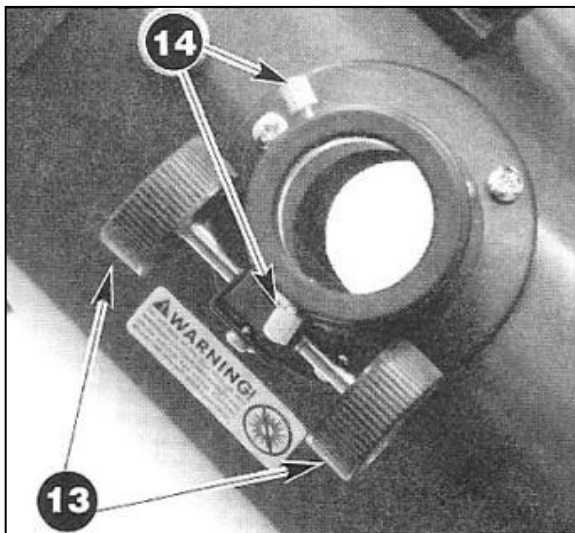


***WARNING: Never look directly at the Sun through the telescope or its finder scope — even for an instant — as permanent eye damage could result. Do not point the telescope at the Sun, as parts will melt! Children should use this telescope ONLY with adult supervision.***

## Telescope Parts



- 1) Eyepiece (replaced with zoom eyepiece 8 to 24 mm – glued in)
- 2) EZ Finder Scope (remember to turn off when not in use)
- 3) Telescope tube
- 4) Focuser
- 5) Tube Clamp
- 6) Altitude Clamp (please do not turn this)
- 7) Mirror Assembly (please do not turn these screws)
- 8) Support
- 9) Handle
- 10) Eyepiece rack (removed)
- 11) Eyepiece (replaced by zoom eyepiece)
- 12) Feet

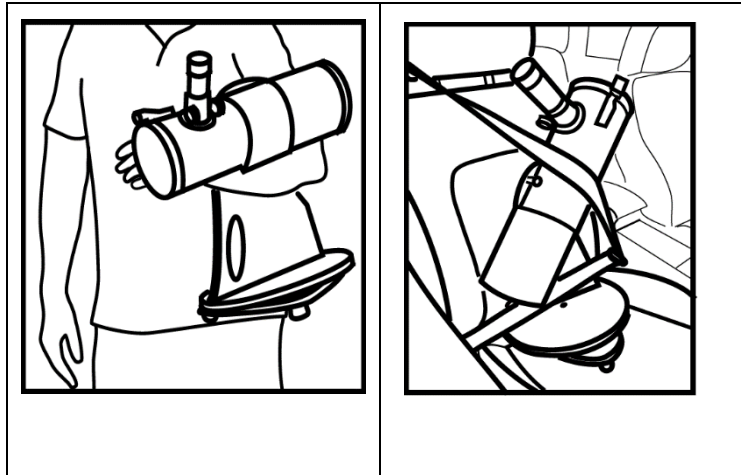


## Focuser Details

- 13) Focus wheels
- 14) Eyepiece securing screws (glued in place please do not try to turn)

## Transporting the Telescope

The easiest way to carry the telescope is to place your forearm under the telescope tube when it is in a level position, and lift, holding the upright support against your side. When in a car, simply place the scope on a seat and use a seatbelt to secure it. The lap belt goes across the base, and the chest belt should cross the tube.



## Care and Maintenance

**Regarding cleaning the lenses or mirrors:** Don't. Let the Librarian know if they seem dirty. Please do not touch the surface of the mirrors (inside the tube) or the eyepiece lens. Just touching these items will cause damage.

**Aligning the Mirrors:** Again, please don't. If it seems that the telescope is in need of adjustment, please tell the Librarian.

**Fog on the mirrors and eyepieces:** One of the odd things that happens when star gazing is that dew forms on pretty much everything (and everyone). The big mirror is tucked safely down at the bottom of the telescope, and so it does not get much dew on it. Eyepieces, however, often have dew form on them, making them useless until they warm up and dry out. If the eyepiece fogs up, wrap your hands around it for a few moments. As it warms up, the fog should disappear. Please don't wipe the eyepiece lens with a tissue or cloth as it has special coatings on it that could be damaged if you do. Please do not touch the eyepiece lens... ever.

