

Paul Castle Observatory

USER
MANUAL



User Manual For The Paul R. Castle Observatory

The Paul R. Castle Memorial Observatory was originally dedicated and opened for use by club members on May 22nd, 2010. The observatory site is located at the home of Gary Nordick and family, who are gracious hosts to a very fine, dark sky astronomical site. This observatory and the adjoining grassy field site is the centerpiece of the Popular Astronomy Club's observing activities. The observatory, named in honor of its original owner and former club president, Paul R. Castle, originally featured an Astro-Physics 6" f12 Super Planetary Refractor telescope attached to an equatorial mount secured to a massive wooden pier and housed inside a moveable 10' diameter dome. Years of exposure to the elements and use by the club payed a heavy toll on the observatory and in 2020, the club engaged in a project to renew and improve this cherished observatory. Under the able leadership of PAC's observatory director, Rusty Case, club members disassembled the observatory, made repairs and completely rebuilt the observatory. The dome was repainted, and the wooden pier was replaced with a fabricated steel pier bolted to a massive concrete foundation. The Nordick family donated surplus metal siding which was used to spruce up the lower portion of the dome support structure. With the help of donations from the family of Dr. Harry Nelson, former PAC president and professor of Astronomy at Augustana College, a new computerized telescope was purchased to replace the AP refractor which found a new home with PAC member Steve Sinksen. The new telescope is a Celestron CPC 1100 HD, Schmidt Cassegrain. Construction, maintenance and refurbishing of the observatory represents the tireless efforts and dedication by PAC members who donated both time and money to keep the observatory functional, useful and attractive. The observatory is the culmination of hundreds of hours of labor and donations by the Castle family, the Nelson family, the Nordick family and PAC club members. The result is, without a doubt, one of the finest astronomical observatories in the Quad Cities area. It is the intent of this document to provide rules of use and instruction in the operation of the observatory in the hope that it can be maintained and enjoyed by club members for many years to come.

Astronomy should be shared and enjoyed together with friends and family. With this in mind, **one primary guideline that should be followed is to never use the observatory alone. There should always be at least two or three people at the observatory who know and understand the basic operation of the equipment.** Not only is it more fun to share observations together, but it is much safer to have an extra hand in case there is a problem of some sort. Remember, the observatory is remote, and help is not readily available.

PAC members must be mindful of the fact that we are guests of the Nordick family and as such there are five basic requirements that we must meet in using the observatory:

- 1) Access to use of the observatory will be controlled by the current observatory director, Rusty Case, the president, Alan Sheidler and the secretary, Terry Dufek. Other PAC board members may also possess and dispense keys once they have been authorized to do so by the observatory director and the president. Regular PAC members must contact one of these to obtain a key to get into the

observatory. **For safety reasons, keys will be given only to members who have been properly trained in the use of the observatory.** The person who you get the key from will contact the Nordicks to make them aware you will be at the observatory. There is no reason to contact the Nordicks unless there is a medical emergency.

- 2) **For safety reasons, a minimum of two people must always be present at the observatory. It is recommended you notify a friend or family member of the time you will be at the observatory and please have a cell phone handy in case of emergency.**
- 3) PAC members desiring to use the observatory, but who are not certified in its use, may still use the observatory under the guidance and accompaniment of a board member or other certified member.
- 4) Anyone desiring to use the observatory, or the adjoining grassy field must contact one of the key holders at least 24 hours ahead of the desired use time. Keep in mind the observatory is located on a farm with on-going equipment use and other farming activities. This is a courtesy to the Nordick family and to make sure the area is not being used for farming activities.
- 5) Part of the legal agreement states that there will be no smoking or use of alcoholic beverages. Breaking of this rule will terminate the violator's right to use the observatory for a period of time to be determined by the PAC Board.

Another guideline is to always remember to keep the observatory tidy and clean. Pick up any trash that may be there, sweep out any dirt that may have entered between observing sessions and report any problems with the observatory or equipment. Do not attempt to repair something you do not feel qualified to fix.

Always keep safety as your top priority when using the observatory. Always be careful when using the ladder. Have a flashlight handy. A red flashlight is good to have to help see things during an observing session. At the end of an observing session, a white flashlight is nice to have to safely find your way back to the car. Remember the observatory site is remote. For safety, a minimum of two people must be present at the observatory. Notify a friend or family member that you will be out there and please have a cell phone handy in case of emergency.

