INSTRUCTION MANUAL

Orion®
Aristocrat™ 60mm

#9800 Brass Altazimuth Refractor Telescope

ORION
TELESCOPES & BINOCULARS
Providing Exceptional Consumer Optical Products Since 1975

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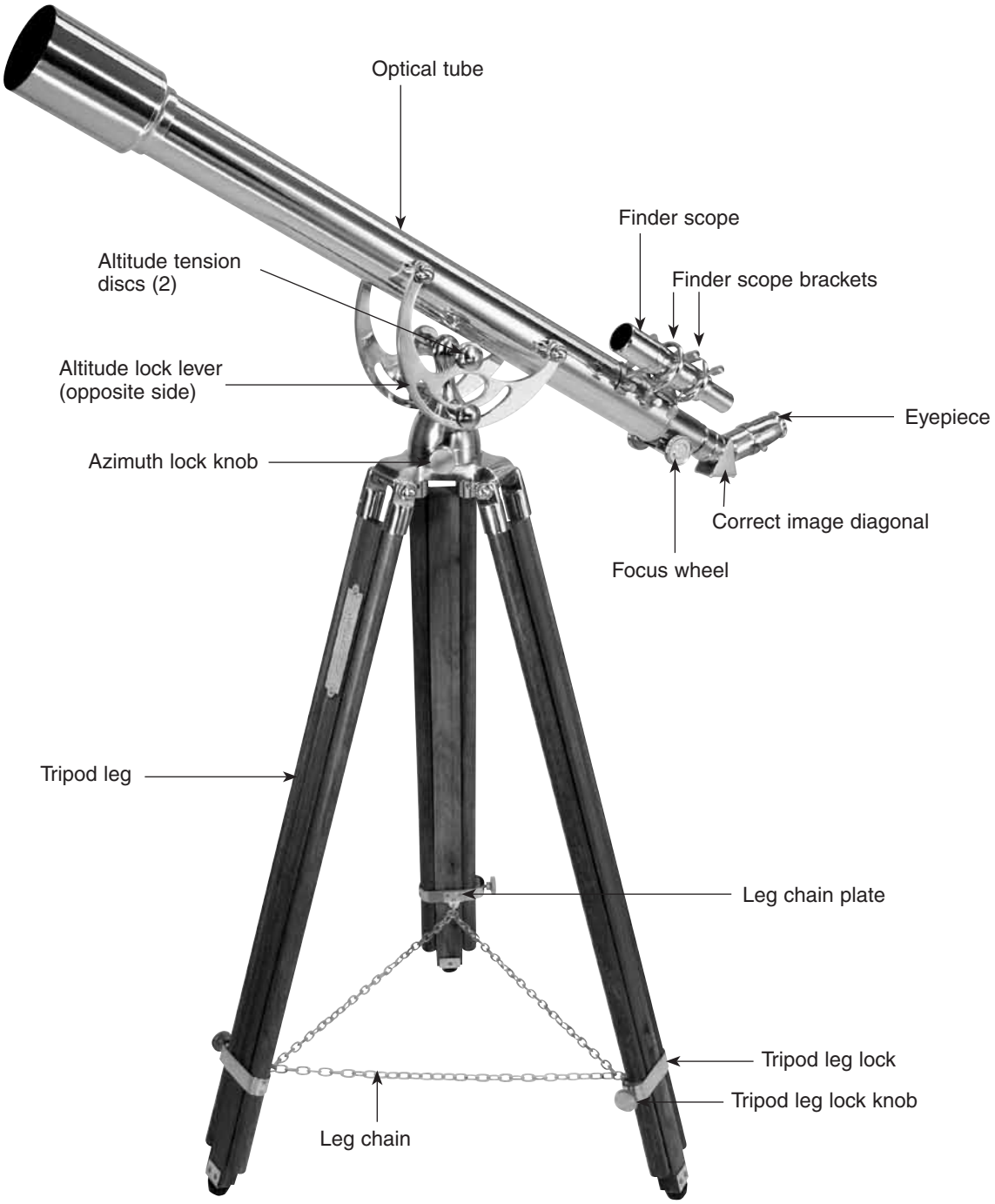

Figure 1.

