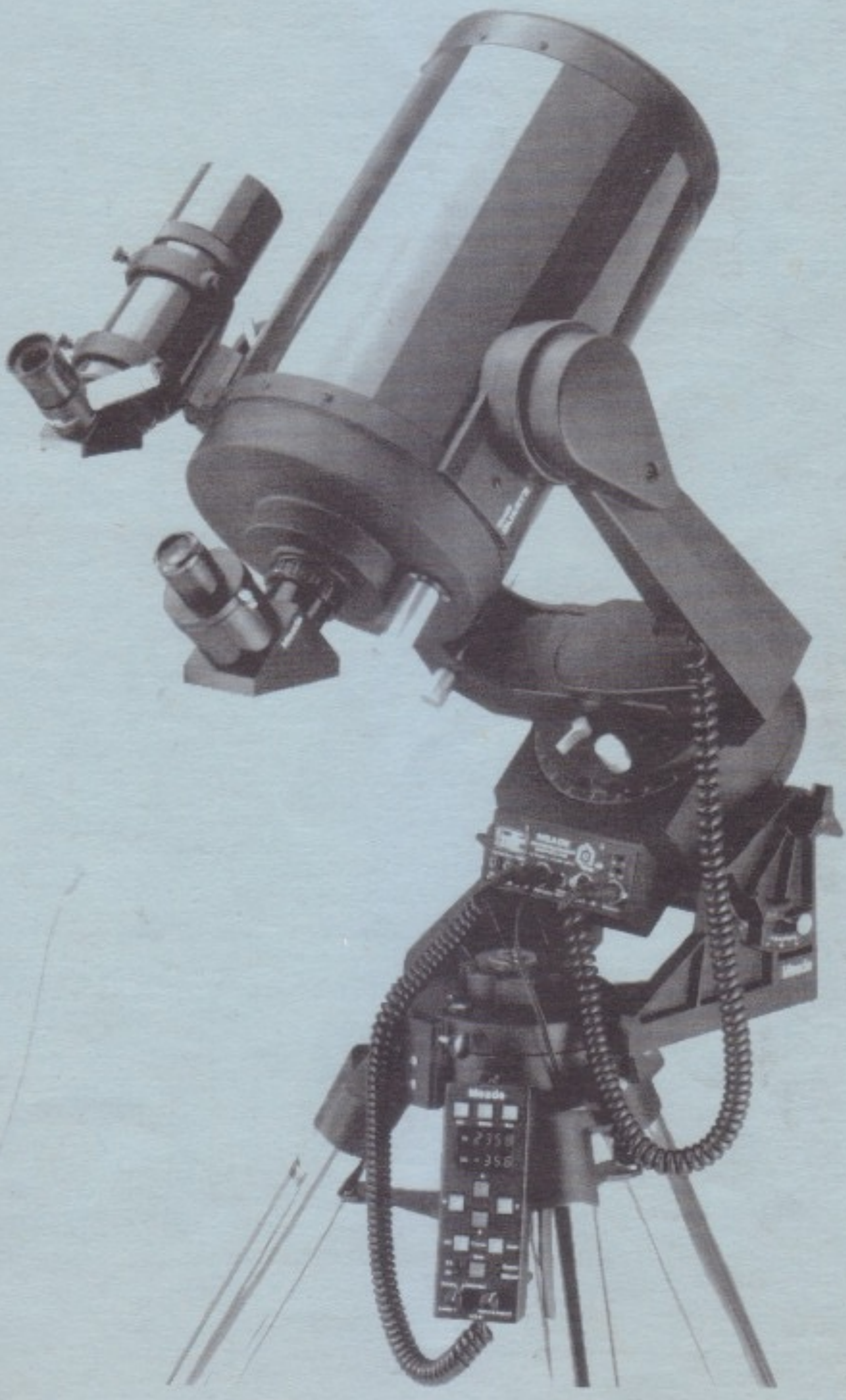
# Premier Series Instruction Manual

## 2080: 8" Schmidt-Cassegrain Models
## 2120: 10" Schmidt-Cassegrain Models



## WARNING

**NEVER ATTEMPT TO OBSERVE THE SUN THROUGH YOUR MEADE TELESCOPE! OBSERVING THE SUN, EVEN FOR THE SHORTEST FRACTION OF A SECOND, WILL CAUSE INSTANT AND IRREVERSIBLE EYE DAMAGE. WHEN OBSERVING DURING THE DAYTIME, DO NOT POINT THE TELESCOPE EVEN CLOSE TO THE SUN.**



Meade Instruments Corporation
1675 Toronto Way
Costa Mesa, CA 92626
(714) 556-2291

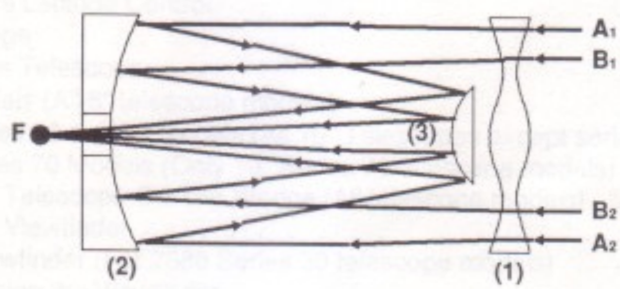
Ver. 0190-1

# Note

Instructions for the use of optional accessories are not included in this manual. For details in this regard, see the Meade "Accessories Catalog and Observer's Guide."

**THE SYSTEM 2000 SCHMIDT-CASSEGRAIN OPTICAL SYSTEM**

(Diagram not to scale)




In the Schmidt-Cassegrain design of the Meade 8-inch Model 2080 shown, light enters from the right, passes through a thin lens with 2-sided aspheric correction (1) ("correcting plate"), proceeds to a spherical primary (2) and then to a convex aspheric secondary mirror (3). The convex secondary mirror multiplies the effective focal length of the promary mirror and results in a focus at F, with light passing through a central perforation in the primary mirror.

The 8-inch Model 2080 telescope includes an oversize 8.25-inch diameter primary mirror, yielding a fully illuminated field-of-view significantly wider than is possible with a standard 8-inch diameter primary. Because the Schmidt correcting plate near its edge acts, in effect, as a negative lens, light impinging near the circumference of the correcting plate is lost unless the primary mirror size compensates for this light diverging from the corrector. (Note in the diagram that light rays A1 and A2 would be lost except for the oversize primary mirror.) In fact, the oversize primary of the Model 2080 results in about 6 percent more light reaching the focal surface of the telescope.

# TABLE OF CONTENTS


A. Introduction . . . . . . 6
1. What Is Premier . . . . . . 6
a. Accessory Levels . . . . . . 6
b. Focal Ratio . . . . . . 6
c. Superwedge . . . . . . 7
2. Manual Terminology . . . . . . 7
3. Standard Equipment . . . . . . 7
B. Telescope Assembly . . . . . . 8
1. Unpacking (All Premier models) . . . . . . 8
2. The Field Tripod (All Premier models) . . . . . . 8
3. Equatorial Wedge . . . . . . 10
a. 8" Equatorial Wedge (For all 2080 models) . . . . . . 10
1) Azimuth Control . . . . . . 11
2) Deluxe Latitude Control . . . . . . 11
b. 10" Equatorial Wedge (For all 2120 models not using the Superwedge) 12
1) Azimuth Control . . . . . . 13
2) Deluxe Latitude Control . . . . . . 13
c. Superwedge . . . . . . 14
4. Setting Up The Telescope . . . . . . 16
a. 2080 Models (All 8" telescope models) . . . . . . 16
b. 2120 Series 30 and 50 Models (All 10" Telescopes except series 70) 16
c. 2120 Series 70 Models (Only 10" Series 70 telescope models) 16
5. Mounting The Telescope On The Wedge (All telescope models) 18
6. Mounting The Viewfinder . . . . . . 20
a. 6 x 30 Viewfinder (For 2080 Series 30 telescope models) 20
1) Attaching the Viewfinder . . . . . . 20
2) Focusing the Viewfinder . . . . . . 20
3) Collimating the Viewfinder . . . . . . 20
b. 8 x 50 Viewfinder (For 2120 Series 30 telescope models) 21
1) Attaching the Viewfinder . . . . . . 21
2) Focusing the Viewfinder . . . . . . 21
3) Collimating the Viewfinder . . . . . . 21
c. 9 x 60 Viewfinder (For all Premier Series 50 and 70 telescope models) 22
1) The Illuminated Reticle . . . . . . 22
2) Attaching the Viewfinder . . . . . . 22
3) Focusing the Viewfinder . . . . . . 22
4) Collimating the Viewfinder . . . . . . 22
5) Finding the Celestial Pole . . . . . . 23
7. Attaching The Electric Declination Motor (All Premier telescope models) 24
a. Installation . . . . . . 24
b. Troubleshooting . . . . . . 24
8. Attaching the Diagonal and Eyepiece . . . . . . 25
a. Series 30 Telescope . . . . . . 25
b. Series 50 and Series 70 Telescopes . . . . . . 25
9. Magnetic Compass (All Premier telescope models) . . . . . . 26
a. Setting Magnetic Declination . . . . . . 26
b. Compass Installation . . . . . . 27
c. Finding True North . . . . . . 28

C. Telescope Functions (All Premier telescope models) . . . . . . . . . . . 31
1. LX6 Power Panel . . . . 31
a. Ammeter . . . . 31
b. Power Indicator . . . . 32
c. On/Off Switch . . . . 32
d. Northern/Southern Switch . . . . 32
e. Dec Motor Output . . . . 32
f. Electric Focuser Output . . . . 32
g. Illuminated Reticle Output . . . . 32
h. Electronic Command Center . . . . 32
i. Power Input Socket . . . . 32
j. CAT Socket . . . . 32
k. Encoders Socket . . . . 33
2. Electronic Command Center (ECC) . . . . 33
a. Map Light . . . . 33
b. DRS Buttons . . . . 33
c. DRS Display . . . . 33
d. Drive Corrector Control Buttons . . . . 33
e. Electric Focuser Buttons . . . . 34
f. Map Light Button . . . . 34
g. 2X/8X Slide Switch . . . . 34
h. Quartz/Manual Slide Switch . . . . 34
i. Variable Speed Knob . . . . 34
j. Reticle Adjustment Knob . . . . 34
3. Operation . . . . 35
a. AC Operation . . . . 35
b. DC Operation . . . . 35
c. Battery Pack . . . . 35
D. Telescope Operation (All Premier telescope models) . . . . 36
1. Your First Observations . . . . 36
2. Focusing . . . . 36
3. Magnifications . . . . 37
4. Apparent Field and Actual Field . . . . 38
5. Celestial Coordinates: Declination and Right Ascension . . . . 39
6. Lining Up With The Celestial Pole . . . . 40
7. Precise Polar Alignment . . . . 41
8. Electric Motor Drive . . . . 42
9. Setting Circles . . . . 43
10. Observing With The Telescope . . . . 44
E. Maintenance (All Premier Models) . . . . 45
1. Cleaning The Optics . . . . 45
2. Alignment (Collimation) Of The Optical System . . . . 45
3. Dewing Of The Corrector Plate . . . . 47
4. Adjusting The Right Ascension Lock . . . . 47
5. Adjusting The Declination Lock . . . . 48
6. A Note ON The "Flashlight" Test . . . . 48
7. Factory Servicing And Repairs . . . . 48
8. Troubleshooting The LX6 Drive System . . . . 49
F. Specifications . . . . 50

**PRECAUTIONARY WARNING!** Be sure to read this manual, or at minimum, the introductory assembly and operational procedures contained herein before attempting to use your Model 2080 or 2120.

## A. INTRODUCTION

The Premier 2080 8" Schmidt-Cassegrain Telescopes and Premier 2120 10" Schmidt-Cassegrain Telescopes are instruments of advanced mirror-lens design for astronomical and terrestrial applications. Optically and mechanically, the 2080 and 2120 telescope models are perhaps the most sophisticated and precisely manufactured telescopes ever made available to the serious amateur. These telescopes enable the visual astronomer to reach out for detailed observations of the Solar System (the planets: Jupiter, Saturn, Mars) and beyond to distant nebulae, star clusters, and galaxies. The astrophotographer will find a virtually limitless range of possibilities since, with the precision Meade worm-gear motor drive system, long exposure guided photography becomes not a distant goal, but an achievable reality. The capabilities of the instrument are essentially limited not by the telescope, but by the acquired skills of the observer and photographer. Do take the time to read this manual thoroughly so that you will be fully acquainted with the many important features of the telescope, as well as with the auxiliary equipment and accessories available for advanced applications.

The 8" models and 10" models are, with the exception of a few assembly operations and features, almost identical operationally. Most standard and optional accessories are interchangeable between the two telescopes. The instructions in this manual generally apply to both telescopes; when exceptions to this rule occur, they are clearly pointed out.

### 1. What Is Premier?

Meade Premier Series telescopes represent a complete reconfiguration of the Meade Schmidt-Cassegrain line. We started with the industry's most advanced drive system, the LX6, which incorporates the precision LX worm gear drive and state-of-the-art electronics. To this base, we added different optical systems and accessories to create a telescope line that will suit the needs of every amateur application, from the budget conscious beginner to the serious astrophotographer. *An important point to remember is that the least expensive Premier Series model can be upgraded at a later date to be identical with the most advanced model, as all Premier models are standardized with the LX6 drive base.*

#### a. ACCESSORY LEVELS

To better understand this manual, the Premier telescope model numbers should be explained. As stated above, every model telescope starts with the exact same LX6 drive base. There are three accessory levels creating three series of telescope models. They are:

**Series 30:** Basic accessories with no ECC (Electronic Command Center or Handbox) or EDM (Electric Declination Motor System).

**Series 50:** Most common accessories, including 2" Diagonal Mirror, ECC, EDM, and premium-grade eyepiece.

**Series 70:** Advanced accessories, including CAT (Computer Aided Telescope System), DRS (Digital Readout System), Electric Focuser, and several premium-grade eyepieces.

#### b. FOCAL RATIO

Premier telescopes are available in two focal ratios, either the classic f/10 or the wide-field f/6.3.

Premier telescopes with f/10 optical systems all have model numbers which end with a "0". Telescopes with f/6.3 optical systems all have model numbers which end with a "6". Therefore:

**f/10 optical systems** are model numbers: 30, 30H, 50, 50H, 70, and 70H

**f/6.3 optical systems** are model numbers: 36, 36H, 56, 56H, 76, and 76H

**c. SUPERWEDGE**

Premier 10" telescopes are available with the Superwedge. Premier telescopes with the Superwedge have model numbers ending with the letter "H". Therefore:

**Telescopes with Superwedge** have model numbers: 30H, 36H, 50H, 56H, 70H, and 76H

## 2. Manual Terminology

Since this manual covers the assembly and operation of all Premier telescope models, it is important to define terminology so that sections of the manual that apply to specific telescope models can be identified. The following list breaks the Premier model numbers into sections which will be used throughout this manual.

**2080 Models:** All 8" Premier telescope models - f/6.3, f/10 and all accessory levels.

**2120 Models:** All 10" Premier telescope models - f/6.3, f/10 and all accessory levels.

**Series 30 Models:** All 8" and 10" Premier models - 30, 30H, 36, and 36H.

**Series 50 Models:** All 8" and 10" Premier models - 50, 50H, 56, and 56H.

**Series 70 Models:** All 8" and 10" Premier models - 70, 70H, 76, and 76H.

**f/6.3 Models:** All 8" and 10" Premier models - 36, 36H, 56, 56H, 76, 76H.

**f/10 Models:** All 8" and 10" Premier models - 30, 30H, 50, 50H, 70, 70H.

## 3. Standard Equipment

Since this manual covers 32 different telescope models (including foreign versions), it is not practical to list the standard equipment for each model. Most accessories that are included with any telescope model are described in this manual, with notes explaining for which telescope model it is included as standard equipment.

For an exact standard equipment listing for your telescope, see the "Packing Program" included in your telescope package.

## B. TELESCOPE ASSEMBLY

Use the following steps to assemble your telescope. Note: Section headings list which Premier models are covered under that heading.

### 1. Unpacking (All Premier Models)

Meade Premier telescopes are packed in a variety of methods, depending on the model, to assure safe arrival. In general, the field tripod and equatorial wedge are shipped in separate cartons. All 2080 models and 2120 Series 70 models are packed as complete telescopes, while 2120 10" Series 30 and 50 model telescopes are packed for shipment in two cartons. Accessories are usually packed separately, but are sometimes included with the telescope. See the "Packing Program" included with your telescope to see how your specific telescope was packed.

Carefully unpack and remove all the telescope parts from their packing material. Compare the parts to the "Packing Program" to identify each part.

NOTE: We recommend that you keep all packing materials. If it is ever necessary for you to return your telescope to the Meade factory for servicing, these materials will help to assure that no shipping damage will occur.

> **Note to foreign users:** Meade 8" and 10" Premier Schmidt-Cassegrain models supplied to countries outside the U.S.A. are identical in all respects to the telescopes offered domestically, with the exception of the AC wall adapter. Also included is a set of plug adapters which will allow the wall adapter to be plugged into the standard wall sockets of most countries.

### 2. The Field Tripod (All Premier Models)

The Field Tripods for the Meade Models 2080 and 2120 telescopes are supplied as completely assembled units, except for the spreader bar (#4, Fig. 1) and the 6 lock knobs (2 knobs for each of the 3 tripod legs) used to adjust the height of the tripod. These knobs are packed separately for safety in shipment.

For terrestrial observations, the base of the 2080's fork mount may be attached to the field tripod, using the optional Altazimuth Adapter. (Because of the additional weight of the 2120, we do not normally recommend use of the 10" telescope with the Altazimuth Adapter). The Model 2080 telescope in this way is mounted in an "altazimuth" ("altitude-azimuth," or "vertical-horizontal") format, ideal for non-astronomical applications. The telescope in this set-up moves along vertical and horizontal axes, corresponding respectively to the Declination and Right Ascension axes in an astronomical observing mode. The telescope may, of course, be used for astronomical observations when set-up in the altazimuth mode, but the electric motor drive will, in this case, be non-functional from a practical point of view.

Alternately, the field tripod is normally used in conjunction with the appropriate equatorial wedge (see section 3) for serious astronomical applications. The equatorial wedge permits alignment of the telescope's Polar Axis with the Celestial Pole (or North Star), so that the electric motor drive becomes operational.

After removing the field tripod from its shipping carton, stand the tripod vertically, with the tripod feet down and with the tripod still fully collapsed (see Fig. 2). Grasp two of the tripod legs and, with the full weight of the tripod on the third leg, gently pull the legs apart to a fully open position.

Thread in the 6 lock-knobs (2 on each tripod leg) near the foot of each tripod leg. Refer to Fig. 1. These lock-knobs are used to fix the height of the inner, extendable tripod leg sections. Note: "Firm feel" tightening is sufficient; over-tightening may result in stripping of the knob threads.

Unthread the tension knob (#3, Fig. 1) from the threaded rod. Then, turn the threaded rod (#2, Fig. 1) so that about 1-1/2" of its length protrudes up through the tripod head (#1, Fig. 1) of the field tripod.

Underneath the tripod head of the field tripod is a hex lock-nut which should be tightened to fix the position of the threaded rod.

Slide the spreader bar onto the threaded rod. The spreader bar should be positioned so that the 3 arms of the spreader bar are lined up with the 3 tripod legs.

Replace and tighten the tension knob (#3, Fig. 1). Firm tightening of the tension knob is sufficient to result in rigid positioning of the tripod legs. It is not necessary to use extreme force in tightening this knob.

The field tripod is now ready to accept the equatorial wedge.

To vary the tripod height, loosen the 6 lock-knobs and slide the 3 inner tripod leg sections out to the desired height. A bubble level is included on all equatorial wedges to aid in leveling the field tripod.