If problems with observatory or equipment occur which demand immediate correction to enable safe operation or preventing closure of the observatory which cannot be remedied by those present on site, contact one of the following for help:

- 1) Observatory Director, Rusty Case, (563) 349-2444
- 2) President, Alan Sheidler, (309) 236-0077
- 3) Secretary, Terry Dufek, (563) 386-3509
- 4) Treasurer, Dale Hachtel (614) 935-5748

Checklist for Opening the Observatory:

- 1) Obtain the key to unlock the observatory door from one of the observatory directors.
- 2) Switch on the Main Power Switches on the Power Panel (Fig. 3) to provide 120VAC power for the observatory.
- 3) Switch on the white lights inside the observatory.
- 4) If it is still light out when you arrive at the observatory, remove the J-hooks and open the observatory shutter door to make it easier to see what you are doing (see figures 3-6). **Always exercise care when operating the shutter opener. The electric drive motor system can develop large forces which can damage equipment and/or cause personal injury.**
- 5) Sign the logbook kept inside the observatory. All visitors to the observatory should sign in.
- 6) Remove the dome's four hold-down clamps and place them for safe keeping in the standby position (see figure 2).
- 7) Before attempting to rotate the dome (by hand), unplug the electric shutter drive motor and secure the power cable as shown in Fig. 4. Then check to see if the dome is free to rotate. *The shutter is electric, but the dome must be rotated by hand. There is no motor for dome rotation.*
- 8) Remove the cloth cover from the telescope. Be careful not to damage the finder scope as the cover is removed.
- 9) Connect the telescope's hand controller.
- 10) Switch on the power to the telescope's drive mechanism. If the telescope is unresponsive, check the Main Power Panel power supply and the telescope's integral power switch at the base of the telescope itself. Both must be "on".
- 11) Remove the lens caps and diagonal dust cover (Fig. 12).
- 12) Install an eyepiece in the diagonal.
- 13) Install the dew shield.
- 14) Verify the Focus Locks are "unlocked" before attempting to focus the telescope.
- 15) Point the telescope at a star or distant land object and verify the finder scope is aligned with the main telescope. Adjust alignment if needed.
- 16) Switch off the white lights and use the dimmer switch to adjust desired red light intensity for observing.
- 17) Follow the alignment procedures to perform a telescope alignment using either a solar system object (like Jupiter or the Moon) or by performing a Two-Star alignment.
- 18) Observe!

Checklist for Closing the Observatory:

- 1) Immediately after finishing your observing session, switch on the white lights for safety.
- 2) Collect all eyepieces and other lenses and return them to the available eyepiece case for safe keeping.
- 3) Verify the Focus Lock Knobs are “unlocked”.
- 4) Remove the dew shield.
- 5) Install the lens cap on the main objective of telescope, sighting scope, and the star diagonal to keep dust out of the optics (see Fig. 12).
- 6) Position the telescope pointed vertically down (objective down toward the scope drive base) as shown in Fig. 12.
- 7) Turn off the telescope.
- 8) Disconnect the telescope’s hand controller and put it safely away.
- 9) Place the cloth covering over the telescope.
- 10) Rotate the dome to the home position as shown in figure 9.
- 11) Plug in the shutter door electric motor and very CAREFULLY close the shutter door. Two people must be working together for safe closing of the shutter door. Close the shutter only far enough to allow the J-hooks clamps to engage with the wing nuts. Use the orange alignment marks as a guide to position the shutter (see Fig. 5).
- 12) Install the foam seals at the base of the shutter door and reinstall the J-hook clamps to secure the shutter door.
- 13) Secure the dome with the four hold-down clamps by placing them in the “hold-down” position as shown in figure 2.
- 14) Look around the observatory inside and outside, remove all trash and personal items.
- 15) Check to make sure you have the door key to the observatory before leaving.
- 16) Turn off the all the lights in the observatory. TURN OFF both power switches on the breaker box. Verify both power supplies (one for the scope and the other for the shutter opener) are deactivated. The red lights on each will be glowing if power is still on. **Power must be OFF to avoid damage to equipment while the observatory is unattended.**
- 17) Close and lock the observatory door.
- 18) Return the observatory key to the observatory director you obtained it from.
- 19) Report any problems with the observatory or the equipment.
- 20) If you have observing notes, it is encouraged that you provide a copy for the club newsletter (Terry Dufek, editor).