Aristocrat 60mm Brass Refractor

Congratulations on your purchase of an Orion Aristocrat 60mm. Your Aristocrat 60mm was hand crafted out of brass and African mahogany. It is a sophisticated instrument that not only looks great, but also performs well with its quality optics. The Aristocrat is great for a bay window, or any place you need that "touch of class" and wish to get majestic views of the land, sea or sky. With proper care, the Aristocrat 60mm will last a lifetime, and probably longer. These instructions will help you assemble and use your Aristocrat 60mm. Please read them thoroughly.

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1. Unpacking

The entire telescope will arrive in one box. Be careful unpacking the box since some of the contents are small and easy to overlook. We recommend keeping the box and all original packaging. In the event that you need to ship the telescope to another location, or return it to Orion for warranty repair, having the proper packaging will help ensure that your telescope will survive the journey intact.

Make certain all the parts in the parts list are present. Familiarize yourself with the features and compare them to the callouts on Figure 1. If anything appears to be missing or broken, immediately call Orion Customer Support (1-800-676-1343) for assistance.

Warning: Never look directly at the Sun through your telescope or its finder scope—even for an instant—without a professionally made solar filter that completely covers the front of the instrument, or permanent eye damage could result. Young children should use this telescope only with adult supervision.

2. Parts List

1	Optical tube with cradle and altazimuth mount
1	45° Correct-image diagonal
1	25mm Plössl eyepiece
1	6x30 correct-image finder scope
4	Brass thumbscrews
2	Finder scope brackets
3	Leg attachment shafts
6	Acorn nuts
12	Brass washers
3	Mahogany wood tripod legs.
1	Brass leg chain with three leg plates
9	Brass leg plate screws

3. Assembly

Assembly should take no more than 30 minutes. Refer to Figure 1 during assembly. You will need a small phillips-head screwdriver and a 5/8" or 16mm crescent wrench. An adjustable wrench can also be used. When assembling, be careful not to scratch any of the brass parts.

1. Gently lay the optical tube and mount on its side. Attach the tripod legs, one at a time to the base of the mount by first lining the holes on the top of the tripod with the holes on the base of the mount. Make certain that the chain holes on the brass leg locks are facing inside so that you can attach the leg chain later on. Slide a leg attachment shaft through the top of a leg and through the holes in the base of the mount. Place a brass washer on either end of the leg attachment shaft. Then thread an acorn nut on both sides of the threaded shaft. Secure the nuts finger tight for now. Figure 2 shows detail of this attachment.
2. Stand the tripod and telescope up and spread the legs slightly (be careful). Attach the brass plates on the leg chain to each tripod leg lock with three phillips head screws. Once attached, spread the tripod legs as far as they will go (Figure 3).

Figure 2. Attaching the tripod legs to the mount.

3. Tighten the acorn nuts with the wrench. Be very careful when doing this so as not to scrape or strip the nuts. Do not overtighten the nuts.
4. Attach the finder scope brackets to the optical tube with the brass thumbscrews (Figure 4).
5. Unthread the six thumbscrews on the finder scope brackets until they are flush with the inside of the bracket. Then insert the brass finder scope into the brackets so the large end (objective lens) is facing the front of the telescope, as shown in Figure 1. The grooves on the body of the finder scope should line up with the thumbscrews on the brackets. Thread the six finder scope bracket thumbscrews equally until the finder scope is secure in the brackets.
6. Remove the brass cover on the end of the focuser drawtube. Insert the chrome barrel of the correct-image diagonal into the focuser of the telescope and tighten it with the thumbscrew.
7. Insert the chrome barrel of the 25mm eyepiece into the open end of the correct image diagonal and secure it with the thumbscrew.