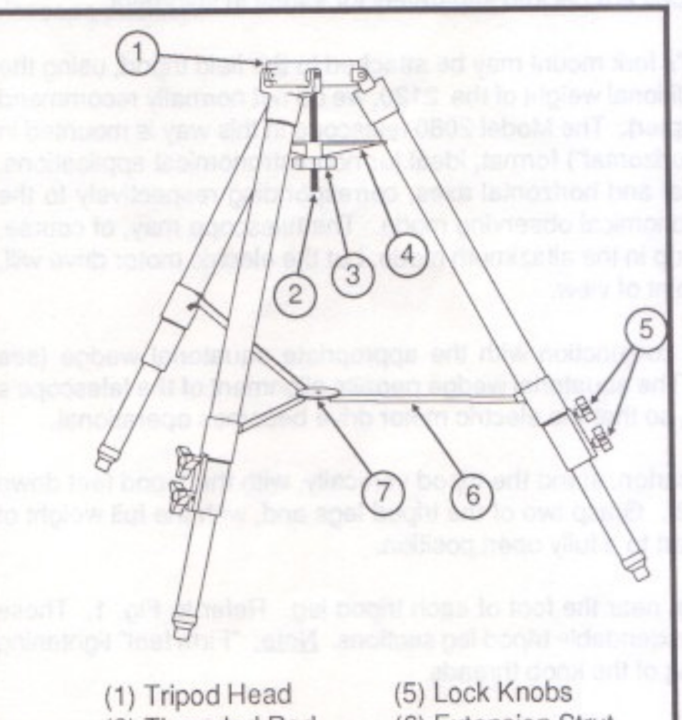
To collapse the tripod for storage follow these steps:

1. Loosen the tension knob (#3, Fig. 1) sufficiently to allow the spreader bar (#4, Fig. 1) to rotate 60° from its assembled position, so that one spreader bar arm is located between each adjacent pair of tripod legs.
2. Leave the tension knob near the bottom end of the threaded rod (#2, Fig. 1) with the spreader bar resting on the tension knob,
3. At the base of the tripod is a 3-vane extension strut system, with a circular hub at its center (#7, Fig. 1). To collapse the tripod, grasp the tripod head (#1, Fig. 1) with one hand and, with the other hand, pull directly "up" on the central hub of the extension strut system. This operation will cause the tripod legs to move inward to a collapsed position.

PRECAUTIONARY NOTES

1. If the tripod does not seem to extend or collapse easily, do not force the tripod legs in or out. By following the instructions above, the tripod will function properly, but if you are unclear on the proper procedure, forcing the tripod into an incorrect position may damage the extension strut system.

2. Do not overtighten the 6 lock-knobs used to fix the inner tripod leg sections at various heights. "Firm feel" tightening is sufficient.




(1) Tripod Head
(2) Threaded Rod
(3) Tension Knob
(4) Spreader Bar
(5) Lock Knobs
(6) Extension Strut
(7) Tension Hub

**Fig. 1: Field Tripod**

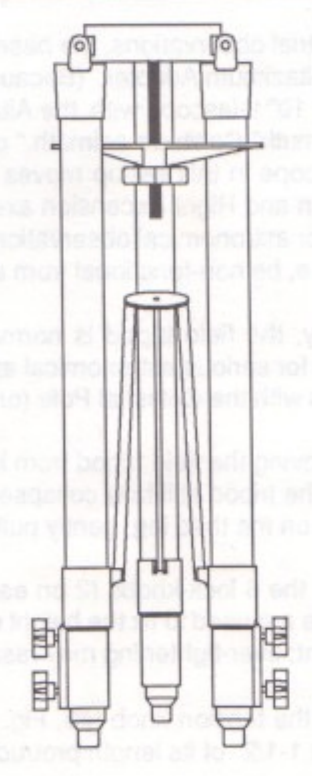


**Fig. 2: Field Tripod (collapsed)**

## 3. Equatorial Wedge

There are three equatorial wedges used on Meade Premier telescopes. Pick the section, below, that applies to your telescope.

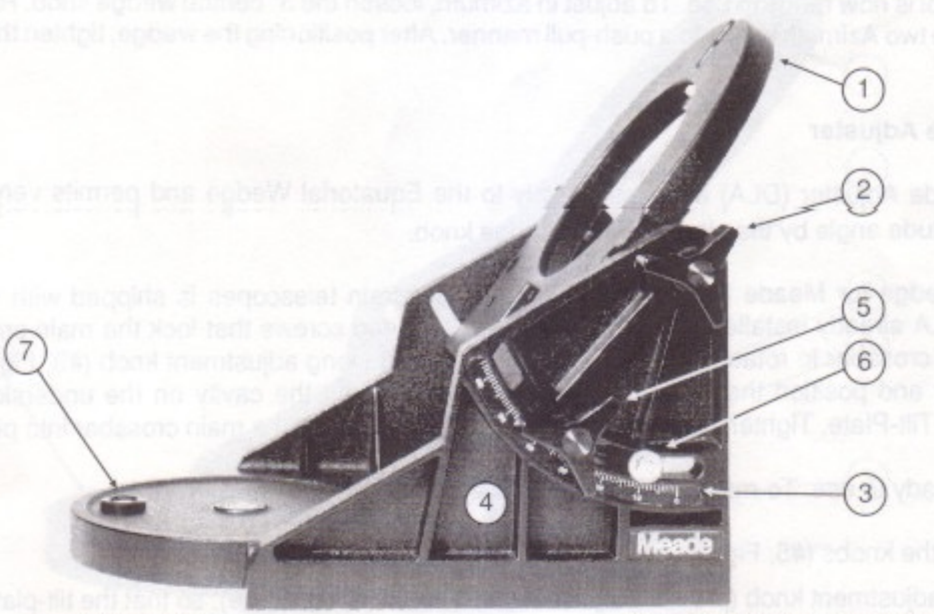
### a. 8" EQUATORIAL WEDGE (For all 2080 Models)

The Equatorial Wedge permits use of the Model 2080 telescope in an astronomical, or "equatorial," mode. The wedge fits onto the field tripod, described below, and accepts the base of the Model 2080 fork mount. See Fig. 11.

NOTE: The Meade equatorial wedge is designed solely for use in conjunction with the Meade field tripod. The wedge should never be used without the field tripod, e.g. by placing the wedge alone on a table top and then mounting the telescope on the wedge. The Model 2080 , placed onto the equatorial wedge alone without the field tripod attached to the wedge may become seriously imbalanced, to the point where the telescope may actually tip over.

The equatorial wedge for the Model 2080 telescope is of modern design, with several important features incorporated to simplify and facilitate telescope operation. After using the wedge, you will find that the functional design features included are of very significant value in routine telescope operations. Features included are:

1. Attachment of the wedge to the field tripod by means of only one manual knob.
2. Quick azimuth adjustment by loosening the manual knob as described above.
3. Bubble level for rapid tripod/wedge leveling.
4. Etched latitude scale for fast adjustment of the latitude angle.




(1) Tilt-Plate
(2) Attachment Knob
(3) Latitude Scale
(4) Wedge Body
(5) Tilt Angle Adjustment Knob
(6) Fine Latitude Adjustment Mechanism
(7) Bubble Level

**Fig. 3: Equatorial Wedge for 2080 Model Telescopes**

To assemble the equatorial wedge, follow this procedure (note that all required wedge hardware and manual knobs are shipped within the wedge carton):

1. The wedge consists of two basic parts: the wedge body and the tilt-plate, as shown in Fig. 3. Attach the tilt-plate to the wedge body by threading in the four knobs provided. Two knobs, with washers, should be used on each side of the wedge body so that a total of 4 knobs attach the tilt plate to the wedge body.

2. Place the wedge onto the field tripod with the central threaded rod of the tripod fitting through the center hole in the floor of the wedge. Thread the 2-1/2" diameter manual knob onto the threaded rod of the tripod and firmly tighten the manual knob.

**1) Azimuth Control**

The Azimuth Control for the Meade Equatorial Wedge and Field Tripod is shipped in a plastic bag and includes the following parts:

- Azimuth Base (large U shaped piece of aluminum)
- Azimuth Arm (small T shaped piece of aluminum)
- 2 - Azimuth Knobs
- 2 - 8-32 x 1/2" flat-head machine screws
- 2 - 8-32 x 1" round-head machine screws

To attach the Azimuth Control to your wedge and tripod, follow these steps:

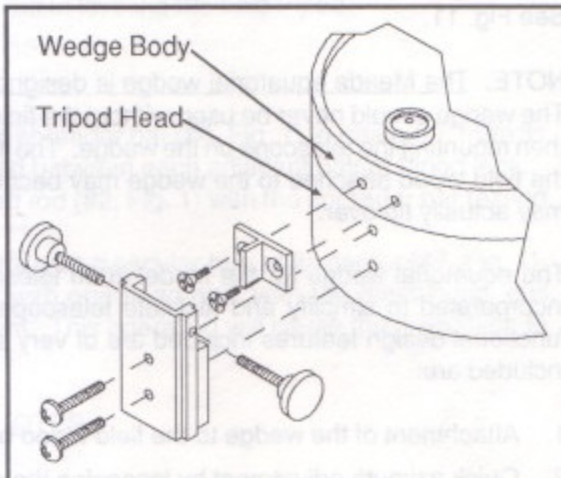


**Fig. 4: Azimuth Control**

1. Remove the 4 set screws from the wedge and field tripod (which plug the attachment holes) using a screwdriver.
2. Attach the Azimuth Arm to the Equatorial Wedge using the 2 ea. 8-32 x 1/2" flat-head machine screws.
3. Attach the Azimuth Base to the Field Tripod using the 2 ea. 8-32 x 1" round-head machine screws.
4. Thread the two Azimuth Adjustment Knobs into the Azimuth Base, until they just touch the Azimuth Arm.

The Azimuth control is now ready to use. To adjust in azimuth, loosen the 3" central wedge knob. Rotate the wedge by using the two Azimuth knobs in a push-pull manner. After positioning the wedge, tighten the central wedge knob.

**2) Deluxe Latitude Adjuster**

The Deluxe Latitude Adjuster (DLA) attaches directly to the Equatorial Wedge and permits very precise adjustments in latitude angle by the simple turning of one knob.

The Equatorial Wedge for Meade 8" and 10" Schmidt-Cassegrain telescopes is shipped with the main crossbar of the DLA already installed. Loosen the two socket-head screws that lock the main crossbar in place, to allow the crossbar to rotate slightly if needed. Thread the long adjustment knob (#3, Fig. 13) into the main crossbar and position the end of the adjustment knob into the cavity on the underside of the Equatorial Wedge Tilt-Plate. Tighten the two socket-head screws locking the main crossbar into place.

The DLA is now ready to use. To make fine latitude adjustments, follow this procedure:

1. Slightly loosen the knobs (#5, Fig. 3), on each side of the wedge.
2. Turn the DLA's adjustment knob (pressing against the bottom of the tilt-plate), so that the tilt-plate moves in latitude angle.
3. Re-tighten the two knobs, which were loosened in step 1, above.

NOTE: When installing the tilt-plate to the wedge, note that it is a tight fit and the sides must generally spread slightly to accept the tilt-plate. If the main crossbar of the DLA is already tightened into place this will inhibit your installation of the tilt-plate. You will therefore see that by releasing the screws on the ends of the DLA crossbar your installation of the wedge tilt-plate will be facilitated.

**b. 10" EQUATORIAL WEDGE (For all 2120 Models not using the Superwedge)**

The Equatorial Wedge permits use of the Model 2120 telescope in an astronomical, or "equatorial," mode. The wedge fits onto the field tripod, described below, and accepts the base of the Model 2120 fork mount. See Fig. 11.

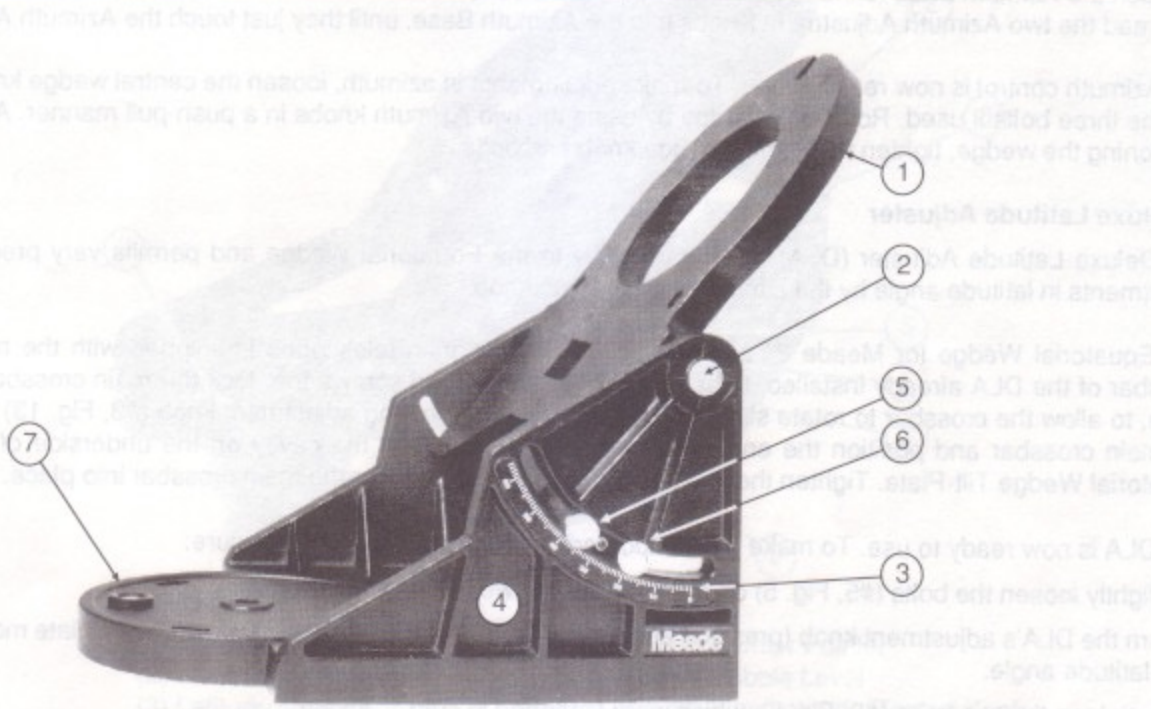
NOTE: The Meade equatorial wedge is designed solely for use in conjunction with the Meade field tripod. The wedge should never be used without the field tripod, e.g. by placing the wedge alone on a table top and then mounting the telescope on the wedge. The Model 2120, placed onto the equatorial wedge alone without the field tripod attached to the wedge may become seriously imbalanced, to the point where the telescope may actually tip over.

The equatorial wedge for the Model 2120 telescope is of modern design, with several important features incorporated to simplify and facilitate telescope operation. After using the wedge for your telescope, you will find that the functional design features included are of very significant value in routine telescope operations. Features included are:

1. Attachment of the wedge to the field tripod by means of only one manual knob. (For photographic applications with the Model 2120 where additional steadiness is required, 3 additional hex-head screws are provided).
2. Quick azimuth adjustment by loosening the manual knob as described above.
3. Bubble level for rapid tripod/wedge leveling.
4. Etched latitude scale for fast adjustment of the latitude angle.

To assemble the equatorial wedge, follow this procedure (note that all required wedge hardware and manual knobs are shipped within the wedge carton):

1. The wedge consists of two basic parts: the wedge body and the tilt-plate, as shown in Fig. 5. Attach the tilt-plate to the wedge body with the four bolts provided. Two bolts, with washers, should be used on each side of the wedge body so that a total of 4 bolts attach the tilt plate to the wedge body.




(1) Tilt-Plate
(2) Attachment Screw
(3) Latitude Scale
(4) Wedge Body
(5) Tilt Angle Adjustment Screw
(6) Fine Latitude Adjustment Mechanism
(7) Bubble Level

**Fig. 5: Equatorial Wedge for 2120 Model Telescopes**

2. Place the wedge onto the field tripod with the central threaded rod of the tripod fitting through the center hole in the floor of the wedge. Thread the 2-1/2" diameter manual knob onto the threaded rod of the tripod and firmly tighten the manual knob.

3. When engaging in long-exposure astrophotography with your telescope, it is advisable to thread in the 3 additional bolts through the wedge floor and into the top of the field tripod. These screws fit through the oval-shaped slots in the wedge floor; the wedge must first be turned horizontally on the field tripod so that the oval slots lie over any 3 of the 6 threaded holes on the top surface of the tripod head. Tighten the 3 socket screws with the hex wrench provided. Note, however, that for normal visual observations through the Model 2120, use of these socket screws is not required; the manual knob (Step (2) above) is generally sufficient for rigid attachment of the wedge to the tripod.

**1) Azimuth Control**

The Azimuth Control for the Meade Equatorial Wedge and Field Tripod is shipped in a plastic bag and includes the following parts:

- Azimuth Base (large U shaped piece of aluminum)
- Azimuth Arm (small T shaped piece of aluminum)
- 2 - Azimuth Knobs
- 2 - 8-32 x 1/2" flat-head machine screws
- 2 - 8-32 x 1" round-head machine screws

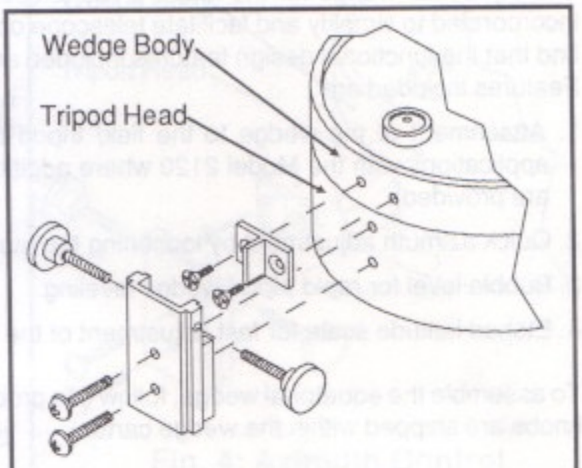


**Fig. 6: Azimuth Control**

To attach the Azimuth Control to the wedge and tripod, follow these steps:

1. Remove the 4 set screws from the wedge and field tripod (which plug the attachment holes) using a screwdriver.
2. Attach the Azimuth Arm to the Equatorial Wedge using the 2 ea. 8-32 x 1/2" flat-head machine screws.
3. Attach the Azimuth Base to the Field Tripod using the 2 ea. 8-32 x 1" round-head machine screws.
4. Thread the two Azimuth Adjustment Knobs into the Azimuth Base, until they just touch the Azimuth Arm.

The Azimuth control is now ready to use. To make adjustments in azimuth, loosen the central wedge knob, and the three bolts if used. Rotate the wedge by using the two Azimuth knobs in a push-pull manner. After positioning the wedge, tighten the central wedge knob and bolts.

**2) Deluxe Latitude Adjuster**

The Deluxe Latitude Adjuster (DLA) attaches directly to the Equatorial Wedge and permits very precise adjustments in latitude angle by the simple turning of one knob.

The Equatorial Wedge for Meade 8" and 10" Schmidt-Cassegrain telescopes is shipped with the main crossbar of the DLA already installed. Loosen the two socket-head screws that lock the main crossbar in place, to allow the crossbar to rotate slightly if needed. Thread the long adjustment knob (#3, Fig. 13) into the main crossbar and position the end of the adjustment knob into the cavity on the underside of the Equatorial Wedge Tilt-Plate. Tighten the two socket-head screws locking the main crossbar into place.

The DLA is now ready to use. To make fine latitude adjustments, follow this procedure:

1. Slightly loosen the bolts (#5, Fig. 5) on each side of the wedge.
2. Turn the DLA's adjustment knob (pressing against the bottom of the tilt-plate), so that the tilt-plate moves in latitude angle.
3. Re-tighten the two bolts (#5, Fig. 5), which were loosened in step 1, above.

NOTE: When installing the tilt-plate to the wedge, note that it is a tight fit and the sides must generally spread slightly to accept the tilt-plate. If the main crossbar of the DLA is already tightened into place this will inhibit your installation of the tilt-plate. You will therefore see that by releasing the screws on the ends of the DLA crossbar your installation of the wedge tilt-plate will be facilitated.

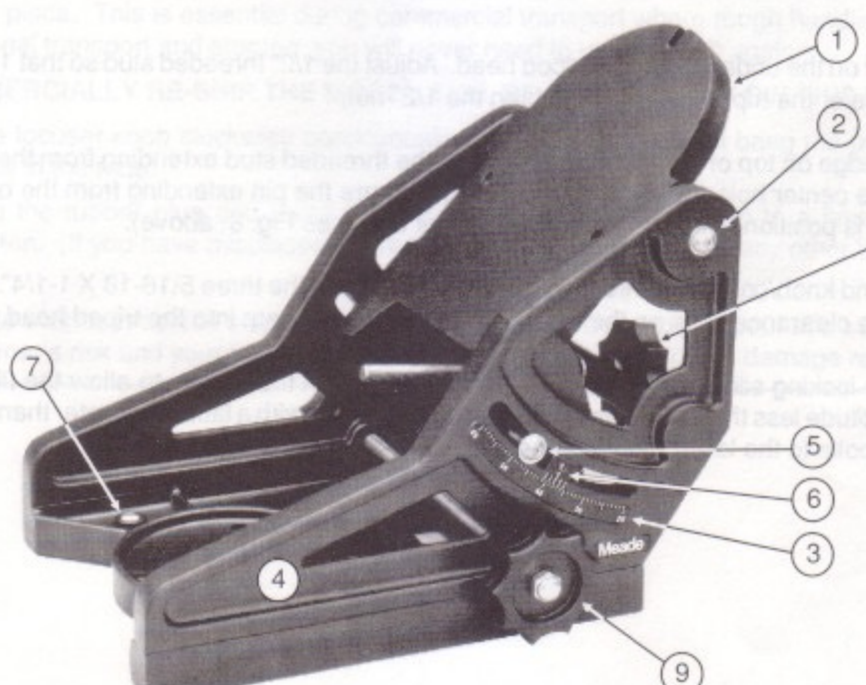
**c. SUPERWEDGE (For all 10" Models using the Superwedge)**

The Superwedge permits use of the Model 2120 telescope in an astronomical, or "equatorial," mode. The wedge fits onto the field tripod, described below, and accepts the base of the Model 2120 fork mount. See Fig. 11.