The Eyepiece chart on the telescope shows what magnification you will have for each setting of the Zoom Eyepiece. The "True Field" describes the width of the

image in the eyepiece. A full Moon is 30 minutes of a degree (or 1/2 of a degree) wide, so you could fit about 4 full Moons in the field of view when using the 24mm setting. Change the Zoom setting until your target fits the eyepiece the way you like. You will have to tweak the focus.

**Modifications:** We have tried to make this telescope very easy to use and hard to damage or lose parts. Many screws and knobs are glued into place or otherwise made difficult to turn. Please do not try to tighten or loosen any screws or knobs. As described in this manual, you can move the focus wheels, you can turn the zoom eyepiece to change the power of magnification and you turn on the finder scope but please do not try to turn any other knobs or screws.

The various covers and caps are tied to the telescope to prevent loss. They should always be in place when the telescope is not in use. Please do not detach the various strings. The focuser should be moved all the way in when not in use and, especially, when being transported.

## Getting Started

Please read the instructions and practice with the telescope inside before you take it out in the dark. The image will be much better if you let the telescope cool down to air temperature before you start observing.

This is a “Push-to” telescope. Once you find what you are looking for, you can either watch the object move through your “field of view” (what you see through the eyepiece) and then reposition the telescope or keep pushing the scope to hold the object in the center of the eyepiece. Objects appear to move across the field of view faster at higher magnifications. This is because the field of view becomes narrower. Why do objects move across your field of view? Because the Earth rotates.....

Like many reflector telescopes, the image in the eyepiece is upside-down.

When looking at star charts you will have to keep this in mind.

**Do You Wear Eyeglasses?** If so, you will probably be able to observe with your glasses off by just refocusing the telescope to your unaided vision. If your

eyes are astigmatic, images will probably appear best with glasses on. This is because a telescope's focuser can accommodate for nearsightedness or farsightedness, but not astigmatism. You can also observe with your eyeglasses on.

**This is important enough to say again:**

***WARNING: Never look directly at the Sun through the telescope or its finder scope — even for an instant - as permanent eye damage could result. This is one of the few really bad things you can do to yourself with this telescope. Young children should use this telescope ONLY with adult supervision.***

***NEVER POINT THIS TELESCOPE AT THE SUN***

**Focusing the Telescope:** Try out the telescope during the day when you can see what you're doing. Remove the dust caps from the eyepiece and telescope tube. Remember to replace them when done.

The "power" of a given telescope depends upon the eyepiece you use. This scope has a Zoom eyepiece. Always start by using the telescopes' lowest-power (turn the body of the Zoom so the pointer is at "24") to locate and center an object. Low magnification shows a larger area of sky in the eyepiece, making finding and centering an object much easier.

With the eyepiece adjusted for low power (24 mm), aim the telescope in the general direction of an object at least 1/4-mile away. Slowly rotate the focus wheels until the object comes into sharp focus. Go a little bit beyond sharp focus until the image starts to blur again, then reverse the rotation of the knob, just to make sure you've hit the exact focus point. When focusing on stars, bring them to as small a point as possible.

Many "deep-sky" objects are big, but dim. Low magnification will be better for them. Once you've centered an object in the eyepiece, you can switch to a higher magnification by twisting the Zooms' barrel towards the "8". This is recommended for small and bright objects, like planets and double stars. The Moon also takes higher magnifications well. You may have to refocus a little after changing power.

## **Operating the Finder Scope**

The finder scope has a wider field of view than the telescope so that it is easier to find what you want to see. Turn on the finder scope by turning the knob on the right

side. Remember to turn it off when not in use. Point the telescope towards the object you wish to observe. Look through the finder scope and center the red dot on the object you want to observe. It may be difficult at first to use the finder scope but with a little experience it should become easy.