Figure 1: The Paul R. Castle Observatory was dedicated on May 22, 2010 and refurbished during the summer of 2020. This is the observatory as it appeared on the evening of August 15, 2020.



Figure 2: Four dome hold-down clamps are used to secure the dome when not in use. The dome rests on a series of rollers which enable the dome to be rotated easily by hand for viewing in any desired direction. The upper photo shows the clamps in the “hold-down” position and the lower photo shows one of them in the “standby position”. To be able to rotate the dome and use the observatory, the clamps must be in the “standby position”. The hold-down clamps ensure the dome does not lift or shift position in high wind conditions when the observatory is not in use. **Always return the hold-down clamps to the “hold-down” position before leaving the observatory.**

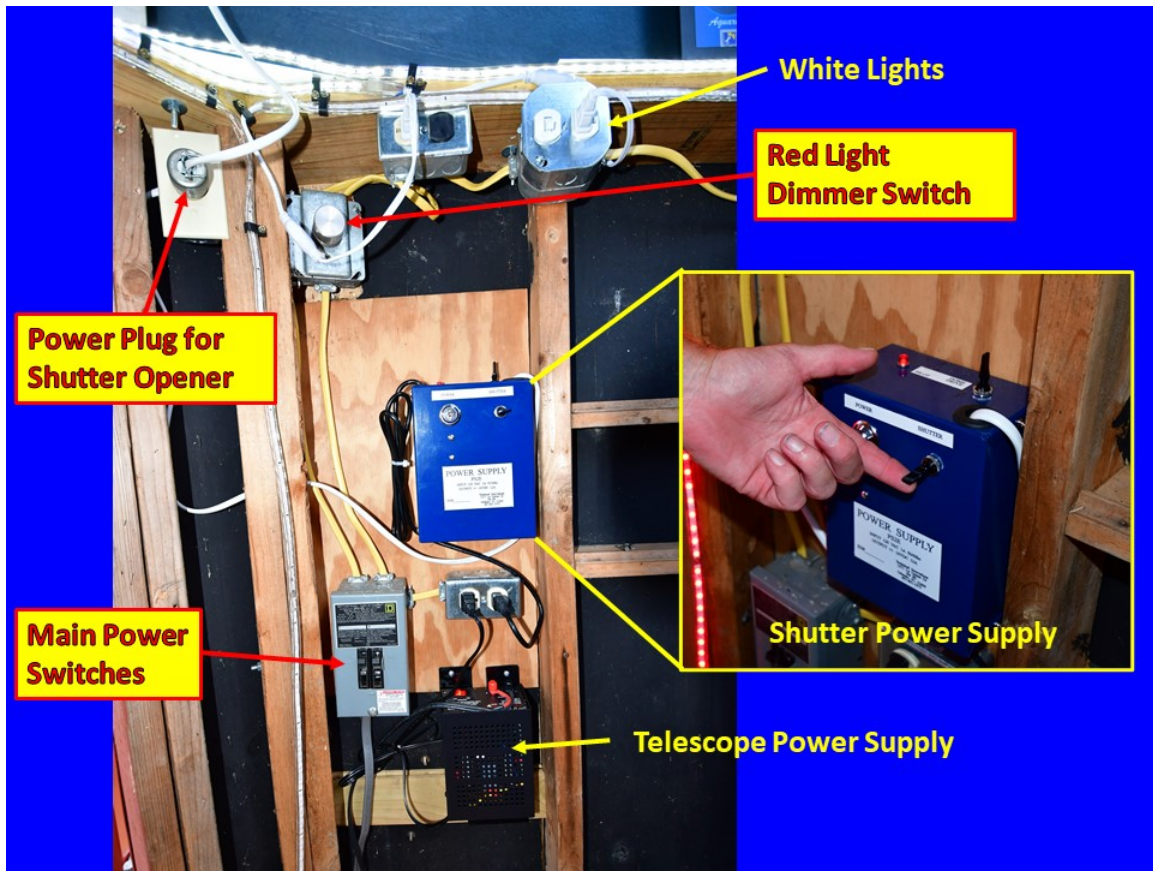


Figure 3: Power Distribution Center. The Main Power Switches turn on/off the 120VAC power to the observatory. Nothing inside the observatory can be operated without first switching on the circuit breakers. The Shutter Door Opener must be plugged in as shown to open or close the observatory shutter doors. Remember to unplug this before attempting to rotate the dome. The Shutter Power Supply and the Telescope Power Supply have red indicator lights showing that 120VAC power is on. **Be sure the Main Power Switches are off before leaving the observatory after an evening of observing. All power must be deactivated to avoid possibility of damage to the telescope and equipment while the observatory is unattended.**