NOTE: The Meade Superwedge is designed solely for use in conjunction with the Meade field tripod. The Superwedge should never be used without the field tripod, e.g. by placing the Superwedge alone on a table top and then mounting the telescope on the wedge. The Model 2120, placed onto the Superwedge alone without the field tripod attached to the wedge may become seriously imbalanced, to the point where the telescope may actually tip over.

The Superwedge for the Model 2120 telescope is of modern design, with several important features incorporated to simplify and facilitate telescope operation. After using the Superwedge for your telescope, you will find that the functional design features included are of very significant value in routine telescope operations. Some of these features include:

1. Attachment of the Superwedge to the field tripod by means of only one manual knob. (For photographic applications with the Model 2120 where extreme steadiness is required, 3 additional hex-head screws are provided).
2. Quick azimuth adjustment by loosening the manual knob as described above.
3. Bubble level for rapid tripod/wedge leveling.
4. Etched latitude scale for fast adjustment of the latitude angle.
5. Built-in latitude adjustment control.




(1) Tilt-Plate
(2) Attachment Screw
(3) Latitude Scale
(4) Wedge Body
(5) Tilt Angle Adjustment Screw
(6) Vernier Pointer
(7) Bubble Level
(8) Fine Latitude Control Knob
(9) Azimuth Control Knob

**Fig. 7: Superwedge for 2120 Model Telescopes**

To assemble the Superwedge, follow this procedure (note that all required wedge hardware and manual knobs are shipped within the wedge carton):

1. Locate the two 8-32 nylon set screws on the rim of the tripod head and remove them. Attach the tangent arm to the tripod using the supplied 8-32 X 1/2" socket cap screws. (See Fig. 8, below.)

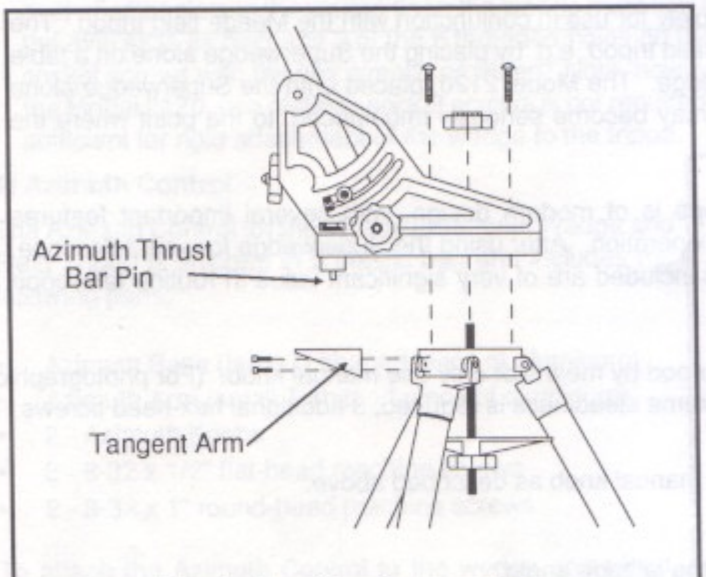



**Fig. 8: Mounting Superwedge**

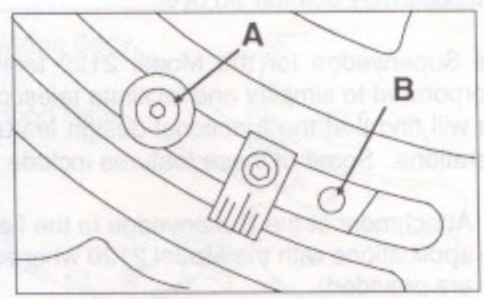



**Fig. 9: Latitude Range Holes**

2. Loosen the 1/2" nut on the underside of the tripod head. Adjust the 1/2" threaded stud so that 1-1/2" extend past the top surface of the tripod head. Re-tighten the 1/2" nut.

3. Place the Superwedge on top of the tripod head so that the threaded stud extending from the tripod head passes through the center hole on the wedge floor. Make sure the pin extending from the bottom of the azimuth thrust bar is positioned in the slot on the tangent arm (see Fig. 8, above).

4. Install the large hand knob/compass onto the threaded stud. Pass the three 5\16-18 X 1-1/4" button head screws through the clearance slots on the wedge floor and thread them into the tripod head.

5. The lower tilt plate locking screws (see "A", Fig. 9) are installed in the factory to allow the tilt plate to be adjusted for any latitude less than 55 degrees. If viewing in a region with a latitude greater than 55 degrees, move the locking bolts to the lower mounting holes (see "B", Fig. 9).

## 4. Setting Up The Telescope

### a. 2080 MODELS (All 8" Telescopes)

The 2080 model telescopes are shipped as completely assembled instruments. Simply remove the telescope from the packing materials.

### b. 2120 SERIES 30 AND SERIES 50 MODELS (All 10" Telescopes except Series 70)

**SEE CAUTION BOX, BELOW.** The 2120 Series 30 and Series 50 model telescopes are shipped as completely assembled instruments. Simply remove the telescope from the packing materials.

### c. 2120 SERIES 70 MODELS (Only 10" Series 70 Telescope Models)

**SEE CAUTION BOX, BELOW.** The 2120 Series 70 model telescopes are shipped as completely assembled instruments. Simply remove the telescope from the packing materials.

## CAUTION: All Premier 2120 Model Owners

**DO NOT ATTEMPT TO TURN THE FOCUSER KNOB OF THE OPTICAL TUBE UNTIL YOU HAVE READ THIS NOTE!**

Next to the base of the focuser knob you will see a red-colored slotted head bolt. This bolt is used only for safety in shipment. Remove this bolt before attempting to turn the focuser knob. In its place, insert the rubber plug provided as a dust protector (this rubber plug is included with your hardware package).

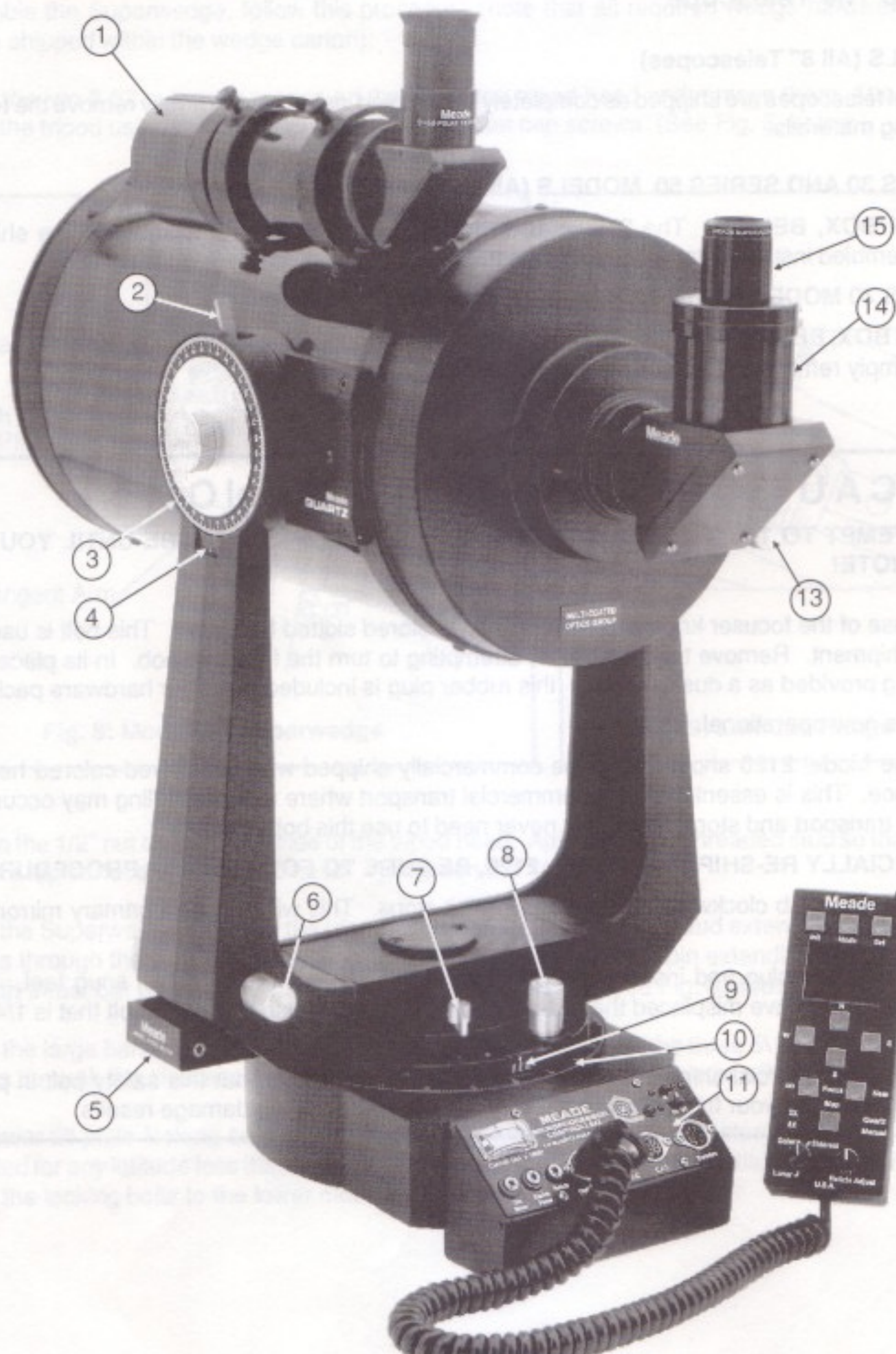
Your focuser is now operational.

Warning! The Model 2120 should never be commercially shipped without this red-colored head bolt secured in place. This is essential during commercial transport where rough handling may occur. For your personal transport and storage, you will never need to use this bolt again.

**TO COMMERCIALLY RE-SHIP THE MODEL 2120, BE SURE TO FOLLOW THIS PROCEDURE:**

1. Turn the focuser knob clockwise continuously until it stops. This will bring the primary mirror all the way back in the tube.
2. Remove the rubber plug and insert the red-headed bolt. Thread it in to a firm snug feel. Do not overtighten. (If you have misplaced the red-headed bolt, you may use any other bolt that is 1/4-20x1" long).

Please note that commercial shipment of the Model 2120 telescope without this safety bolt in place is done at owner's risk and your freight insurance may be voided if shipping damage results.




(1) Viewfinder
(2) Declination Lock
(3) Declination Setting Circle
(4) Declination Pointer
(5) Declination Motor
(6) Declination Slow-Motion Control
(7) R.A. Lock
(8) R.A. Slow Motion-Control
(9) R.A. Pointer
(10) R.A. Setting Circle
(11) LX6 Power Panel
(12) Electronic Command Center
(13) Focus Knob
(14) 2" Diagonal Mirror
(15) Eyepiece

**Fig. 10: Premier 2080 Model 56**

## 5. Mounting The Telescope On The Wedge (All Telescope Models)

With 2080 model telescopes, three knobs are supplied for mounting the telescope's drive base to the tilt-plate of the equatorial wedge. With the Model 2120, three socket screws are provided for this purpose.

(1) Tilt Plate
(2) Wedge Body-to-Tilt Plate Attachment Knob
(3) Tilt Angle Adjustment Knob
(4) Knob for Attaching the Telescope to Tilt Plate
(5) Drive Base
(6) Slot for Knob (#4, above)
(7) Holes for Additional Attachment Knobs
(8) Bubble Level
(9) Manual Knob for Attaching the Wedge to Field Tripod

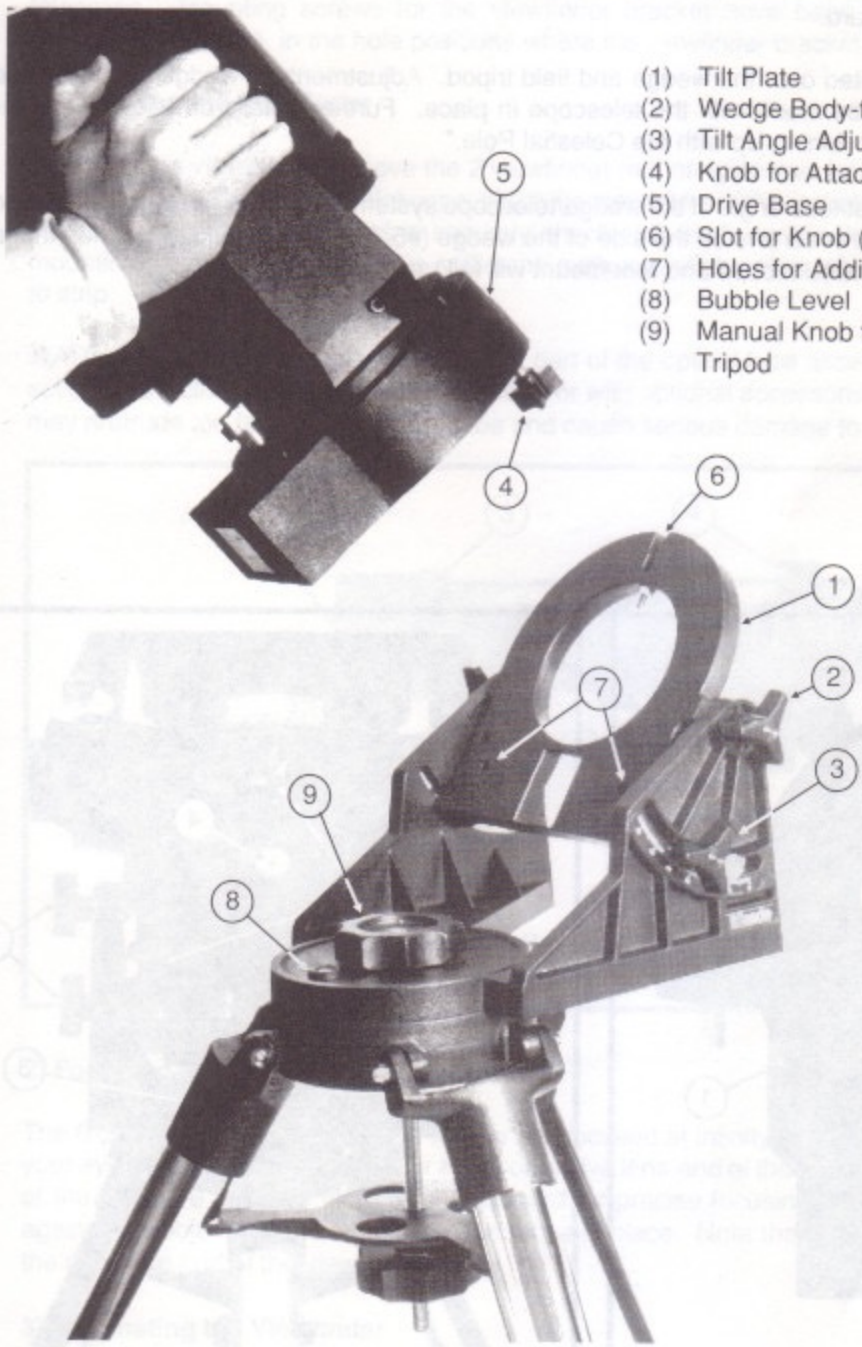



**Fig. 11: Placing the Telescope on the Equatorial Wedge**

Thread one of these knobs (or screws, as appropriate) partially into the hole on the underside of the drive base, located at the curved-end of the drive base. See #4, Fig. 11. This knob or screw should be threaded in about 3 full turns, not fully threaded into the hole.

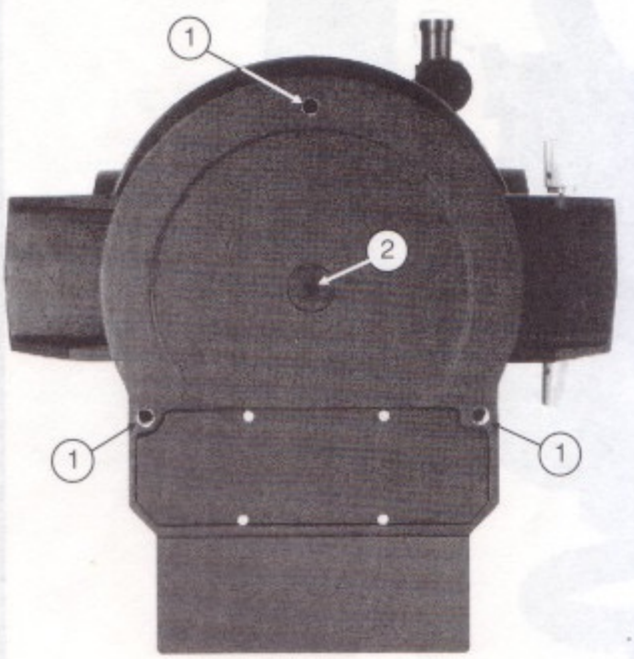
Check that the knobs or bolts at the side of the wedge, (#5, Fig. 3 or #5, Fig. 5), are firmly tightened before placing the telescope onto the wedge.

Grasping the 2 fork arms of the telescope firmly, with the power panel towards you, place the telescope onto the tilt plate of the wedge by sliding the knob (Model 2080) or screw (Model 2120) into the slot at the top of the curved-end of the wedge tilt-plate.

Insert the 2 remaining knobs for Model 2080, or socket screws for Model 2120, through the underside of the tilt plate and into the underside of the drive base. Tighten down all 3 knobs or screws to a firm feel. Extreme force is not necessary in this regard.

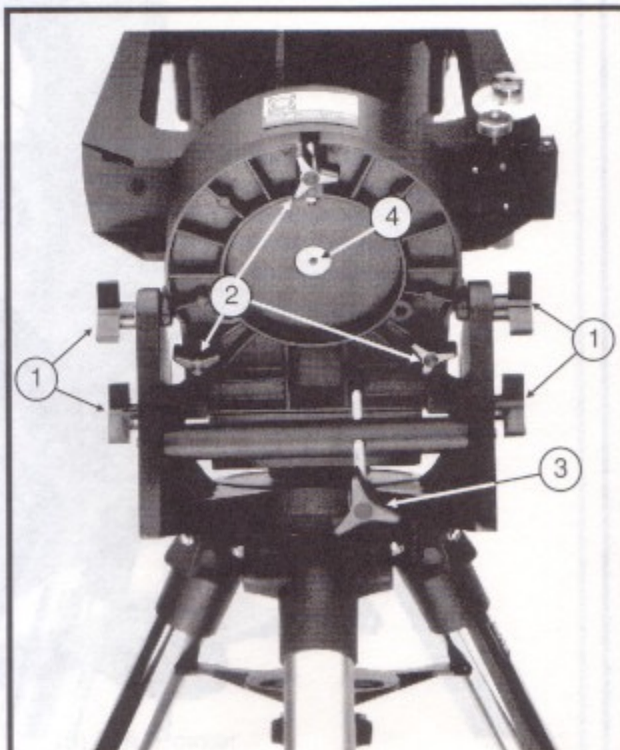
The telescope is now fully mounted onto the wedge and field tripod. Adjustments in wedge latitude angle and/or azimuth orientation may be made with the telescope in place. Further details on telescope polar alignment are given below under "Lining Up with the Celestial Pole."

CAUTION: When changing the latitude angle of the wedge/telescope system, be sure to grasp the telescope firmly before loosening the knobs or screws on the side of the wedge (#5, Fig. 3 or #5, Fig. 5). When these knobs or screws are loosened, the telescope and fork mount will fall rapidly if not supported.