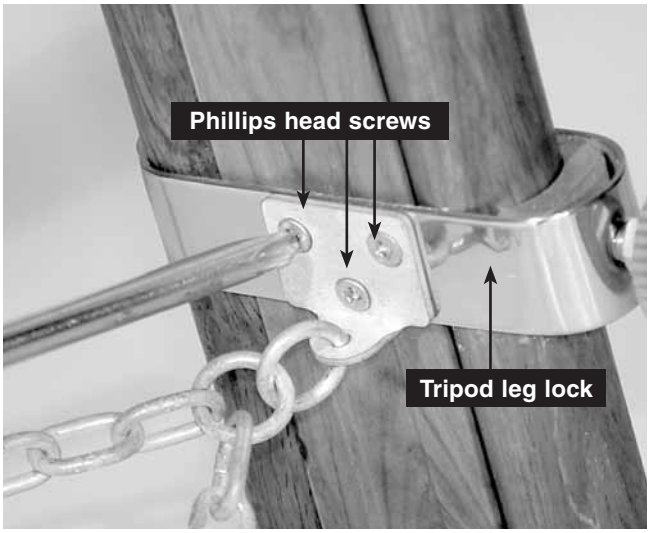

Figure 3. Use a phillips-head screwdriver to attach the brass chain plates to the tripod leg locks.

Figure 4. Attaching the finder scope brackets to the optical tube.

Your telescope is now fully assembled and should resemble Figure 1. Leave the dust cover on the front of the telescope when it is not in use.

4. Getting Started

Aiming the Telescope

The Aristocrat 60mm mount permits movement along two axes: altitude (up/down) and azimuth (left/right). See Figure 5. Moving the telescope up/down and left/right is the "natural" way people aim objects and this makes pointing the telescope intuitive and easy.

Aiming in Azimuth (Left/Right)

To move the telescope in azimuth, loosen the azimuth lock knob, take hold of the telescope and gently rotate the telescope to the desired position. Then re-tighten the azimuth lock knob.

Aiming in Altitude (Up/Down)

With your hand firmly supporting the focuser end of the telescope, loosen the altitude lock lever and lift or lower the telescope close to the desired position. As you get close to where you want the telescope to be aimed, tighten the lock lever slightly to increase the tension and make slower, more stable movements. When you are in the desired position, completely tighten the lock lever.

If the altitude movement seems too loose or too tight when the altitude lock lever is completely loosened, you will want to increase the tension on the altitude cradle. Turn the altitude tension discs clockwise or counter clockwise to increase or decrease altitude tension on the mount, using the discs on both sides of the mount. Adjust until the altitude motion feels comfortable for you. Once set, this adjustment will rarely need to be made again.

Focusing the Telescope

With the 25mm eyepiece securely inserted into the correct-image diagonal, aim the optical tube so the front (open) end is pointing in the general direction of an object at least 1/4 mile away. With your fingers, slowly rotate the focus wheel 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.

Aligning the Finder Scope

The finder scope is used to aid in aiming the telescope. It is a small, lower-powered telescope that sits on top of the main telescope. Without it, it would be very difficult to aim your Aristocrat 60mm.

The finder scope (Figure 6) must be aligned accurately with the telescope for proper use. To align it, first aim the main telescope in the general direction of an object at least 1/4 mile away–the top of a telephone pole, tree, etc. Position that object in the center of the telescope's eyepiece.

Now, look in the finder scope. Is the object visible? Ideally, it should be somewhere in the field of view. If it is not, some coarse adjustments of the six finder scope alignment thumbscrews will be needed to get the finder scope roughly parallel to the main tube.

With the image in the finder scope's field of view, you will now use the six alignment thumbscrews to center the object on the intersection of the crosshairs.

By loosening one alignment thumbscrew and tightening another, you change the line-of-sight of the finder scope. Continue making adjustments to the various alignment thumbscrews until the image in the eyepiece is exactly centered in both the finder scope and telescope's eyepiece.