Once an object is centered in the finder scope it should be centered in the telescope eyepiece as well. If it is not then the finder scope will need to be adjusted. Inform the Librarian. Please do not try to adjust the finder scope yourself.

## What to Expect

Depending upon what is in the sky; Planets will look small, but you might be able to see cloud bands on Jupiter or the rings of Saturn. Craters on the Moon will be clear and numerous, the waxing and waning of Venus should be visible, and many bright deep-sky objects will fill the eyepiece. Don't expect to see color as you do in NASA photos as our eyes are not sensitive enough to see color in deep-sky objects, except in a few of the brightest ones. Remember that you are seeing these objects using your own eyes! Each session with the telescope will be a learning experience. Each time you work with the telescope, it will get easier to use, and stellar objects will become easier to find.

## Objects to Observe:

**The Moon** is one of the easiest and most interesting targets to view with the telescope. Lunar craters, "seas", and even mountain ranges can all be clearly seen from an average distance of 238,000 miles away! With its ever-changing phases, you'll get a new view of the Moon every night it's up. Make sure to observe the Moon when it is well above the horizon to get the sharpest images. The best time to observe is during a partial phase, that is, when the Moon is *not* full. During partial phases, shadows are cast on the surface which reveals more detail, especially right along the border between the dark and light portions of the disk (called the "terminator").

If the Moon is too bright, or you want a bit more contrast, remove the small plug from the dust cover and put the cover back on the telescope. This is called "stepping down" and reduces the light hitting your eye.

**The Planets** do not stay at “fixed” locations like the stars do. To find them you should refer to the Sky Calendar (telescope.com), or to charts published monthly in *Astronomy*, *Sky & Telescope*, or other astronomy magazines and web sites (www.skymaps.com is one of my favorites). Venus, Jupiter, and Saturn are the brightest objects in the sky after the Sun and the Moon.

**Stars:** Even powerful telescopes cannot magnify a star to appear as more than a point of light. You can, however, enjoy the different colors of the stars and locate many pretty double and multiple stars. Look at the middle star in the handle of the Big Dipper, Mizar. It is really two stars very close together. Being able to see the two stars separate is called “Star Splitting”. The gorgeous two-color double star, Albireo, in Cygnus, is a favorite. Defocusing a star slightly can help bring out its color.

**Deep-Sky Objects:** Under dark skies, you can see lots of fascinating deep-sky objects, including nebulas, star clusters, and a variety of different types of galaxies. Most deep-sky objects are very faint, so it is important that you find an observing site well away from light pollution. Take plenty of time to let your eyes adjust to the darkness. Do not expect these subjects to appear like the photographs you see in books and magazines; many will look like dim gray smudges. As you become more experienced and your observing skills get sharper, you will be able to ferret out more and more subtle details and structure.

Star Clusters are particularly pretty, usually bright, and easy to see.

## **When to go observing:**

**“Seeing” and Transparency:** Atmospheric conditions vary significantly from night to night. “Seeing” refers to the steadiness of the Earth’s atmosphere at a given time. In conditions of poor seeing, atmospheric turbulence causes objects viewed through the telescope to “boil”.

In conditions of good seeing, star twinkling is minimal and images appear steady in the eyepiece. Seeing is best overhead, worst at the horizon. Good “transparency” is especially important for observing faint objects. Transparency is judged by the magnitude of the faintest stars you can see with the unaided eye (Mag.1 is very bright, 2 is dimmer, and so on... 4th magnitude or lower is desirable).

One more time, and with *Feeling!*

**WARNING:** *Never look directly at the Sun through the telescope or its finder scope — even for an instant — or permanent eye damage could result. Do not point the telescope at the Sun, as parts will melt! Children should use this telescope ONLY with adult supervision.*

*The best thing that we're put here for's to see;  
The strongest thing that's given us to see with's  
a telescope. Someone in every town  
seems to me owes it to the town to keep one.  
In ~~Littleton~~ **East Meadow** it may as well be ~~me~~ **the library.***

Paraphrased from

***“The Star Splitter”***

*By Robert Frost*