(1) Wedge Attachment Holes
(2) 1/4-20 Photo-Tripod Attachment Hole

**Fig. 12: Underside of the Drive Base**




(1) Tilt Plate Attachment Knobs
(2) Telescope-to-Tilt Plate Attachment Knobs
(3) Deluxe Latitude Control Knob
(4) 1/4-20 Photo-Tripod Attachment Hole

**Fig. 13: Telescope Attached To**

## 6. Mounting The Viewfinder

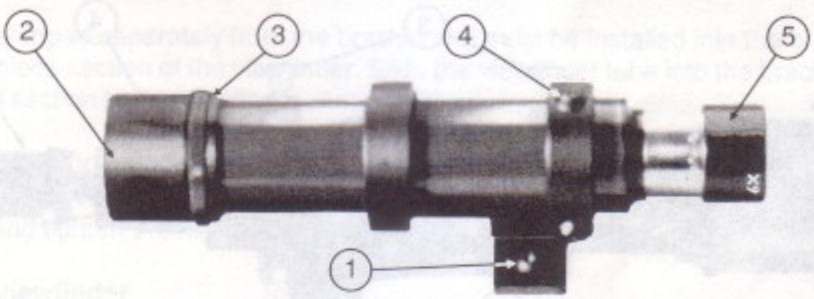
**a. 6 x 30 VIEWFINDER (For 2080 Series 30 Telescopes)**

The standard 6X30mm viewfinder is shipped in its mounting bracket with each Premier 2080 Series 30 telescope. Mounting screws for the viewfinder bracket have been threaded into the top of the main telescope's rear cell, in the hole positions where the viewfinder bracket will be seated. See Fig. 14.

**1) Attaching the Viewfinder**

To attach the viewfinder, remove the 2 viewfinder mounting screws from the rear cell, using one of the hex wrenches provided with the telescope; place the viewfinder with bracket over these mounting holes and then replace the 2 mounting screws to securely attach the viewfinder bracket to the rear cell. Tightening these mounting screws to a "firm feel" is sufficient; avoid over-tightening, which might cause the rear cell threads to strip.

WARNING: Never use set screws on any part of the optical tube assembly, except those factory-supplied set screws included with the basic telescope or with optional accessories. Longer non-standard set screws may protrude too far into the optical tube and cause serious damage to the primary mirror.




(1) Mounting Screw
(2) Objective Lens Cell
(3) Knurled Collar
(4) Collimation Screws
(5) Eyepiece

**Fig. 14: 6x30 Viewfinder for 2080 Series 30 Telescopes**

**2) Focusing the Viewfinder**

The 6x30mm viewfinder has been factory pre-focused at infinity. Should this focusing need adjustment for your eyes, loosen the knurled collar at the objective lens-end of the viewfinder (#3, Fig. 14), enabling rotation of the objective lens cell forward or backward for precise focusing. Then tighten down the knurled collar against the objective lens cell to lock the focus in place. Note that no focusing is possible or necessary at the eyepiece end of the viewfinder.

**3) Collimating the Viewfinder**

The viewfinder will require alignment, or collimation, with the main telescope. Using the 25mm eyepiece, point the main telescope at some easy to find land object (e.g. the top of a telephone pole or corner of a building) at least 200 yards distant. Center a well-defined object in the main telescope. Then, using one of the hex wrenches provided, tighten or loosen, as appropriate, the viewfinder's 3 collimation screws (#4, Fig. 14) until the crosshairs of the viewfinder are precisely centered on the object already centered in the main telescope. With this collimation accomplished, objects located first in the wide-field viewfinder will then be centered in the main telescope's field of view.

Once attached, the viewfinder may be left permanently mounted onto the telescope's rear cell. The viewfinder need not be removed when storing the telescope in its carrying case.

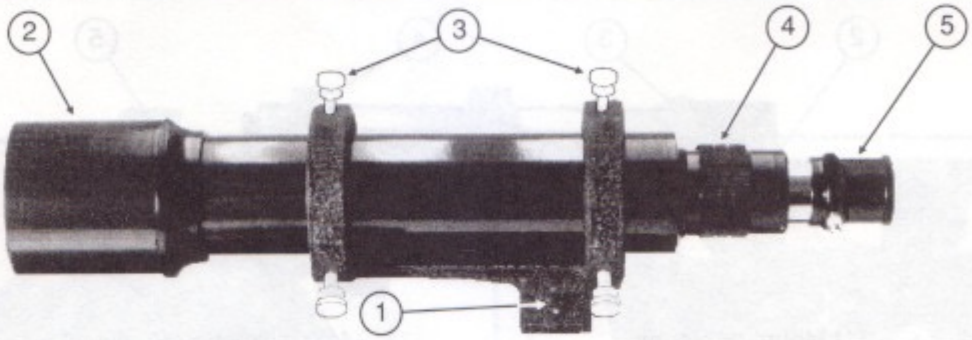
**b. 8 x 50 VIEWFINDER (For 2120 Series 30 Telescopes)**

Each Premier 2120 Series 30 telescope is supplied as standard equipment with an 8x50mm straight-through viewfinder. The bracket for this viewfinder is packed separately from the finder itself, and 6 nylon thumbscrews for collimation are pre-threaded into the viewfinder bracket. Mounting screws for attachment of the finder bracket to the main telescope have been threaded into the top of the main telescope's rear cell, at the hole positions where the viewfinder bracket will be seated. See Fig. 15.

**1) Attaching the Viewfinder**

To attach the viewfinder, remove the 2 viewfinder mounting screws from the rear cell using one of the hex wrenches provided with the telescope; place the viewfinder with bracket over these mounting holes and then replace the 2 mounting screws to securely attach the viewfinder bracket to the rear cell. Tightening these mounting screws to a "firm feel" is sufficient; avoid over-tightening, which might cause the rear cell threads to strip.

WARNING: Never use set screws on any part of the optical tube assembly, except those factory supplied set screws included with the basic telescope or with optional accessories. Longer, non-standard set screws may protrude too far into the optical tube and cause serious damage to the primary mirror.




(1) Mounting Hole
(2) Objective Lens Cell
(3) Collimation Screws
(4) Focuser

**Fig. 15: 8x50 Viewfinder for 2120 Series 30 Telescopes**

**2) Focusing the Viewfinder**

Focusing the finder is accomplished with the helicoid mechanism located near the finder's eyepiece. Note: if the eyepiece is ever removed from the finder, **be careful not to touch in any way the crosshairs of the eyepiece**, which are exposed at the barrel end of the eyepiece!

**3) Collimating the Viewfinder**

The viewfinder will require alignment, or collimation, with the main telescope. Using the 25mm eyepiece, point the main telescope at some easy to find land object (e.g. the top of a telephone pole or corner of a building) at least 200 yards distant. Center a well-defined object in the main telescope. Then, simply turn the 6 nylon collimation thumbscrews (#3, Fig. 15) until the crosshairs of the viewfinder are precisely centered on the object already centered in the main telescope. With this collimation accomplished, objects located first in the wide-field viewfinder will then be centered in the main telescope's field of view.

Once attached, the viewfinder may be left permanently mounted onto the telescope's rear cell; the viewfinder need not be removed when storing the telescope in its carrying case.

**c. 9 X 60 POLAR VIEWFINDER (For All Premier Series 50 and Series 70 Telescopes)**

In addition to being an excellent 9 X 60 viewfinder, the Meade Illuminated Reticle Polar Viewfinder is designed to be used as an optical guide for finding the celestial pole.

**1) The Illuminated Reticle**

To assure safe arrival, the Polar Viewfinder is shipped with the bulb/battery holder (#1, Fig.16) not mounted on the viewfinder. To attach, thread the bulb/battery holder into the hole located just under the eyepiece of the viewfinder.

To turn on the reticle, rotate the knurled switch (#2, Fig. 16) on the bulb/battery holder to the "on" position. The brightness is adjustable by rotating the knurled switch. To prolong battery life, remember to turn off the reticle when not in use.

To replace the batteries in the Polar Viewfinder, remove the bulb/battery holder from the Polar Viewfinder. Separate the two halves of the bulb/battery holder by unthreading the two pieces, exposing the batteries. After replacing the batteries, thread the two halves of the bulb/battery holder together, and replace the unit onto the Polar Viewfinder.

**2) Attaching the Viewfinder**

The viewfinder is shipped separately from the bracket and must be installed into the bracket. Unthread the rear diagonal/eyepiece section of the viewfinder. Slide the viewfinder tube into the bracket and reattach the diagonal/eyepiece section to the viewfinder.

The viewfinder attaches to the main telescope with a quick-release bracket. This allows the viewfinder to be easily removed from the telescope for storage. Simply slide the viewfinder with bracket into the mating base on the telescope and tighten the two thumbscrews.

**3) Focusing the Viewfinder**

The Meade Polar Viewfinder has been pre-focused at the factory. However, should it become necessary to adjust the focus, follow these steps:

1. Rotate the eyepiece (#7, Fig. 16) until the reticle is in sharp focus.

2. Loosen the black knurled locking ring (just behind the dew shield, #4, Fig. 16).

3. While looking at a star, rotate the dew shield (#5, Fig. 16) until the star is in focus. (This refocuses the objective lens.) CAUTION! Take care when rotating counter clockwise. You are unthreading the dew shield and it may fall off if rotated too far! Refocusing the objective lens will only require a few turns of the dew shield at most.

4. When the dew shield is rotated to the sharpest focus for your eye, tighten the black knurled locking ring against the dew shield to fix the position.

**4) Collimating the Viewfinder**

The viewfinder will require alignment, or collimation, to the main telescope. Using a low-power eyepiece, point the main telescope at some easy to find land object (e.g. the top of a telephone pole or corner of a building) at least 200 yards distant. Center a well-defined object in the main telescope. Then, simply turn the 6 nylon collimation thumbscrews (#3, Fig. 16) until the crosshairs of the viewfinder are precisely centered on the object already centered in the main telescope. With this collimation accomplished, objects located first in the wide-field viewfinder will then be centered in the main telescope's field of view.

**5) Finding the Celestial Pole**

To accurately position the telescope on the celestial pole, follow this procedure:

1. Align (or collimate) the Polar Viewfinder with the main optical tube (as described in section 4, page 22) by adjusting the black thumbscrews on the bracket until an object in the main telescope is centered on the cross hairs of the Polar Viewfinder.

2. Rotate the optical tube in declination until the declination circle reads 90 degrees. (In this position, the optical tube will be pointing toward Polaris.)

3. Rotate the telescope in R.A. until one of the crosshairs is vertical to the horizon (this is not necessarily vertical to your eye), and the viewfinder's eyepiece is also vertical to the horizon. By making sure the viewfinder's eyepiece is also vertical, you are automatically picking the correct crosshair to make vertical to the horizon.

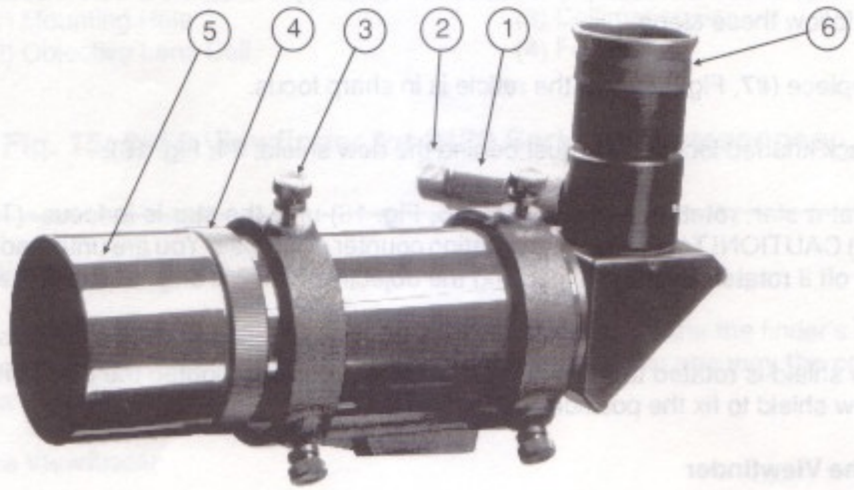
4. Hold the Polaris Reference Circle next to the telescope with the arrow pointing up.

5. Rotate the inner (local time) circle until your current local time corresponds to the current date on the outer (date) circle.

6. The position of Polaris will be indicated by the slant of the inner (local time) circle that extends out to the outer (date) circle.

7. The date circle represents the reticle in the Polar Viewfinder. Move the telescope in azimuth (rotate the wedge) and latitude (move the tilt plate of the wedge) until Polaris is in the same position on the reticle as shown on the Polar Reference Circle.

You now have an accurate polar alignment.




(1) Bulb/Battery Holder
(2) Off/On Switch
(3) Collimation Screws
(4) Knurled Locking Ring
(5) Dew Shield/Objective Lens Cell
(6) Eyepiece

**Fig. 16: 9x60 Polar Viewfinder for Series 50 & 70 Telescopes**

## 7. Attaching The Electric Declination Motor (All Premier Telescope Models *)

### a. INSTALLATION

1. Using the telescope's supplied hex wrench, remove the rear Declination slow-motion knob. This knob is on the opposite side of the fork arm, away from the R.A. controls. (See Fig. 17)
2. Slide the large Teflon gear onto the shaft, small end first. Position the gear so that the small metal hub does not quite touch the fork arm, (about 1/64" gap) and tighten the set screw.
3. Using the two screws supplied (#4, Fig. 17), attach the Declination Motor (#5, Fig. 17) to the undersurface of the fork arm. Adjust the motor position so that the small chrome pinion gear (#3, Fig. 17) on the motor will engage with the Teflon slip-gear. Tighten the mounting screws only sufficiently to hold the motor in position. Over pressure may stall the motor.
4. Plug the Declination cord into the motor. Plug the other end of the cord into the "Dec" socket on the LX6 Power Panel. The electric Declination motor is now ready for operation.

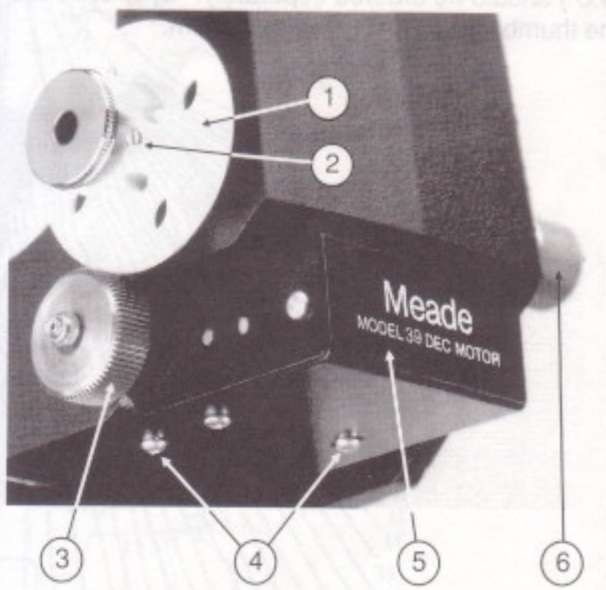
The Declination slow-motion system is designed to be used manually without disengaging the motor. The Teflon gear will slip, allowing manual override. To use the manual slow-motion Declination control, simply turn the Declination slow-motion knob as if the motor were not attached.

The tension of the Teflon gear has been set at the factory. If it needs adjustment, turn the small slotted head set screw on the large hub of the Teflon gear (#2, Fig. 17). This adjustment is very sensitive and requires only a very small turn. If this adjustment is set too light, the motor will turn the gear, but not the shaft. If it is set too tight, the manual slow-motion knob will become hard to turn.

### b. TROUBLESHOOTING

If the electric Declination motor turns when pushing either of the red "North" or "South" buttons on the Electronic Command Center, but does not move the telescope, check the following:

1. Make sure that the Declination tangent arm has not run out of travel. Look on the inside of the left fork arm at the bar running down the inside of the fork arm. If it is all the way to one side, then it must be moved back to the middle of the fork arm by turning the manual slow-motion knob.
2. Make sure the Declination lock is locked.
3. Check that the Teflon gear has sufficient tension.




(1) Clutch Gear
(2) Tension Adjustment
(3) Pinion Gear
(4) Attachment Screws
(5) Dec Motor
(6) Slow-Motion Knob

**Fig. 17: Attaching the Dec Motor**

* The Electric Declination Motor is optional on Series 30 telescope models, and factory installed on Series 70 telescope models.

## 8. Attaching Diagonal and Eyepiece

### a. SERIES 30 TELESCOPES

The eyepiece holder threads directly onto the rear-cell thread of the Models 2080 and 2120. The diagonal prism slides into the eyepiece holder and, in turn, accepts the supplied 1-1/4" O.D. eyepiece. For astronomical observations, the diagonal prism generally provides a more comfortable right-angle viewing position. Alternately, an eyepiece may be inserted directly into the eyepiece holder for straight-through observations. Note in this case, however, that the image will appear inverted and reversed left-for-right. With the diagonal prism, telescopic images appear correctly oriented up-and-down, but still reversed left-for-right. For terrestrial applications, where a fully corrected image orientation is desired, both up-and-down and left-for-right, the optional #924 Erecting Prism (1-1/4" O.D.) should be ordered separately. Eyepieces and the diagonal prism are held in their respective places on the telescope by a moderate tightening of the thumbscrews on the diagonal prism and eyepiece holder.

### b. SERIES 50 AND SERIES 70 TELESCOPES

The 2" diagonal mirror (#14, Fig. 10) threads directly onto the rear-cell thread of the Models 2080 and 2120, and, in turn, accepts the supplied 1-1/4" O.D. eyepiece. The 2" diagonal mirror will accept both 1-1/4" and 2" eyepieces by using the 1-1/4" adapter for 1-1/4" eyepieces, or removing this adapter for 2" eyepieces.

For astronomical observations, the diagonal mirror generally provides a more comfortable right-angle viewing position. Alternately, an eyepiece may be inserted directly into the eyepiece holder for straight-through observations, with the use of an optional eyepiece holder. Note in this case, however, that the image will appear inverted and reversed left-for-right. With the diagonal mirror, telescopic images appear correctly oriented up-and-down, but still reversed left-for-right. For terrestrial applications, where a fully corrected image orientation is desired, both up-and-down and left-for-right, the optional #924 Erecting Prism (1-1/4" O.D.) should be ordered separately. Eyepieces are held in the diagonal prism by a moderate tightening of the thumbscrew on the diagonal prism.

## 9. Magnetic Compass (All Premier Telescope Models)

The magnetic compass helps the observer to set-up the telescope without actually seeing the pole star Polaris. This allows setting up before dark or in locations where the view of Polaris is obstructed. The magnetic compass has an adjustment to compensate for the local angle of Magnetic Declination. Note: Magnetic Declination is the difference between Magnetic North (which the compass shows) and true north (where the telescope should be pointed). Magnetic Declination should not be confused with the astronomical term "Declination," which, when used with "Right Ascension", describes the celestial coordinate system.

### a. SETTING MAGNETIC DECLINATION

In order to obtain an accurate reading using the compass, you must first adjust for the Magnetic Declination for your location.

1. First, determine the Magnetic Declination in your area using the Isogonic Chart (Fig. 18)

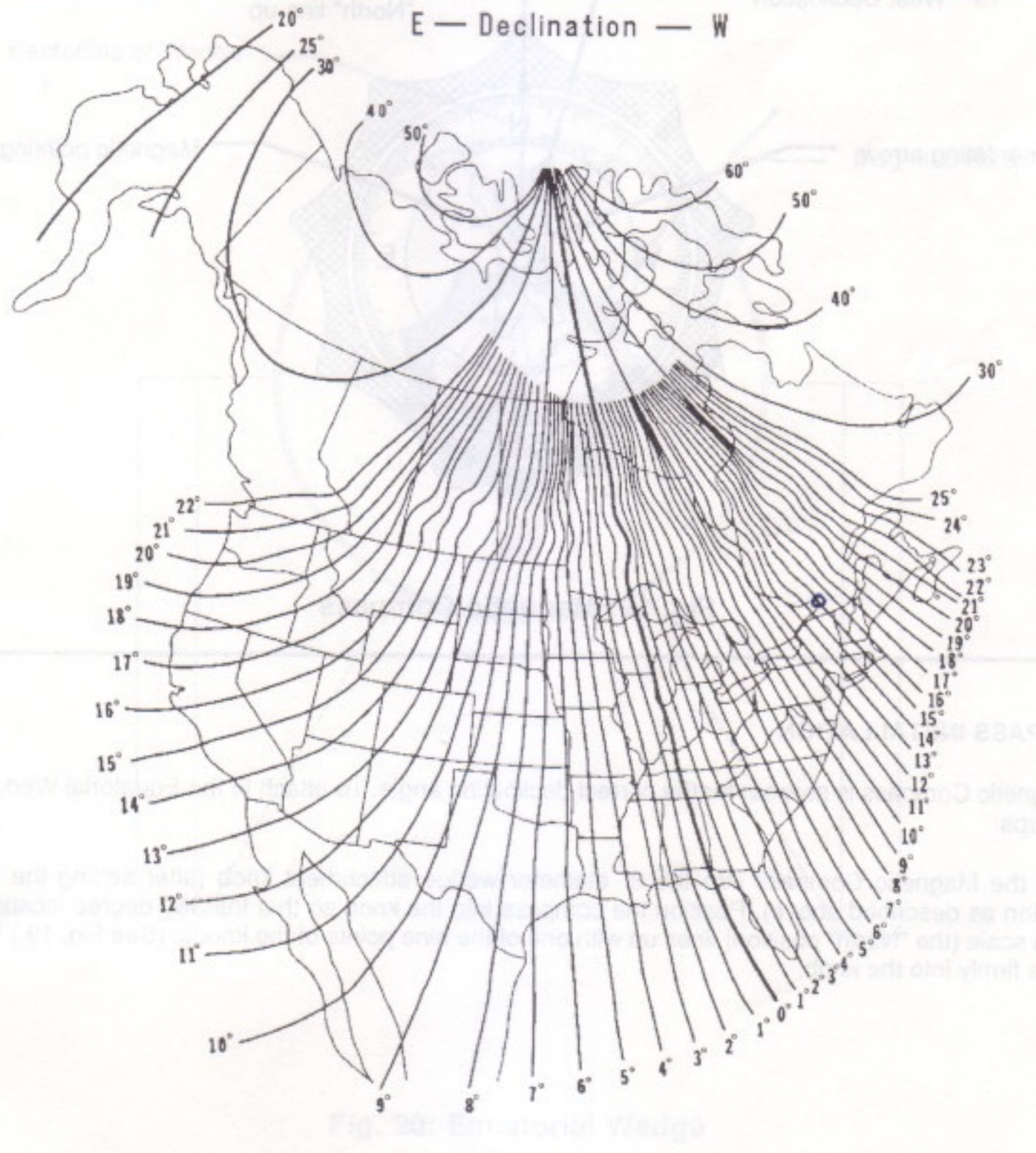



Fig. 18: Magnetic Declination Map

2. Squeeze the clear central vial with thumb and index finger of the left hand.

3. With the right hand, rotate the outer dial until the orienting arrow (the black arrow painted on the inside clear surface) is lined up with the desired Magnetic Declination angle on the declination scale. Notice that East Magnetic Declination is to the right of the "North" position and West Magnetic Declination is left of the "North" position. As an example, Fig. 19 shows the correct setting for 10 degrees west declination, which covers Buffalo, NY, or Philadelphia, PA.