Check the alignment by moving the telescope to another object and fixing the finder scope's crosshairs on the exact point you want to view. Then look through the telescope's eyepiece to see if that point is centered in the field of view. If it is, the job is done. If not, make necessary adjustments until the two images match.

Once aligned, the finder scope should not need realignment unless the telescope is roughly handled or jostled.

Focusing the Finder Scope

If, when looking through the finder scope, the images appear somewhat out of focus, you will need to refocus the finder scope for your own eyes. Loosen the lock ring located behind the objective lens cell on the body of the finder scope (Figure 6). Back the lock ring off a few turns, for now. Refocus the finder scope on a distant object by threading the objective lens cell in or out on the finder scope body. Once the image appears sharp, lock the ring behind the objective lens cell. The finder scope's focus should not need to be adjusted again.

Figure 5.
Eyepieces and Magnification

The Aristocrat has two axes of motion: Altitude (up/down) and Azimuth (left/right).

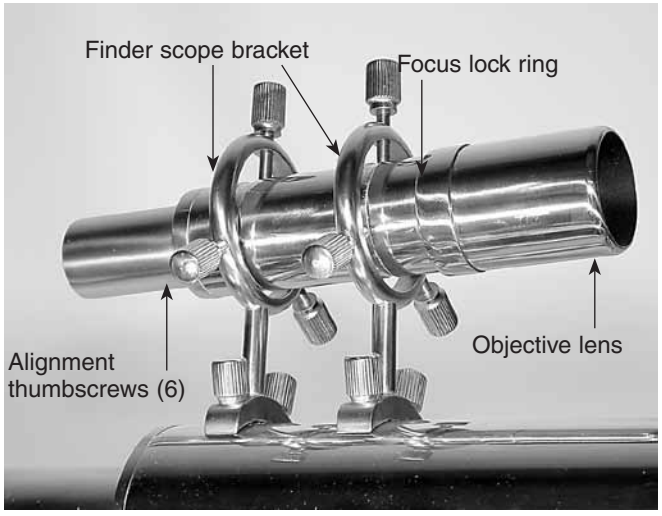

Figure 6. The 6x30 correct-image finder scope.

Your Aristocrat 60mm comes with a 25mm focal length Plössl eyepiece that provides 36x magnification. The Aristocrat can accept any 1.25" eyepiece (the most common eyepiece barrell diameter). Orion also makes several brass eyepieces that will provide different magnifications for your Aristocrat 60mm.

To calculate magnification, or power, of a telescope-eyepiece combination, simply divide the focal length of the telescope by the focal length of the eyepiece:

$$\frac{\textbf{Telescope Focal Length (mm)}}{\textbf{Eyepiece Focal Length (mm)}} = \textbf{Magnification}$$

For example, the Aristocrat 60mm, which has a focal length of 900mm, used in combination with the 25mm eyepiece, yields a magnification of

$$\frac{\textbf{900mm}}{\textbf{25mm}} = \textbf{36x}$$

Whatever you choose to view, always start by inserting your lowest power (longest focal length) eyepiece to locate and center the object. Low magnification yields a wide field of view, which shows a much larger area in the eyepiece. This makes finding and centering an object much easier. Trying to find and center objects with higher power (narrow field of view) is like trying to find a needle in a haystack!

5. Terrestrial Viewing

Your Aristocrat 60mm excels in terrestrial daytime viewing. It employs a correct-image finder scope and a correct-image diagonal to provide views that are right-side up. This will allow you to comfortably view nature, vistas, boats, etc. Do not view through a closed window or bug screen as they will cause distortions to your images. Stick with magnifications below 100x, since at higher powers images rapidly lose sharpness and quality due to “heat waves” caused by sun-heated air.

Remember to aim well clear of the Sun, as the unfiltered rays of the sun through the telescope can cause permanent eye damage.

6. Astronomical Viewing

The Aristocrat 60mm was designed primarily for terrestrial daytime viewing, but it can be used for astronomy. We recommend using an optional 90° star diagonal when viewing the night sky.