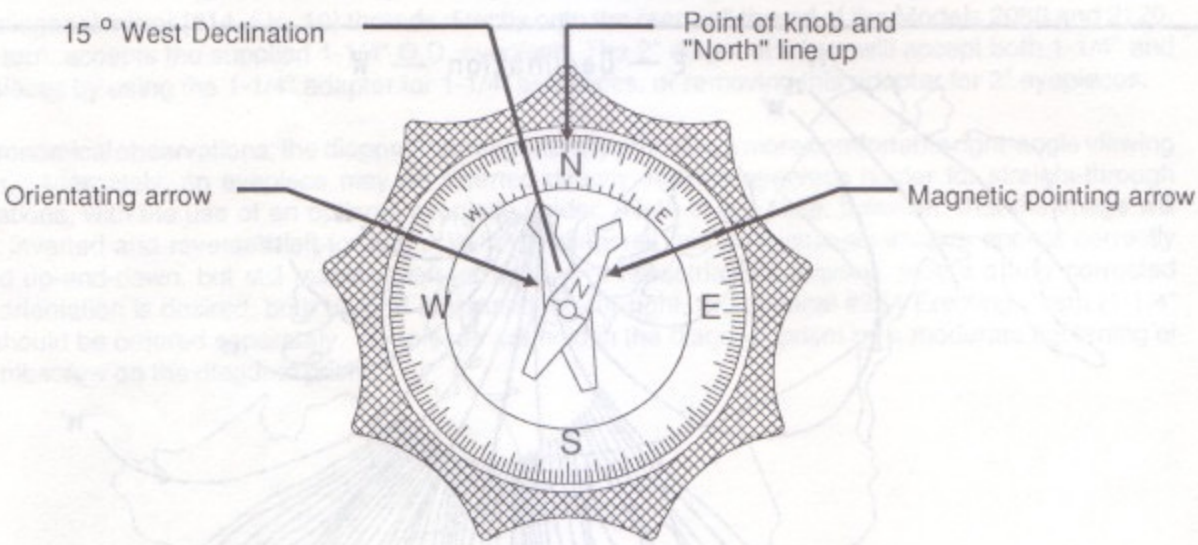



Fig. 19: Magnetic Compass

b. COMPASS INSTALLATION

The Magnetic Compass is now set for the correct declination angle. To attach to the Equatorial Wedge, follow these steps:

1. Snap the Magnetic Compass into the 3" diameter wedge attachment knob (after setting the Magnetic Declination as described above). Position the compass into the knob so that the 360 degree location on the direction scale (the "North" position) lines up with one of the nine points of the knobs. (See Fig. 19.) Press the compass firmly into the knob.

2. Assemble the Equatorial Wedge onto the Field Tripod as described in the Instruction Manual using the knob/compass combination to attach the wedge to the tripod.

**c. FINDING TRUE NORTH**

The Magnetic Compass is now ready to use. Just follow these simple steps for a quick and easy azimuth alignment:

1. Loosen the knob/compass slightly. This allows for rotation of the Equatorial Wedge under the knob/compass (Fig. 20). The magnetic pointing arrow will point to magnetic north.

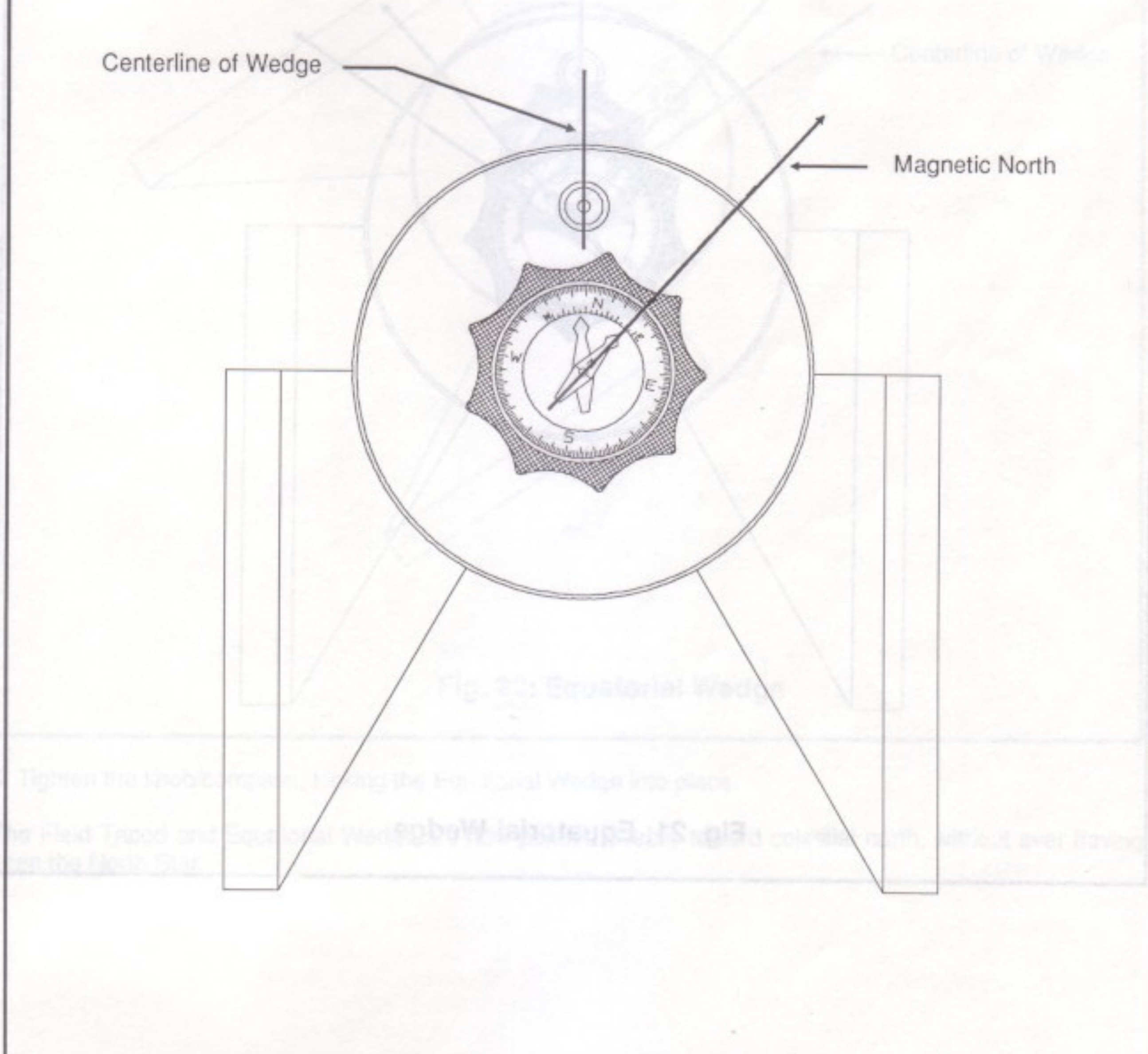



**Fig. 20: Equatorial Wedge**

2. Rotate the knob/compass so that the magnetic pointing arrow lies directly over the painted black alignment arrow (Fig. 21). The "North" position on the direction scale (and the point on the knob/compass) now point directly north.

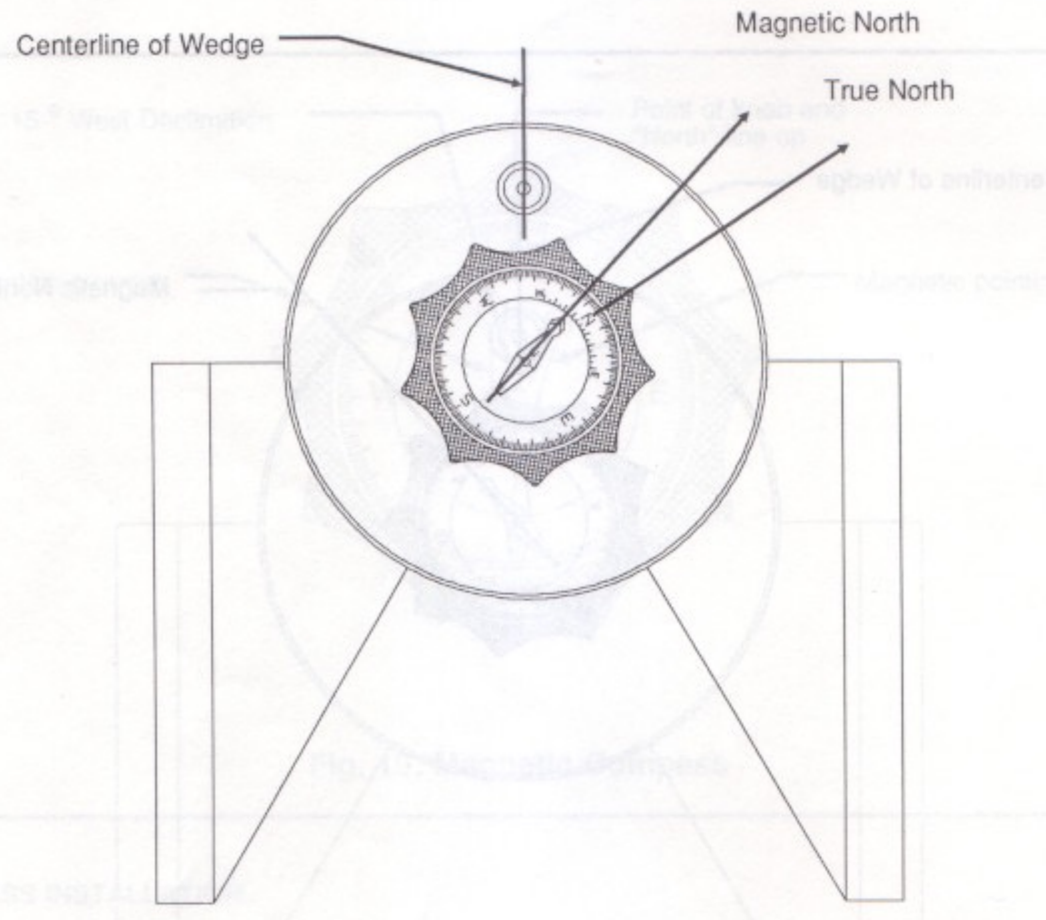



Fig. 21: Equatorial Wedge

3. By rotating the Equatorial Wedge in azimuth, position the point of the knob/compass so that it points directly to the center of the bubble level (Fig. 22). The centerline of the Equatorial Wedge now falls directly on the true north line.

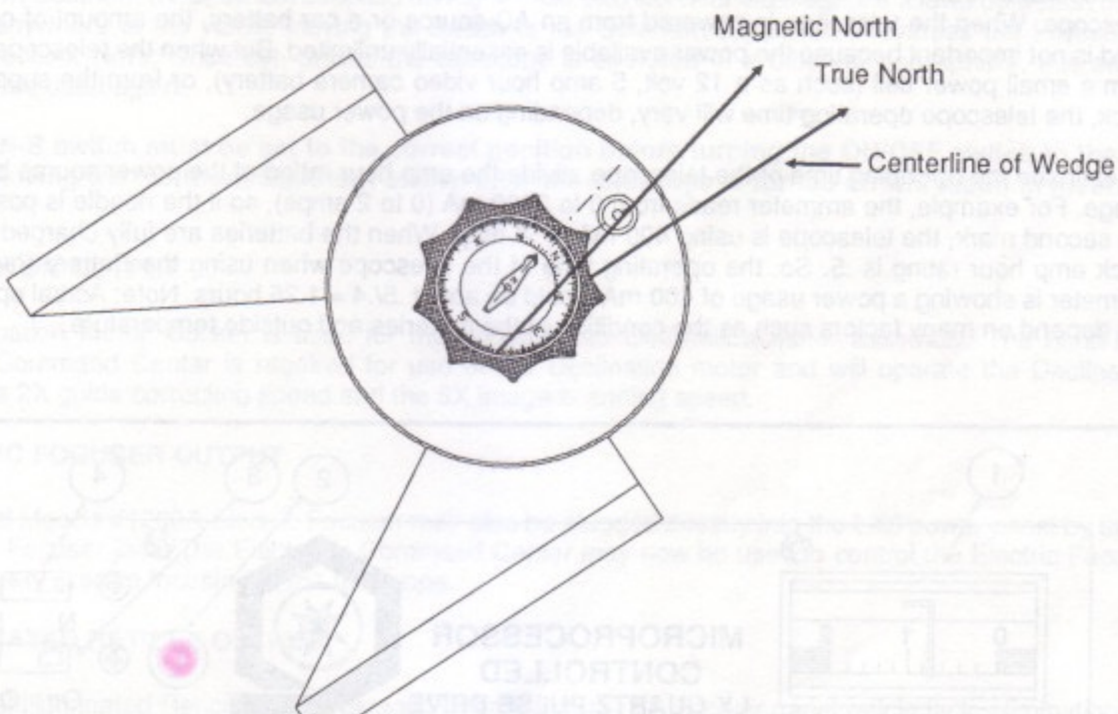



Fig. 22: Equatorial Wedge

4. Tighten the knob/compass, locking the Equatorial Wedge into place.

The Field Tripod and Equatorial Wedge are now pointed directly toward celestial north, without ever having seen the North Star.

## C. TELESCOPE FUNCTIONS (All Premier Telescope Models)

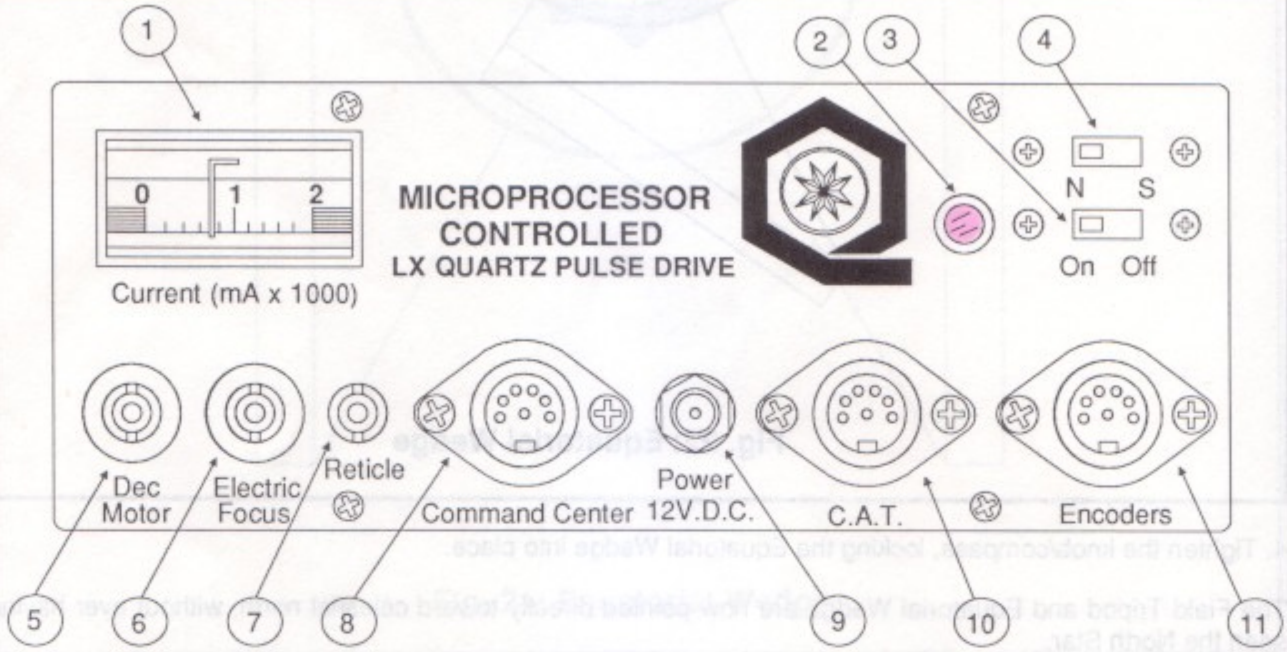
### 1. LX6 Power Panel

The Meade LX6 Quartz drive system has several built-in features for simplifying the operation of the telescope. Output jacks are provided on the Power Panel for some of the more common accessories, eliminating the need for separate Battery Packs.

#### a. AMMETER

An important feature on the LX6 telescope is the ammeter. This meter shows the power usage of the telescope. When the telescope is powered from an AC source or a car battery, the amount of current being used is not important because the power available is essentially unlimited. But when the telescope is powered from a small power cell (such as a 12 volt, 5 amp hour video camera battery), or from the supplied Battery Pack, the telescope operating time will vary, depending on the power usage.

To estimate the operating time of the telescope, divide the amp hour rating of the power source by the power usage. For example, the ammeter reads from 0 to 2000 mA (0 to 2 amps), so if the needle is positioned over the second mark, the telescope is using 400 mA or .4 amp. When the batteries are fully charged, the Battery Pack amp hour rating is .5. So, the operating time of the telescope when using the Battery Pack when the ammeter is showing a power usage of 400 mA would be about .5/.4 = 1.25 hours. Note: Actual operating time will depend on many factors such as the condition of the batteries and outside temperature.




(1) Ammeter
(2) Power Indicator
(3) On/Off Switch
(4) Northern/Southern Switch
(5) Dec Motor Output
(6) Electric Focus Output
(7) Illuminated Reticle Output
(8) Electronic Command Center Socket
(9) Power Input Socket
(10) C.A.T. Socket
(11) Encoders Socket

**Fig. 23: LX6 Power Panel**

**b. POWER INDICATOR**

The red Power Indicator light is illuminated anytime the ON/OFF switch is in the ON position, and indicates that power is being supplied to the telescope.

**c. ON/OFF SWITCH**

This switch turns on and off the power to the telescope.

**d. NORTHERN/SOUTHERN SWITCH**

The Northern/Southern (N-S) switch supplied on the Meade LX6 Schmidt-Cassegrains allows operation of the telescope anywhere in the world. Moving the switch to the Southern (S) position reverses the telescope's tracking direction. Note: Once set, unless the telescope is operated in a different hemisphere, this switch need never be used again.

**Note: The N-S switch must be set to the correct position before turning the ON/OFF switch to the ON position. Moving the Northern/Southern switch after the telescope is turned on will result in incorrect tracking.**

**e. DEC MOTOR OUTPUT**

The "Declination Motor" socket is used for the optional #39 Declination motor assembly. The hand-held Electronic Command Center is required for use of the Declination motor and will operate the Declination Motor at the 2X guide correcting speed and the 8X image scanning speed.

**f. ELECTRIC FOCUSER OUTPUT**

The optional Meade #1200A Electric Focuser may also be plugged directly into the LX6 power panel by using the Electric Focuser jack. The Electronic Command Center may now be used to control the Electric Focuser to achieve very precise focusing of the telescope.

**g. ILLUMINATED RETICLE OUTPUT**

The optional Illuminated Reticle can be plugged directly into the LX6 power panel reticle jack, eliminating the need for a separate battery box. The Reticle Adjust Knob (located on the Electronic Command Center) controls the brightness of the reticle.

**h. ELECTRONIC COMMAND CENTER SOCKET**

The Electronic Command Center Socket results in the "plug-in" capability of the LX6. By simply plugging the Electronic Command Center into the socket, the full range of LX6 features are made available. See below for description of the Electronic Command Center features.

**i. POWER INPUT SOCKET**

Each LX6 includes power cords for three different methods of powering the telescope: Directly from auto cigarette lighter plugs; directly from 115 v.AC home outlets; and from a Battery Pack (using 10 user supplied AA-sized batteries). Each of these power cords plugs into the Power Input socket to supply power to the telescope.

**j. CAT SOCKET**

When the optional Model 9008 or 9010 CAT Computer Aided Telescope system is plugged into this socket, the CAT receives all encoder information and power directly from the Power Panel, eliminating unnecessary wires.

**k. ENCODERS SOCKET**

When encoders are added to the telescope, either for the CAT or Digital Readout System (DRS), they are plugged into this socket.

## 2. Electronic Command Center (ECC)*

The hand-held Electronic Command Center plugs directly into the LX6 power panel "Command Center" socket (#8, Fig. 23) and is the heart of the LX6 concept. Virtually all telescope functions are put at your fingertips, making separate Battery Packs and handboxes obsolete. At the same time, if a simple, quick observing session is planned which will not require the sophisticated features of the LX6 , the telescope may be operated without the Electronic Command Center, reducing power consumption. This may be useful if you wish to power the telescope from the Battery Pack.

**a. MAP LIGHT**

The Electronic Command Center (ECC) includes a red L.E.D. located at the top of the handbox. Depressing the "Map" button (#6, Fig. 24) illuminates this light for reading star maps or charts during an observing session.

**b. DRS BUTTONS**

These buttons control the Digital Readout System functions. See section I for detailed information on the use of the DRS. Note: If the DRS is not installed, these buttons are non-functional.

**c. DRS DISPLAY**

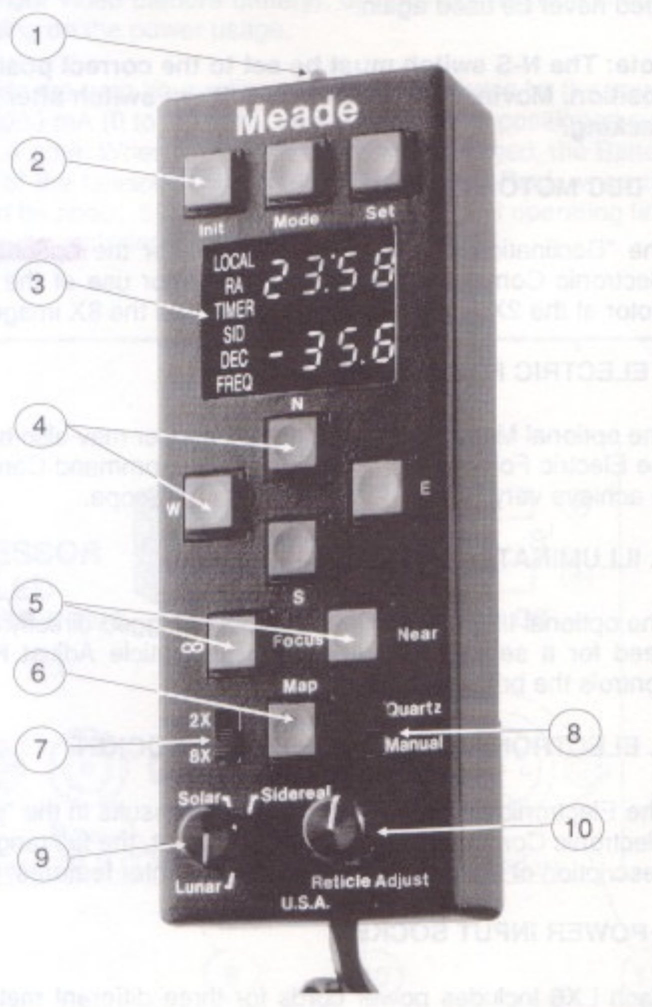
This area contains the bar L.E.D.'s (Light Emitting Diodes) and numeric L.E.D.'s which make up the DRS. See section I for detailed information. Note: If the DRS is not installed, this display is blank.

**d. DRIVE CORRECTOR CONTROL BUTTONS**

These buttons are used to electronically move the telescope. The "E" and "W" buttons move the telescope in Right Ascension using the main drive motor. The "N" and "S" buttons move the telescope in Declination using the optional #39 Dec Motor. If this motor is not attached, these two buttons are non-functional.

The speed at which the telescope moves when using these buttons is determined by the position of the 2X/8X slide switch (see #7, Fig. 24).

* Optional on Series 30 telescope models




(1) Map Light
(2) DRS Buttons
(3) DRS Display
(4) Drive Corrector Buttons
(5) Focus Buttons
(6) Map Light Button
(7) 2X/8X Slide Switch
(8) Quartz/Manual Slide Switch
(9) Variable Speed Knob
(10) Reticle Adjust Knob

**Fig. 24: Electronic Command Center (ECC)**

**e. ELECTRIC FOCUSER BUTTONS**

Add the optional Meade #1200A Electric Focuser, and ultraprecise microfocusing is at your fingertips. Simply depress the ECC's focus pushbuttons (#5, Fig. 24) to obtain the sharpest lunar and planetary focus possible. Coarse focusing is accomplished with the telescope's manual focus knob.

**f. MAP LIGHT BUTTON**

When pushed, this button illuminates the L.E.D. located at the top of the ECC. (See #1, Fig. 24.)

**g. 2X/8X SLIDE SWITCH**

As described previously, when any one of the four Drive Corrector buttons is pressed, the telescope moves in the labeled direction. The speed at which the telescope moves is determined by the 2X/8X slide switch.

When in the 2X position, the telescope moves twice the tracking rate in the Right Ascension direction; perfect for critical corrections during long exposure photography or image centering at very high observing powers. Moving to the 8X position results in telescope movement at eight times the tracking speed in the Right Ascension direction. With the Electric Declination Motor, which plugs into the LX6 power panel, you can scan at either speed in any direction, making the manual controls almost superfluous.

Note: When using the 8X speed in the "East" direction, the telescope actually reverses the direction of the drive. When the 8X button is released, the telescope automatically slews in the "West" direction to remove any backlash in the drive system introduced when the direction was first reversed. Should you "tap" the "East" button only momentarily, this automatic slew funtion will engage, even if no backlash was introduced. To avoid this, you can either overshoot with the 8X East and come back with the 8X West, or switch to the 2X speed for final correction.

**h. QUARTZ/MANUAL SLIDE SWITCH**

When the slide switch is on the "Quartz" position, the Quartz crystal in the LX6 Drive is controlling the telescope's tracking speed. The "E" and "W" buttons override the Quartz crystal to speed up or slow down the tracking speed as long as the button is pressed. When the button is released, the Quartz crystal resumes control. Note: In the "Quartz" mode, the variable speed knob (#9, Fig. 24) is non-functional. This mode of operation is best suited for observing or photographing deep-space objects, which move at the sidereal rate.

Moving the slide switch to the "Manual" position transfers the tracking speed control from the Quartz crystal to the variable speed knob (#9, Fig. 24).

**i. VARIABLE SPEED KNOB**

This knob varies the drive frequency from approximately 57 Hz to 61 Hz, which covers the Lunar, Solar, and Planetary rates. The Lunar and Solar rate positions are marked for reference. As in the "Quartz" mode, the "E" and "W" buttons override the variable knob to speed up and slow down the drive rate.

**j. RETICLE ADJUSTMENT KNOB**

This knob controls the brightness of the optional MA 12mm Illuminated Reticle eyepiece, which plugs into the main Power Panel.

### 3. Operation

The 8" and 10" Premier Series telescopes incorporate the superb Meade LX Drive System and the latest in state-of-the-art electronics to achieve a first in commercially produced telescopes: quartz accuracy coupled with true sidereal rate tracking. The quartz crystal used in the Meade LX6 Quartz Drive provides accurate tracking to within plus or minus .005% of the sidereal frequency, independent of temperature changes or local power line variations.

#### a. AC OPERATION

Meade Premier Series telescopes are supplied with an AC Adapter, which converts 115 v.AC from a wall outlet into the 12 v.DC required by the telescope. The AC Adapter should only be plugged into an indoor home AC outlet. The AC Adapter has a 25 foot cord, which should reach most observing locations from an indoor plug. If the cord is too short to reach the telescope's location, optional extension cords are available from your Meade dealer in 25 foot lengths. Do not plug the AC Adapter into the end of a standard extension cord to extend the observing range of the telescope.

To use the AC Adapter, plug it into a standard indoor AC outlet. Plug the other end of the cord into the power input socket (#9, Fig. 24). Check that the Northern/Southern (N-S) switch (#4, Fig. 24) is set for the hemisphere of the observing location and then turn the "On/Off" switch (#3, Fig. 24) to "On". (Remember: The N-S switch must be correctly set before the telescope is turned on.) The power indicator light (#2, Fig. 24) should now be lit and the telescope tracking. If the Power Light is not working, see "Troubleshooting the LX6 Drive System," page 49.

#### b. DC OPERATION

The 8" and 10" Premier Series telescopes operate on DC current and may be powered directly from a 12 volt battery or power cell. The LX6 drive system normally draws about .5 amp in standard operation with the Electronic Command Center (ECC) in use. Maximum current usage is .8 amp when all optional accessories are being used. If the telescope is being powered from a fully charged car battery in good condition, the current drain is negligible and the telescope may be used all night without fear of a "dead battery".

The Premier Series telescopes are supplied with a DC power cable for use with a car battery. To use the DC power cable, connect the cable to the power socket (#9, Fig. 24) on the power panel of the LX6, and the cigarette plug to your cigarette lighter. Be sure that the N-S switch is correctly set and that the On/Off switch is "On". If the power indicator is not lit, see "Troubleshooting the LX6 Drive System," page 49.

#### c. BATTERY PACK

Also supplied with the telescope is a small Battery Pack with cord. This Battery Pack holds 10 size AA batteries and is intended for short observing sessions. Rechargeable batteries are recommended. Note: When the telescope is being powered by the Battery Pack without the ECC, the power usage is about .35 amp or 30% less than normally required by the telescope when used with the ECC (.5 amp). It is therefore recommended that when using the battery pack, to prolong life, operate the telescope without the ECC.

## D. TELESCOPE OPERATION (All Premier Telescope Models)

### 1. Your First Observations

With the telescope standing upright on its motor drive base, as shown in Fig. 10, and with the diagonal prism and eyepiece in place, you are ready to make observations through the telescope. Even without the viewfinder (if not yet installed), terrestrial objects will be fairly easy to locate and center in the telescope's field of view with a low power eyepiece, simply by "gunsighting" along the side of the main telescope tube.

**IMPORTANT NOTE: NEVER POINT THE TELESCOPE DIRECTLY AT THE SUN, OR ATTEMPT TO OBSERVE THE SUN, EITHER THROUGH THE MAIN TELESCOPE OR THE VIEWFINDER, WITHOUT PROPER PROFESSIONAL EQUIPMENT. INSTANT AND IRREVERSIBLE DAMAGE TO YOUR EYE MAY OTHERWISE RESULT!**

By unlocking the R.A. lock (#7, Fig. 10), the telescope may be turned rapidly through wide angles in Right Ascension (R.A.). The reason for the terminology "Right Ascension" and its complementary term, "Declination" will be made clear further on in this manual. For now, "Right Ascension" simply means "horizontal" and "Declination" means "vertical". Fine adjustments in R.A. are made by turning the R.A. control knob (#8, Fig. 10), while the R.A. lock is in the "unlocked" position.

**DO NOT ATTEMPT TO MOVE THE TELESCOPE MANUALLY IN A HORIZONTAL DIRECTION WHEN THE R.A. LOCK IS IN THE "LOCKED" POSITION.**

The R.A. control knob may be turned, if desired, with the R.A. lock in a "partially locked" position. In this way, a comfortable "drag" in R.A. is created. But do <u>not</u> attempt to operate the R.A. control knob with the telescope fully locked in R.A., as such operation may result in damage to the internal gear system.

Releasing the Declination lock (#2, Fig. 10), permits sweeping the telescope rapidly through wide angles in Declination.

**DO NOT ATTEMPT TO MOVE THE TELESCOPE MANUALLY IN A VERTICAL DIRECTION WHEN THE DECLINATION LOCK IS IN THE "LOCKED" POSITION.**

To use the Declination fine-adjust, or slow motion control, lock the telescope in Declination using the Declination lock (2, Fig. 10), and turn the Declination slow-motion knob (#6, Fig. 10).

NOTE THAT THIS DECLINATION SLOW-MOTION CONTROL HAS A FIXED TRAVEL LENGTH, LIMITED BY THE MOTION OF A TANGENT ARM (LOCATED INSIDE THE FORK TINE). DO NOT FORCE THE DECLINATION SLOW-MOTION KNOB WHEN THE TANGENT ARM HAS REACHED THE END OF ITS TRAVEL. IN THIS CASE, TURN THE DEC. KNOB TO RETURN THE TANGENT ARM TO THE MID-POINT IN ITS TRAVEL RANGE, UNLOCK THE DECLINATION LOCK AND RE-CENTER THE TELESCOPE TUBE MANUALLY.

With the above mechanical operations in mind, select an easy to find terrestrial object as your first telescope subject -- for example, a house or building perhaps one-half mile distant.

Unlock the Dec. lock (#2, Fig. 10), and R.A. lock (#7, Fig. 10), center the object in the telescopic field of view and then re-lock the Dec. and R.A. locks. Precise image centering is accomplished by using the Dec. and R.A. slow motion controls.

### 2. Focusing

The focus knob (#13, Fig. 10), is located at the "4 o'clock" position as you face the rear cell of the telescope. Focusing is accomplished internally by a precise motion of the telescope primary mirror so that, as you turn the focus knob, there are no externally moving parts.

Focusing the telescope from its nearest possible focus point (on an object about 25 ft. away with the Model 2080, or about 50 ft. with the Model 2120) to an object at infinity requires a fairly large number of rotations of the focus knob. The focuser is designed to provide an extremely sensitive means of bringing an object into precise, sharp focus. After a specific object has been brought into focus, closer objects require turning the focus knob clockwise; more distant objects require turning the focus knob counterclockwise.

It is possible that you may notice a slight shifting of the image as you focus, particularly at high powers. This image shift is caused by very small lateral motions of the primary mirror as it moves toward or away from the secondary mirror during the focusing procedure.

## 3. Magnifications

The magnification, or power, of the telescope depends on two optional characteristics: the focal length of the main telescope and the focal length of the eyepiece used during a particular observation. The focal length of the Model 2080 telescope is fixed at 2000mm; the focal length of the Model 2120 telescope is fixed at 2500mm. To calculate the power in use with a particular eyepiece, divide the focal length of the eyepiece into the focal length of the main telescope. For example, using the MA 25mm eyepiece supplied with the Model 2080 Series 30, the power is calculated as follows:

$$\text{Power} = \frac{2000\text{mm}}{25\text{mm}} = 80\text{X}$$

The <u>type</u> of eyepiece (whether "MA" Modified Achromatic, "OR" Orthoscopic, "SP" Super Plossl, etc.) has no bearing on magnifying power but does affect such optical characteristics as field of view, flatness of field and color correction.

The maximum practical magnification is determined by the nature of the object being observed and, most importantly, by the prevailing atmospheric conditions. Under very steady atmospheric "seeing," the Model 2080 may be used at powers up to about 500X on astronomical objects, the Model 2120 up to about 600X. Generally, however, lower powers of perhaps 250X to 350X will be the maximum permissible, consistent with high image resolution. When unsteady air conditions prevail (as witnessed by rapid "twinkling" of the stars), extremely high-power eyepieces result in "empty magnification," where the object detail observed is actually <u>diminished</u> by the excessive power.

See page 38 for additional information on eyepieces.

When beginning observations on a particular object, start with a low power eyepiece; get the object well-centered in the field of view and sharply focused. Then try the next step up in magnification. If the image starts to become fuzzy as you work into higher magnifications, then back down to a lower power — the atmospheric steadiness is not sufficient to support high powers at the time you are observing. Keep in mind that a bright, clearly resolved but smaller image will show far more detail than a dimmer, poorly resolved larger image.

Because of certain characteristics of the human eye (in particular, eye pupil diameter) and because of optical considerations inherent in the design of a telescope, there exists <u>minimum</u> practical power levels also. Generally speaking, the lowest usable power is approximately 4X per inch of telescope aperture, or about 32X in the case of the 8" aperture Model 2080, about 40X in the case of the 10" Model 2120. During the daytime, when human eye pupil diameter is reduced, the minimum practical power with the Model 2080 is increased to about 60X and to about 75X with the Model 2120; powers lower than this level should be avoided during daytime observations. A reasonable magnification range for daytime terrestrial observations through the Model 2080 is from about 80X to 190X; through the Model 2120 from about 100X to 200X.

Accessories are available both to increase and decrease the operating eyepiece power of the telescope. See your Meade dealer for information on accessories.

## 4. Apparent Field and Actual Field

Two terms that are often confused and misunderstood are "Apparent Field" and "Actual Field". "Apparent Field" is a function of the eyepiece design and is built into the eyepiece. While not totally accurate (but a very good approximation), "Apparent Field" is usually thought of as the angle your eye sees when looking through an eyepiece. "Actual Field" is the amount of the sky that you actually see and is a function of the eyepiece being used and the telescope.

The "Actual Field" of view of a telescope can be calculated by knowing the "Apparent Field" and power of an eyepiece with a given telescope. The "Actual Field" of a telescope is calculated by taking the "Apparent Field" of the eyepiece and dividing by the power.

The following table lists the most common optional eyepieces available and the "Apparent Field" for each eyepiece. The power and "Actual Field" of view that each eyepiece yields is listed for each basic telescope optical design.

| Eyepiece/Apparent Field | 8" f/6.3 Power/Actual Field | 10" f/6.3 Power/Actual Field | 8"f/10 Power/Actual Field | 10" f/10 Power/Actual Field |
|---|---|---|---|---|
| **Series 2 Modified Achromatic Eyepieces (3-elements; 1-1/4" O.D.)** | | | | |
| 40mm/36° | 32/1.13° | 40/0.90° | 50/0.72° | 63/0.57° |
| **Series 2 Orthoscopic Eyepieces (4-elements; 1-1/4" O.D.)** | | | | |
| 4mm/45° | 320/0.14° | 400/0.11° | 500/0.09° | 625/0.07° |
| 6mm/45° | 213/0.21° | 267/0.17° | 333/0.14° | 417/0.11° |
| 9mm/45° | 142/0.32° | 178/0.25° | 222/0.20° | 278/0.16° |
| 12.5mm/45° | 102/0.44° | 128/0.35° | 160/0.28° | 200/0.23° |
| 18mm/45° | 71/0.63° | 89/0.51° | 111/0.41° | 139/0.32° |
| 25mm/45° | 51/0.88° | 64/0.70° | 80/0.56° | 100/0.45° |
| **Super Plossl Eyepieces (5-elements; 1-1/4" O.D., except as noted)** | | | | |
| 6.4mm/52° | 200/0.26° | 250/0.21° | 313/0.17° | 391/0.13° |
| 9.7mm/52° | 132/0.39° | 165/0.32° | 206/0.25° | 258/0.20° |
| 12.4mm/52° | 103/0.50° | 129/0.40° | 161/0.32° | 202/0.26° |
| 15mm/52° | 85/0.61° | 107/0.49° | 133/0.39° | 167/0.31° |
| 20mm/52° | 64/0.81° | 80/0.65° | 100/0.52° | 125/0.42° |
| 26mm/52° | 49/1.06° | 62/0.84° | 77/0.68° | 96/0.54° |
| 32mm/52° | 40/1.30° | 50/1.04° | 63/0.83° | 78/0.67° |
| 40mm/44° | 32/1.69° | 40/1.35° | 50/0.88° | 63/0.70° |
| 56mm/52° (2" O.D.) | 23/2.27° | 29/1.82° | 36/1.46° | 45/1.16° |
| **Super Wide Angle Eyepieces (6-elements; 1-1/4" O.D., except as noted)** | | | | |
| 13.8mm/67° | 93/0.72° | 116/0.58° | 145/0.46° | 181/0.37° |
| 18mm/67° | 71/0.94° | 89/0.75° | 111/0.60° | 139/0.48° |
| 24.5mm/67° | 52/1.28° | 65/1.03° | 82/0.82° | 102/0.66° |
| 32mm/67° (2" O.D.) | 40/1.67° | 50/1.34° | 63/1.07° | 78/0.86° |
| 40mm/67° (2" O.D.) | 32/2.09° | 40/1.67° | 50/1.34° | 63/1.07° |
| **Ultra Wide Angle Eyepieces (8-elements; 1-1/4" O.D., except as noted)** | | | | |
| 4.7mm/84° | 272/0.31° | 340/0.25° | 426/0.20° | 532/0.16° |
| 6.7mm/84° | 191/0.44° | 239/0.35° | 299/0.28° | 373/0.23° |
| 8.8mm/84° (1-1/4" - 2" O.D.) | 145/0.58° | 182/0.46° | 227/0.37° | 284/0.30° |
| 14mm/84° (1-1/4" - 2" O.D.) | 91/0.92° | 114/0.73° | 143/0.59° | 179/0.47° |

## 5. Celestial Coordinates: Declination and Right Ascension

Analogous to the Earth-based coordinate system of latitude and longitude, celestial objects are mapped according to a coordinate system on the "celestial sphere," the imaginery sphere on which all stars appear to be placed. The Poles of the celestial coordinate system are defined as those 2 points where the Earth's rotational axis, if extended to infinity, North and South, intersect the celestial sphere. Thus, the North Celestial Pole is that point in the sky where an extension of the Earth's axis through the North Pole intersects the celestial sphere. In fact, this point in the sky is located near the North Star, or Polaris.