What to Expect

So what will you see with your telescope? You should be able to see bands on Jupiter, the rings of Saturn, craters on the Moon, the waxing and waning of Venus, and several bright deep-sky objects. Do not expect to see color as you do in NASA photos, since those are taken with long-exposure cameras and have “false color” added. Our eyes are not sensitive enough to see color in deep-sky objects except in a few of the brightest ones.

What about tracking?

As you view objects in the night sky, you will notice that they slowly move out of the telescope’s field of view. This is due to the rotation of the earth. To keep an object in the telescope’s field of view (to “track” it), you will need to make small adjustments to the altitude and azimuth position of the telescope. To move the telescope in azimuth (left/right), unlock the azimuth lock knob and turn the telescope a very slight amount. To move the telescope in altitude (up/down) loosen the altitude lock lever and make the needed adjustment.

Remember that you are seeing these objects using your own telescope with your own eyes! The object you see in your eyepiece is in real-time, and not some conveniently provided image from an expensive space probe. Each session with your telescope will be a learning experience. Each time you work with your telescope it will get easier to use, and stellar objects will become easier to find. Take it from us, there is big difference between looking at a well-made full-color NASA image of a deep-sky object in a lit room during the daytime, and seeing that same object in your telescope at night. One can merely be a pretty image someone gave to you. The other is an experience you will never forget!

Objects to Observe

Now that you are all set up and ready to go, one critical decision must be made: what to look at?

A. The Moon

With its rocky surface, the Moon is one of the easiest and most interesting targets to view with your telescope. Lunar craters, marias, and even mountain ranges can all be clearly seen from a distance of 238,000 miles away! With its ever-changing phases, you’ll get a new view of the Moon every night. The best time to observe our one and only natural satellite is during a partial phase, that is, when the Moon is NOT full. During partial phases, shadows are cast on the surface, which reveal more detail, especially right along the border between the dark and light portions of the disk (called the “terminator”). A full Moon is too bright and devoid of surface shadows to yield a pleasing view. Make sure to observe the Moon when it is well above the horizon to get the sharpest images.

Use an optional Moon filter to dim the Moon when it is very bright. It simply threads onto the bottom of the eyepieces (you must first remove the eyepiece from the focuser to attach a filter). You’ll find that the Moon filter improves viewing comfort, and also helps to bring out subtle features on the lunar surface.

B. The Planets

The planets don't stay put like the stars, so to find them you should refer to Sky Calendar at our website (telescope.com), or to charts published monthly in *Astronomy, Sky & Telescope*, or other astronomy magazines. Venus, Mars, Jupiter, and Saturn are the brightest objects in the sky after the Sun and the Moon. Your Aristocrat 60mm is capable of showing you these planets in some detail. Other planets may be visible but will likely appear star-like. Because planets are quite small in apparent size, optional higher-power eyepieces are recommended and often needed for detailed observations. Not all the planets are generally visible at any one time.

JUPITER: The largest planet, Jupiter, is a great subject for observation. You can see the disk of the giant planet and watch the ever-changing positions of its four largest moons - Io, Callisto, Europa, and Ganymede.

SATURN: The ringed planet is a breathtaking sight when it is well positioned. The tilt angle of the rings varies over a period of many years; sometimes they are seen edge-on, while at other times they are broadside and look like giant "ears" on each side of Saturn's disk. A steady atmosphere (good seeing) is necessary for a good view. You will probably see a bright "star" close by, which is Saturn's brightest moon, Titan.

VENUS: At its brightest, Venus is the most luminous object in the sky, excluding the Sun and the Moon. It is so bright that sometimes it is visible to the naked eye during full daylight! Ironically, Venus appears as a thin crescent, not a full disk, when at its peak brightness. Because it is so close to the Sun, it never wanders too far from the morning or evening horizon. No surface markings can be seen on Venus, which is always shrouded in dense clouds.