On the surface of the Earth, "lines of longitude" are drawn between the North and South Poles. Similarly, "lines of latitude" are drawn in an East-West direction, parallel to the Earth's equator. The celestial equator is simply a projection of the Earth's equator onto the celestial sphere. Just as on the surface of the Earth, imaginary lines have been drawn on the celestial sphere to form a coordinate grid. Celestial object positions on the Earth's surface are specified by their latitude and longitude.

The celestial equivalent to Earth latitude is called "Declination," or simply "Dec," and is measured in degrees, minutes or seconds north ("+") or south ("-") of the celestial equator. Thus any point on the celestial equator (which passes, for example, through the constellations Orion, Virgo and Aquarius) is specified as having 0°0'0" Declination. The Declination of the star Polaris, located very near the North Celestial Pole, is +89.2°.

The celestial equivalent to Earth longitude is called "Right Ascension," or "R.A." and is measured in hours, minutes and seconds from an arbitrarily defined "zero" line of R.A. passing through the constellation Pegasus. Right Ascension coordinates range from $0^{hr}0^{min}0^{sec}$ up to (but not including) $24^{hr}0^{min}0^{sec}$. Thus there are 24 primary lines of R.A., located at 15 degree intervals along the celestial equator. Objects located further and further east of the prime ($0^h0^m0^s$) Right Ascension grid line carry increasing R.A. coordinates.

With all celestial objects therefore capable of being specified in position by their celestial coordinates of Right Ascension and Declination, the task of finding objects (in particular, faint objects) in the telescope is vastly simplified. The setting circles of the Models 2080 and 2120 may be dialed, in effect, to read the object coordinates and the object found without resorting to visual location techniques. However, these setting circles may be used to advantage only if the telescope is first properly aligned with the North Celestial Pole.

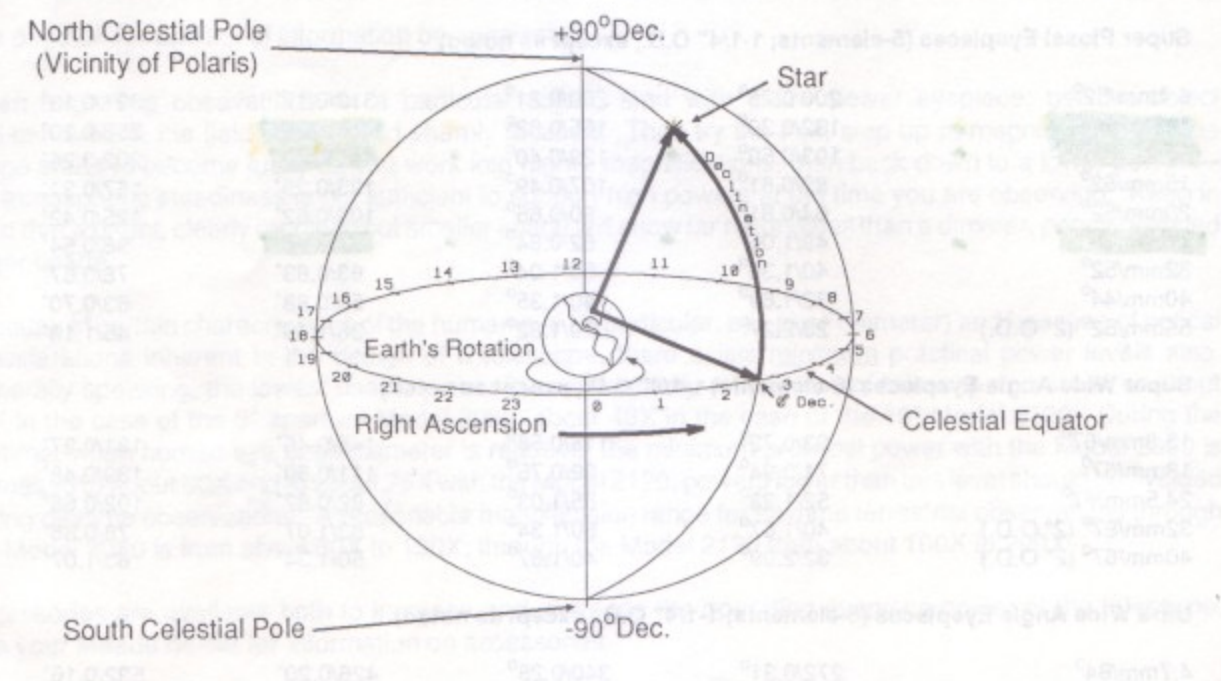



**Fig 25: Celestial Sphere**

## 6. Lining Up With The Celestial Pole

Note: Premier Series 70 models can skip the next two sections. Use the CAT **"START"** routine to obtain polar alignment.

Objects in the sky appear to revolve around the celestial pole. (Actually, celestial objects are essentially "fixed," and their apparent motion is caused by the Earth's axial rotation). During any 24 hour period, stars make one complete revolution about the pole, describing concentric circles with the pole at the center. By lining up the telescope's polar axis with the North Celestial Pole (or for observers located in Earth's Southern Hemisphere with the South Celestial Pole) astronomical objects may be followed, or tracked, simply by moving the telescope about one axis, the polar axis. In the case of the Meade Models 2080 and 2120, this tracking may be accomplished automatically with the electric motor drive.

If the telescope is reasonably well aligned with the pole, therefore, very little use of the telescope's Declination slow motion control is necessary -- virtually all of the required telescope tracking will be in Right Ascension. (If the telescope were perfectly aligned with the pole, no Declination tracking of stellar objects would be required). For the purposes of casual visual telescopic observations, lining up the telescope's polar axis to within a degree or two of the pole is more than sufficient: with this level of pointing accuracy, the telescope's motor drive will track accurately and keep objects in the telescopic field of view for perhaps 20 to 30 minutes.

Begin polar aligning the telescope as soon as you can see Polaris. Finding Polaris is simple. Most people recognize the "Big Dipper." The Big Dipper has two stars that point the way to Polaris (see Fig. 26). Once Polaris is found, it is a straightforward procedure to obtain a rough polar alignment.

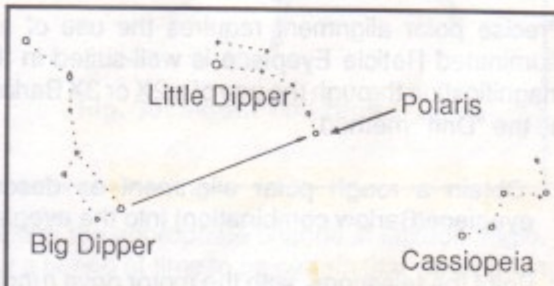



**Fig. 26: Finding Polaris**

To line up the Model 2080 or 2120 with the Pole, follow this procedure:

1. Using the bubble level located on the floor of the wedge, adjust the tripod legs so that the telescope/wedge/tripod system reads "level."

2. Set the Equatorial Wedge to your observing latitude as described in Section 3.

3. Loosen the Dec. lock (#2, Fig. 10), and rotate the telescope tube in Declination so that the telescope's Declination reads 90°. Tighten the Dec. lock.

4. Using the Azimuth and Latitude controls on the Wedge, center Polaris in the field of view. Do not use the telescope's Declination or Right Ascension controls during this process.

At this point, your polar alignment is good enough for casual observations. There are times, however, when you will need to have precise polar alignment, such as when making fine astrophotographs or when using the setting circles to find new objects.

As an aside procedure, during your first use of the telescope, you should check the calibration of the Declination setting circles (see #3, Fig. 10), located at the top of each fork arm. After performing the polar alignment procedure, center the star Polaris in the telescope field. Loosen slightly the knurled central hub of each Declination setting circle. Now turn each circle until it reads 89.2°, the Declination of Polaris, and then tighten down the knurled knobs, avoiding any motion of the circles.

Once the latitude angle of the wedge has been fixed and locked-in, according to the above procedure, it is not necessary to repeat this operation each time the telescope is used, unless you move a considerable distance North or South from your original observing position. (Approximately 70 miles movement in North-South observing position is equivalent to 1° in latitude change). The wedge may be detached from the field tripod and, so long as the latitude angle setting is not altered and the field tripod is leveled, it will retain the correct latitude setting when replaced on the tripod.

## 7. Precise Polar Alignment

It should be emphasized that precise alignment of the telescope's polar axis to the celestial pole for casual visual observations is not necessary. Don't allow a time-consuming effort at lining up with the pole to interfere with your basic enjoyment of the telescope. For long-exposure photography, however, the ground rules are quite different, and precise polar alignment is not only advisable, but almost essential.

Notwithstanding the precision and sophistication of the drive system supplied with the Meade Premier Model telescopes, the fewer tracking corrections required during the course of a long-exposure photograph, the better. (For our purposes, "long-exposure" means any photograph of about 10 minutes duration or longer). In particular, the number of Declination corrections required is a direct function of the precision of polar alignment.

Precise polar alignment requires the use of a crosshair eyepiece. The Meade Model 419 MA 12mm Illuminated Reticle Eyepiece is well-suited in this application, but you will want to increase the effective magnification through the use of a 2X or 3X Barlow lens. Then follow this procedure, sometimes better known as the "Drift" method:

1. Obtain a rough polar alignment as described earlier. Place the illuminated reticle eyepiece (or eyepiece/Barlow combination) into the eyepiece holder of the telescope.

2. Point the telescope, with the motor drive running, at a moderately bright star near where the meridian (the North-South line passing through your local zenith) and the celestial equator intersect. For best results, the star should be located within ± 30 minutes in R.A. of the meridian and within ± 5° of the celestial equator. (Pointing the telescope at a star that is straight up, with the Declination set to 0°, will point the telescope in the right direction.)

3. Note the extent of the star's drift in Declination (disregard drift in Right Ascention):
   a. If the star drifts South (or down), the telescope's polar axis is pointing too far East (Fig. 27).
   b. If the star drifts North (or up), the telescope's polar axis is pointing too far West (Fig. 28).

4. Move the wedge in azimuth (horizontally) to effect the appropriate change in polar alignment. Reposition the telescope's East-West polar axis orientation until there is no further North-South drift by the star. Track the star for a period of time to be certain that its Declination drift has ceased.

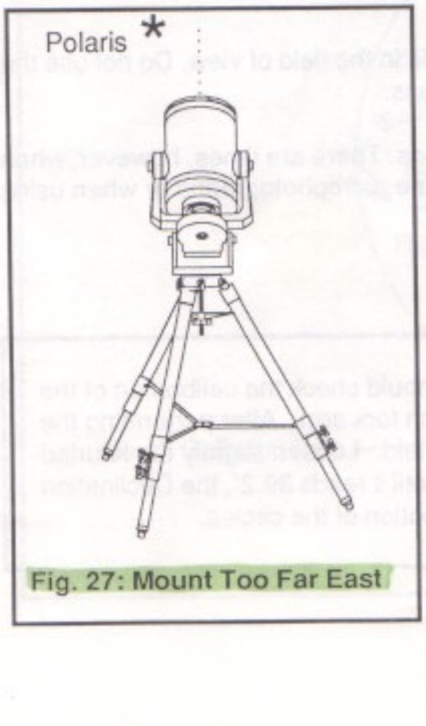



Fig. 27: Mount Too Far East

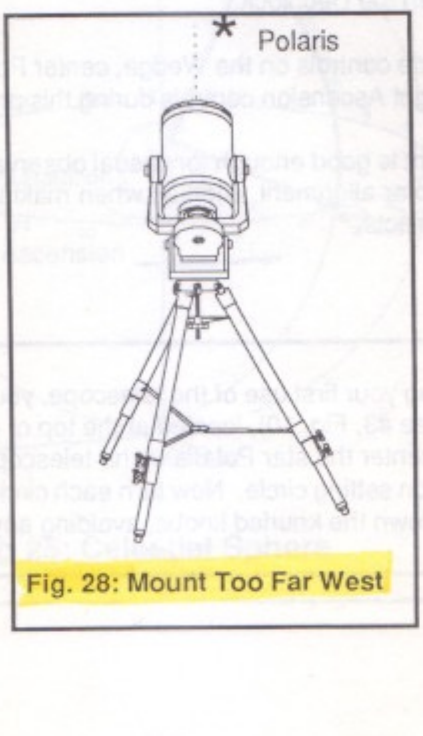



Fig. 28: Mount Too Far West

5. Next, point the telescope at another moderately bright star near the Eastern horizon, but still near the celestial equator. For best results, the star should be about 20° or 30° above the Eastern horizon and within ± 5° of the celestial equator.

6. Again note the extent of the star's drift in Declination:
   a. If the star drifts South, (or down) the telescope's polar axis is pointing too low (Fig. 29).
   b. If the star drifts North, (or up) the telescope's polar axis is pointing too high (Fig. 30).

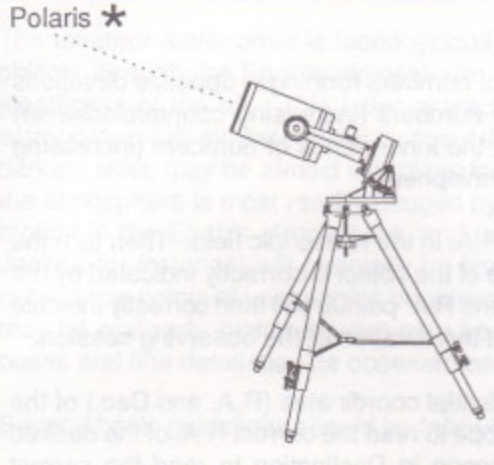


Fig. 29: Mount Too Low

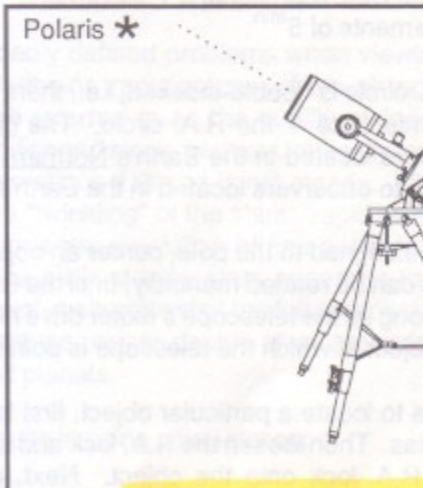


Fig. 30: Mount Too High

7. Use the latitude angle fine-adjust control on the wedge to effect the appropriate change in latitude angle, based on your observations above. Again, track the star for a period of time to be certain that Declination drift has ceased.

The above procedure results in very accurate polar alignment, and minimizes the need for tracking corrections during astrophotography.

## 8. Electric Motor Drive

With the telescope set up in the equatorial mode (accomplished with the wedge/field tripod combination), plug one of the power sources into the Power socket of the LX6 Power Panel. Slide the On/Off switch to the "On" position. Immediately, if you put your ear to the drive base of the telescope, you will be able to hear the low level noise created by the running motor. The drive system turns the fork mount of the telescope through one complete revolution every 24 hours, and results in the stars "standing still" as you view them through the telescope eyepiece. The motor drive also drives the R.A. setting circle, as described in the next section.

The motion of the telescope caused by the drive system is not obvious if you look at the telescope (in fact, it is not even perceptible), but while observing through the telescope, it is a very significant motion indeed. To check this point, with a star centered in the telescope field and the electric motor drive running, unplug the power cord: the star will immediately begin to drift out of the field of view; at higher powers, the effect is even more pronounced.

To actuate operation of the electric motor drive, the R.A. lock (#7, Fig. 10) must be in the "locked" position. As you move from object to object, unlocking and re-locking the R.A. lock each time, the motor drive automatically re-actuates each time the R.A. lock is locked.

## 9. Setting Circles

Setting circles included with the Premier model telescopes permit the location of faint celestial objects not easily found by direct visual observation. Located on the top surface of the telescope's drive base, the R.A. circle (#10, Fig. 10), is 8" in diameter. Identical Declination circles (#3, Fig. 10), are located at the top of each fork tine. With the telescope pointed at the North Celestial Pole, the Dec. circle should read 90° (understood to mean +90°). Objects located below the 0-0 line of the Dec. circle carry minus Declination coordinates. Each division of the Dec. represents a 1° increment. The R.A. circle runs from $0^{hr}$ to (but not including) $24^{hr}$, and reads in increments of $5^{min}$.

Note that the R.A. circle is double-indexed; i.e., there are 2 series of numbers running in opposite directions around the circumference of the R.A. circle. The <u>outer</u> series of numbers (increasing counterclockwise) applies to observers located in the Earth's <u>Northern</u> Hemisphere; the inner series of numbers (increasing clockwise) applies to observers located in the Earth's <u>Southern</u> Hemisphere.

With the telescope aligned to the pole, center an object of known R.A. in the telescopic field. Then turn the R.A. circle, which can be rotated manually, until the R.A. coordinate of the object is correctly indicated by the R.A. pointer. As long as the telescope's motor drive remains "ON," the R.A. pointer will then correctly indicate the R.A. of any object at which the telescope is pointed throughout the duration of the observing session.

To use the circles to locate a particular object, first look up the celestial coordinates (R.A. and Dec.) of the object in a star atlas. Then loosen the R.A. lock and turn the telescope to read the correct R.A. of the desired object; lock the R.A. lock onto the object. Next, turn the telescope in Declination to read the correct Declination of the object. If the procedure has been followed carefully, and if the telescope was well-aligned with the pole, the desired object should now be in the telescopic field of a low-power eyepiece.

If you do not immediately see the object you are seeking, try searching the adjacent sky area, using the R.A. and Dec. slow-motion controls to scan the surrounding region. Keep in mind that, with the 25mm eyepiece, the field of view of the Model 2080 is about 1/2° and the field of the Model 2120 about 0.4°. Because of its much wider field, the viewfinder may be of significant assistance in locating and centering objects, after the setting circles have been used to locate the approximate position of the object.

Pinpoint application of the setting circles requires that the telescope be precisely aligned with the pole. Refer to the preceding section on "Precise Polar Alignment", page 22, for further details.

The setting circles may also be utilized in the absence of a power source for the motor drive. In this case, however, it is necessary to manually reset to the R.A. of the object you are observing just before going to the next object.

## 10. Observing With The Telescope

The Meade Premier Schmidt-Cassegrain telescopes permit an extremely wide array of serious observational opportunities. Even in normal city conditions, with all of the related air and light pollution, there are a good many interesting celestial objects to observe. But to be sure, there is no substitute for the clear, steady, dark skies generally found only away from urban environments, or on mountaintops: objects previously viewed only in the city take on added detail or are seen in wider extension, or even become visible at all for the first time.

The amateur astronomer is faced typically with two broadly defined problems when viewing astronomical objects through the Earth's atmosphere: first is the clarity, or transparency, of the air and, secondly the steadiness of the air. This latter characteristic is often referred to as the quality of "seeing." Amateur astronomers talk almost constantly about the "seeing conditions," since, perhaps ironically, even the clearest, darkest skies may be almost worthless for serious observations if the air is not steady. This steadiness of the atmosphere is most readily gauged by observing the "twinkling" of the stars: rapid twinkling implies air motion in the Earth's atmosphere, and under these conditions resolution of fine detail (on the surface of Jupiter, for instance) will generally be limited. When the air is steady, stars appear to the naked eye as untwinkling points of unchanging brightness and it is in such a situation that the full potential of the telescope may be realized: higher powers may be used to advantage, closer double stars are resolved as distinct points and fine detail may be observed on the Moon and planets.

Several basic guidelines should be followed for best results in using your telescope:

1. Try not to touch the eyepiece while observing. Any vibrations resulting from such contact will immediately cause the image to move.

2. Allow your eyes to become "dark-adapted" prior to making serious observations. Night adaptation generally requires about 10 to 15 minutes for most people.

3. Let the telescope "cool down" to the outside environmental temperature before making observations. Temperature differentials between a warm house and cold outside air require about 30 minutes for the telescope's optics to regain their true and correct figures. During this period, the telescope will not perform well. A good idea is to take the telescope outside 30 minutes before you want to start observing.

4. If you wear glasses and do not suffer from astigmatism, take your glasses off when observing through the telescope. You can re-focus the image to suit your own eyes. Observers with astigmatism, however, should keep their glasses on since the telescope cannot correct for this eye defect.

5. Avoid setting up the telescope inside a room and observing through an open window (or, worse yet, through a closed window!). The air currents caused by inside/outside temperature differences will make quality optical performance impossible.

6. Perhaps most importantly of all, avoid "overpowering" your telescope. The maximum usable magnification at any given time is governed by the seeing conditions. If the telescopic image starts to become fuzzy as you increase in power, drop down to a reduced magnification. A smaller but brighter and sharper image is far preferable to a larger but fuzzy and indistinct one.

7. As you use your telescope more and more, you will find that you are seeing finer detail: observing through a large aperture telescope is an acquired skill. Celestial observing will become increasingly rewarding as your eye becomes better trained to the detection of subtle nuances of resolution.

## E. MAINTENANCE (All Premier Models)

### 1. Cleaning the Optics

Perhaps the most common telescope maintenance error is cleaning the optics too often. A little dust on the surface of the correcting plate causes negligible degradation of optical performance: don't clean the outside surface of this lens unless really necessary. To remove small particles on the corrector lens surface, use a camel's hair brush (**gently**!) or blow off with an ear syringe (available from a local pharmacy). If further cleaning is required, a photographic lens cleaner may be used. In any case, DO NOT clean the correcting plate by taking strong circular wipes with a piece of cloth or other material: use a white "Kleenex"-type tissue and make short, gentle, radial wipes (from the center outward). Change tissues several times when cleaning the entire plate.

If grease or other organic materials (e.g. fingerprints) are in evidence on the outer surface of the corrector lens, the following homemade cleansing solution works well: 2 parts distilled water, 1 part isopropyl alcohol, and 1 drop of biodegradable liquid dishwashing detergent per pint of solution. Use only a small amount of solution and taken gentle, radial swipes, changing tissues several times to clean the corrector lens. When using this proceedure, take special care in cleaning to avoid scratches.

The aluminized surfaces of the Meade 8" and 10" telescopes will probably never need re-aluminizing, if you are careful to replace the dust caps at the eye-end and corrector-end when the telescope is not in use. These dust caps also serve the important purpose of keeping dust and other contaminants off the surfaces of the corrector lens.

**WARNING**: Do not, in any case, remove the correcting plate from its machined housing for cleaning or other purposes. You will almost certainly not be able to replace the corrector in its proper rotational orientation and serious degradation of optical performance may result.

### 2. Alignment (Collimation) Of The Optical System

The optical collimation of any astronomical telescope used for serious purposes is important, but in the cases of the Schmidt-Cassegrain design of the Models 2080 and 2120, such collimation is absolutely essential for good performance. Take special care to read and understand this section well so that your telescope will perform fully to its capabilities.

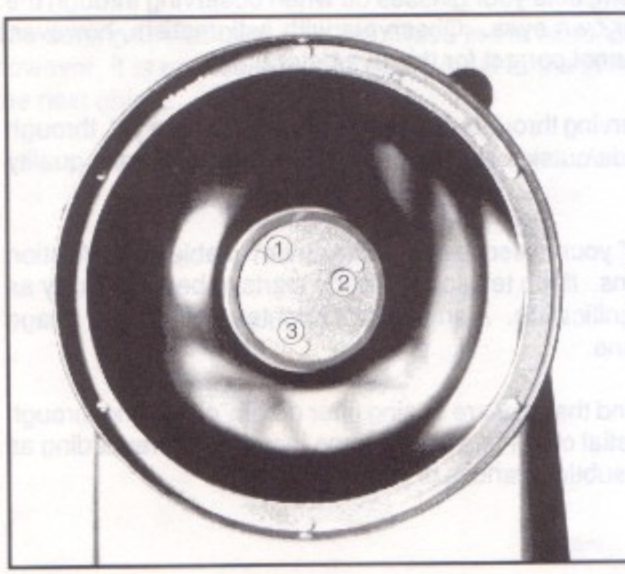



**Fig. 31: Collimation of the Optical System**
(1), (2), (3) Set screws for adjusting collimation.

All Meade Schmidt-Cassegrains are precisely collimated at the factory before packing and shipment and it is probable that you will not need to make any optical adjustments before making observations. However, if the telescope sustained rough handling in shipment, you may need to recollimate the optical system. Such recollimation is not a difficult procedure, in any case.

To check the collimation of your telescope, locate in the telescope a moderately bright (first or second magnitude) star near the zenith; alternately, a terrestrial "hot spot," such as reflected sunlight from a distant car bumper or telephone pole insulator will suffice. This test is simplified if the telescope is in thermal equilibrium. If the telescope has been moved through temperature extremes (e.g. taken from a warm house into cold outside air), allow 30 to 45 minutes for the telescope to "cool down."

To perform the test, center the point source (e.g. star image) in the telescopic field with a low power eyepiece, such as the 25mm eyepiece normally supplied as standard equipment. Defocus the image to fill about 1/8 of the field of view. You will see in the out-of-focus image a circle of light, with the darker circular shadow of the secondary mirror somewhere within. If the darker shadow is well-centered within the lighter circle, your telescope is well collimated, but continue to read this section for the more sensitive high-power tests to be described below. If the darker shadow is <u>not</u> so centered, follow this procedure:

1. Note that the only optical alignment adjustment of the 2080 and 2120 models that is ever necessary or possible is the tilt-angle adjustment of the secondary mirror. Adjustment of this tilt-angle is achieved by turning the 3 set screws shown in Fig. 31, located at the edge of the outer surface of the secondary mirror housing.

DO NOT FORCE THE 3 COLLIMATION SCREWS PAST THEIR NORMAL TRAVEL AND DO NOT ROTATE ANY SCREW OR SCREWS MORE THAN 2 TURNS IN A COUNTERCLOCKWISE DIRECTION (i.e. NO MORE THAN 2 FULL TURNS IN THE "LOOSENING" DIRECTION), OR ELSE THE SECONDARY MIRROR MAY BECOME LOOSENED FROM ITS SUPPORT. NOTE THAT THE SECONDARY MIRROR COLLIMATION ADJUSTMENTS ARE VERY SENSITIVE: GENERALLY, TURNING A COLLIMATION SCREW 1/2-TURN WILL HAVE DRAMATIC EFFECTS ON COLLIMATION.

2. While observing the defocused star image, note the direction in which the darker shadow is offset within the lighter circle. Using the telescope's slow-motion controls, move the defocused image to the edge of the field of view, in the same direction as the darker shadow is offset.

3. Tighten the screw or screws in the same direction as the darker shadow is off-center, loosen the other screw or screws. Continue this process until the defocused image is brought back to the center of the telescopic field.

4. Now proceed to a higher power (e.g. 9mm) eyepiece and repeat the above test. Any lack of concentricity at this point will require only extremely slight adjustments of the 3 set screws.

5. As a final check on collimation, examine the star image <u>in-focus</u> with a fairly high-power (9mm or shorter focal length) eyepiece, under good seeing conditions. The star point should appear as a small central dot (the so-called "Airy disc") with one diffraction ring surrrounding it. Make very small adjustments of the 3 set screws, if necessary, to center the Airy disc in the diffraction ring. With this final adjustment performed, your telescope is collimated.

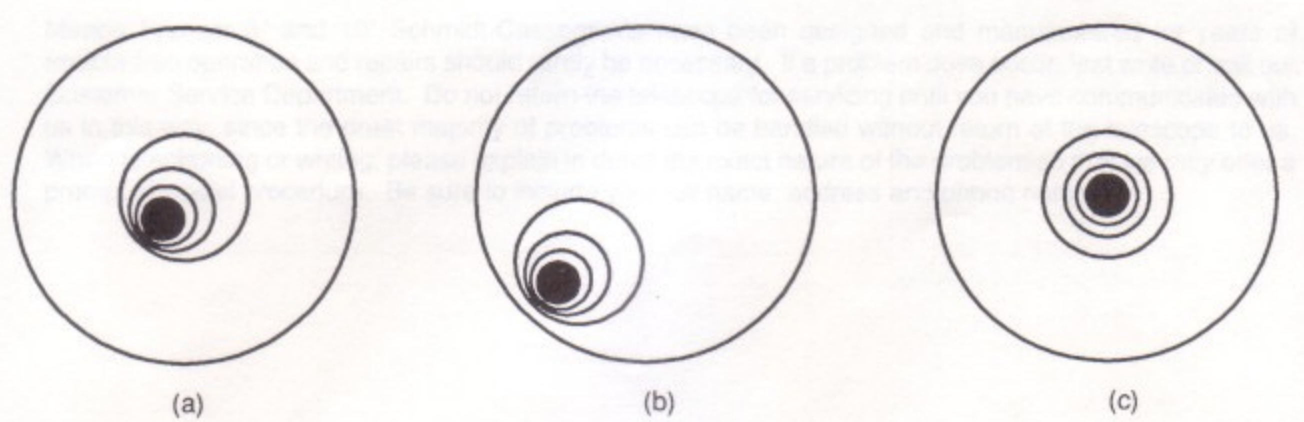



**Fig. 32: Collimating The Optics**

Summary of the Collimation Procedure: (a) Note if the darker shadow is de-centered, as shown (a, Fig. 32), inside the lighter circles; (b) use the telescope's controls to move the image to the edge of the field (b, Fig. 32), in the same direction as the darker shadow is off-center; (c) tighten and/or loosen, as appropriate, the secondary housing's 3 collimation set screws to bring the image back to the center of the field (c, Fig. 32): repeat (a) and (b) if necessary.

## 3. Dewing Of The Corrector Plate

Because of the correcting plate's proximity to the open air, it is possible in most climates that dew may form on the outer surface of the glass during observations. One simple remedy for this dewing is to use a portable hair blow-drier; just a few "light" swipes of the warm air will clear the dew for a period of time.

If the above approach is not satisfactory, the correcting plate's outer surface may be hand cleaned. BUT BE CAREFUL! The correcting plate should be completely free of dirt and abrasive particles before wiping the glass. Use only a clean, white Kleenex tissue and wipe radially outward from the center of the lens to the edge. Change tissues often. Avoid using circular motions when wiping and apply only the minimum pressure required to do the job. Hard wiping of the correcing plate will introduce fine scratches into the glass.

If dewing is a continual problem, a Dew Shield (see previous description in this manual) may be required. The Dew Shield effectively recesses the correcting plate from night air, and significantly inhibits dew formation.

If you find that dew has formed on the correcting plate after bringing the telescope indoors from an observing session, allow the warm indoor air to dissipate the dew before placing the telescope back in its carrying case. Do not wipe off the dew in this instance as it will evaporate naturally.

## 4. Adjusting the Right-Ascension Lock

After a period of time, it is possible that the R.A. lock (#7, Fig. 10) of the telescope will not tighten sufficiently due to internal wear of the clutch mechanism. In such an event, remove the R.A. lock lever using one of the hex wrenches supplied with the telescope. Then, with a pair of pliers, tighten the shaft protruding outward from the motor drive base until you cannot easily rotate the fork mount in R.A. (Take care in this operation not to damage the cosmetic finish of your telescope). Replace the R.A. lock lever so that its handle points straight out from the cross-bar connecting the fork arm.

## 5. Adjusting The Declination Lock

Continual use of the Declination lock (#2, Fig. 10) may cause this lock to loosen. To retighten the lock, first turn the manual Declination slow motion knob (#6, Fig. 10), so that the Declination tangent arm (located inside the left-hand fork arm) is about in the middle of its travel. Put the Declination lock lever in the "unlocked" position, and insert the appropriate hex wrench into the notched-out section of the left-hand fork arm (see Fig. 33, below). Tighten the hex-head nut located just inside the notch. See Fig. 33. Caution: a little tightening of this nut goes a long way; generally, only one turn of the nut is required to fully retighten the Declination lock.

**Fig. 33: Adjusting the Declination Lock.**

## 6. A Note On The "Flashlight" Test

Approximately 94% of the light impinging on the primary mirror of the Model 2080 or 2120 is reflected by the mirror; about 6% of the light is scattered. Similarly, the correcting plate of either model transmits about 98% of the light impinging at each surface; about 2% of the light impinging each surface is scattered.

If a flashlight or other high-intensity light source is pointed down the main telescope tube under dark conditions, the total amount of scattered light will be very considerable. As a result, the optics of the telescope will appear to be of very poor surface quality. This same statement may be made of any high quality optical surfaces when given this grossly misleading "test."

## 7. Factory Servicing And Repairs

Meade Premier 8" and 10" Schmidt-Cassegrains have been designed and manufactured for years of trouble-free operation and repairs should rarely be necessary. If a problem does occur, first write or call our Customer Service Department. Do not return the telescope for servicing until you have communicated with us in this way, since the great majority of problems can be handled without return of the telescope to us. When telephoning or writing, please explain in detail the exact nature of the problem so that we may offer a prompt remedial procedure. Be sure to include your full name, address and phone number.

## 8. Troubleshooting the LX6 Drive System

The following list of problems should cover most common problems.

**Symptom:** Power Indicator (#2, Fig. 23) does not illuminate and/or the Ammeter (#1, Fig. 23) does not show any current.

**Problem:** The telescope is not receiving power.

**Solution:** The telescope is not receiving the correct power. If using the AC wall adapter, be sure it is plugged into an active wall receptacle (make sure the wall receptacle is not a switched plug; if it is, make sure the switch is on). If using the DC power cord or battery pack, check the connections, both at the power cell and at the telescope.

If the connections look good, try an alternate power source. This will eliminate the power cord as the source of the problem.

**Symptom:** When using the ECC, pushing the 8X E or 8X W buttons, the telescope either does not move at all, moves only in one direction, or moves sporadically in one or both directions.

**Problem:** Telescope not moving at 8X centering speed in Right Ascension.

**Solution:** This is almost always due to low battery voltage. When the motor is pushed to 8X speeds, that is when it has the least amount of torque and requires the most current to move the telescope. The 8X centering speed will be the first indication of low battery voltage, and should be taken as a warning, especially if the telescope is being operated from your car battery.

Check the telescope operation using the AC Adapter. If the telescope then operates correctly, then check you battery.

**Symptom:** When the telescope is first turned on, the telescope tracks at the 8X rate for several seconds.

**Problem:** The telescope is doing a self diagnostics test.

**Solution:** This is a normal function of the telescope and does not require any action. During the first 8 seconds of operation, the telescope's microprocessor does a series of tests to determine proper telescope functions.

**Symptom:** The telescope has power, but the telescope is not moving.

**Problem:** The telescope's RA Lock (#7, Fig. 10) is not locked.

**Solution:** Tighten the RA Lock.

Note: The telescope moves very slowly. You will not see the telescope moving by just looking at it - it is like trying to see the hour hand on a 24 hour clock move. Look through the telescope at a land object to make sure the telescope is not moving.

## F. SPECIFICATIONS

| Telescope | 2080 f/6.3 | 2120 f/6.3 | 2080 f/10 | 2120 f/10 |
|---|---|---|---|---|
| Optical Design | Schmidt-Cassegrain Catadioptric | Schmidt-Cassegrain Catadioptric | Schmidt-Cassegrain Catadioptric | Schmidt-Cassegrain Catadioptric |
| Clear Aperture | 203mm (8") | 254mm (10") | 203mm (8") | 254mm (10") |
| Focal Length | 1280mm (50.4") | 1600mm (63") | 2000mm (80") | 2500mm (100") |
| Focal Ratio | f/6.3 | f/6.3 | f/10 | f/10 |
| Resolution | .56 arc sec | .45 arc sec | .56 arc sec | .45 arc sec |
| Limiting Visual Magnitude (approx) | 13.9 | 14.5 | 13.9 | 14.5 |
| Limiting Photographic Magnitude (approx) | 16.5 | 17.0 | 16.5 | 17.0 |
| Image Scale (°/inch) | 1.14°/inch | 0.91°/inch | 0.72°/inch | 0.57°/inch |
| Maximum Practical Visual Power | 500X | 625X | 500X | 625X |
| Optical Tube Size | 9.1" Dia. x 16" Long | 11.75" Dia. x 22" Long | 9.1" Dia. x 16" Long | 11.75" Dia. x 22" Long |
| Secondary Mirror Obstruction | 3.5" (18.6%) | 4.0" (16.0%) | 3.0" (14.1%) | 3.7" ( 13.7%) |
| Telescope Mounting | Fork-Type, Double Tine | Fork-Type, Double Tine | Fork-Type, Double Tine | Fork-Type, Double Tine |
| Setting Circle Diameters | Dec.: 4"; R.A.: 8" | Dec.: 4"; R.A.: 8" | Dec.: 4"; R.A.: 8" | Dec.: 4"; R.A.: 8" |
| Motor Drive Gear Diameter | 5-3/4" Worm Gear | 5-3/4" Worm Gear | 5-3/4" Worm Gear | 5-3/4" Worm Gear |
| Manual Slow-Motion Controls | Dec. and R.A. | Dec. and R.A. | Dec. and R.A. | Dec. and R.A. |
| Telescope Size, Swung Down | 9-1/4" x 14" x 24-1/2" | 12" x 16" x 28" | 9-1/4" x 14" x 24-1/2" | 12" x 16" x 28" |
| 35mm Angular Film Coverage | 1.55° x 1.08° | 1.24° x 0.86° | 0.97° x 0.68° | 0.78° x 0.54° |
| 35mm Linear Film Coverage @: | | | | |
| 50' | 9.7" x 13.6" | 7.75" x 10.9" | 6.2" x 8.7" | 5.0" x 7.0" |
| 500' | 9.4' x 13.3' | 7.5' x 10.7' | 6.0' x 8.5' | 4.8' x 6.8' |
| 3000' | 56.3' x 79.7' | 45.0' x 63.8' | 36.0' x 51.0' | 28.8' x 40.8' |
| Tele-Extender Used Without Eyepiece @: | | | | |
| 50' | 9.1" x 13.3" | 7.3" x 10.6" | 5.8" x 8.5" | 4.6" x 6.8" |
| 500' | 7.7' x 14.1' | 6.1' x 9.0' | 4.9' x 7.2' | 4.0' x 5.8' |
| 3000' | 48' x 70' | 39' x 56' | 31' x 45' | 25' x 36' |
| **Series 30 and 50 Telescope Models** | | | | |
| Carrying Case Dimensions | 30" x 16" x 12" | 31" x 19" x 14" | 30" x 16" x 12" | 31" x 19" x 14" |
| Net Telescope Weights (approx) | | | | |
| Telescope | 26# | 47# | 27# | 45# |
| Equatorial Wedge | 7# | 11# | 7# | 11# |
| "Superwedge" | N/A | 26# | N/A | 26# |
| Field Tripod | 20# | 20# | 20# | 20# |
| Accessories | 11# | 11# | 11# | 11# |
| Shipping Weights (approx) | | | | |
| Telescope | 48# | 91# (Two Crtns) | 47# | 90# (Two Crtns) |
| Equatorial Wedge | 13# | 13# | 13# | 13# |
| "Superwedge" | N/A | 38# | N/A | 38# |
| Field Tripod | 26# | 26# | 26# | 26# |
| Accessories | 11# | 11# | 11# | 11# |
| **Series 70 Telescope Models** | | | | |
| Carrying Case Dimensions | 30" x 16" x 12" | 36" x 21" x 17" | 30" x 16" x 12" | 36" x 21" x 17" |
| Net Telescope Weights (approx) | | | | |
| Telescope | 26# | 47# | 27# | 45# |
| Equatorial Wedge | 7# | 11# | 7# | 11# |
| "Superwedge" | N/A | 26# | N/A | 26# |
| Field Tripod | 20# | 20# | 20# | 20# |
| Accessories | 15# | 15# | 15# | 15# |
| Shipping Weights (approx) | | | | |
| Telescope | 48# | 110# (Two Crtns) | 48# | 100# (Two Crtns) |
| Equatorial Wedge | 13# | 13# | 13# | 13# |
| "Superwedge" | N/A | 38# | N/A | 38# |
| Field Tripod | 26# | 26# | 26# | 26# |
| Accessories | 17# | With Telescope | 17# | With Telescope |