MARS: The Red Planet makes its closest approach to Earth every two years. During close approaches you'll see a red disk, and may be able to see the polar ice cap.

C. The Stars

Stars will appear like twinkling points of light. Even powerful telescopes cannot magnify stars 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. The famous "Double-Double" in the constellation Lyra and the gorgeous two-color double star Albireo in Cygnus are favorites. Defocusing a star slightly can help bring out its color.

D. Deep Sky Objects

Under dark skies, there are many deep sky objects that are bright enough to be viewed with your Aristocrat 60mm, including galaxies, nebulas, and star clusters. Most deep-sky objects are faint, so it is important that you allow plenty of time for your eyes to adjust to the darkness. Do not expect these to look like the photographs you see in books and magazines.

To find deep sky objects in the sky, it is best to consult a star chart and planisphere. These guides will help you locate the brightest and best deep sky objects for viewing with your Aristocrat 60mm.

7. Care and Maintenance.

If you give your telescope reasonable care, it will last a lifetime. Do not store the telescope outdoors. Small components like eyepieces and other accessories should be kept in a protective box or storage case. Keep the dust covers on the front and rear of the telescope and finder scope when not in use.

The Aristocrat's legs are made of Mahogany wood that has been lacquered for protection. As long as they are kept from excess moisture, they will not warp or bend. Should they be exposed to moisture, dry them with a towel as soon as possible.

All the brass parts of the telescope have been treated to prevent tarnishing and discoloring. You will not need to polish the brass. Fingerprints and other marks should be wiped off with a soft cloth. The coating will also cause moisture that comes in contact with the brass to "bead" on the surface. Moisture on the brass parts should be wiped up immediately with a soft cloth.

Cleaning Lenses

Any quality optical lens cleaning tissue and optical lens cleaning fluid specifically designed for multi-coated optics can be used to clean the Aristocrat 60mm's objective lens or the exposed lenses of your eyepieces and finder scope. Never use regular glass cleaner or cleaning fluid designed for eyeglasses

Before cleaning with fluid and tissue, blow any loose particles off the lens with a blower bulb or compressed air. Then apply some cleaning fluid to a tissue, never directly on the optics. Wipe the lens gently in a circular motion, then remove any excess fluid with a fresh lens tissue. Oily fingerprints and smudges may be removed using this method. Use caution - rubbing too hard may scratch the lens. For the larger surface of the objective lens, clean only a small area at a time, using a fresh lens tissue on each area. Never reuse tissues.

8. Specifications

Mount: Brass, altazimuth
Optical tube: Brass, coated to prevent rust and tarnish
Objective lens diameter: 60mm
Objective lens: Achromatic, fully coated
Focal length: 900mm
Focal ratio: f/15
Focuser: Brass rack-and-pinion, accepts 1.25" eyepieces and accessories
Eyepiece: Brass with chrome barrel, 25mm Plössl
Magnification with supplied eyepiece: 36x
Diagonal: Brass with chrome barrel, 1.25", correct-image, 45°
Finder scope: 6x30 correct-image, achromatic
Tripod: Mahogany wood, lacquered
Weight: 22lbs. 13oz.

One-Year Limited Warranty

This Orion Aristocrat 60mm is warranted against defects in materials or workmanship for a period of one year from the date of purchase. This warranty is for the benefit of the original retail purchaser only. During this warranty period Orion Telescopes & Binoculars will repair or replace, at Orion's option, any warranted instrument that proves to be defective, provided it is returned postage paid to: Orion Warranty Repair, 89 Hangar Way, Watsonville, CA 95076. If the product is not registered, proof of purchase (such as a copy of the original invoice) is required.

This warranty does not apply if, in Orion's judgment, the instrument has been abused, mishandled, or modified, nor does it apply to normal wear and tear. This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state. For further warranty service information, contact: Customer Service Department, Orion Telescopes & Binoculars, 89 Hangar Way, Watsonville, CA 95076; (800) 676-1343.

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