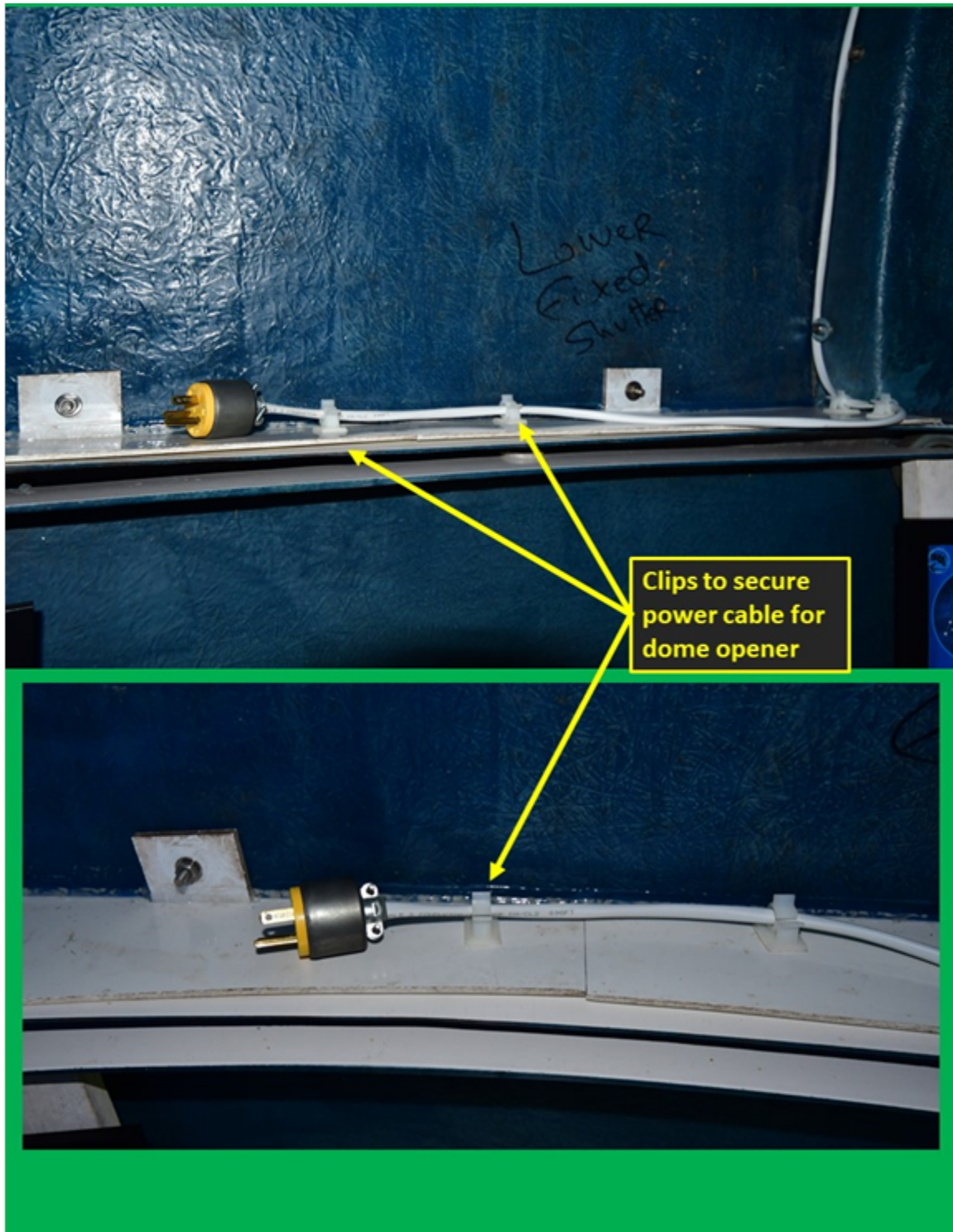


Figure 4: This shows how to properly secure the shutter door power cord after the observatory is opened. After unplugging from the power plug (see Fig. 3), place the male plug end of the power cord into the clips to prevent the plug from fouling on items inside the observatory when the dome is rotated. Remember to reinstall the plug when ready to close the shutter doors at the end of your observing session.

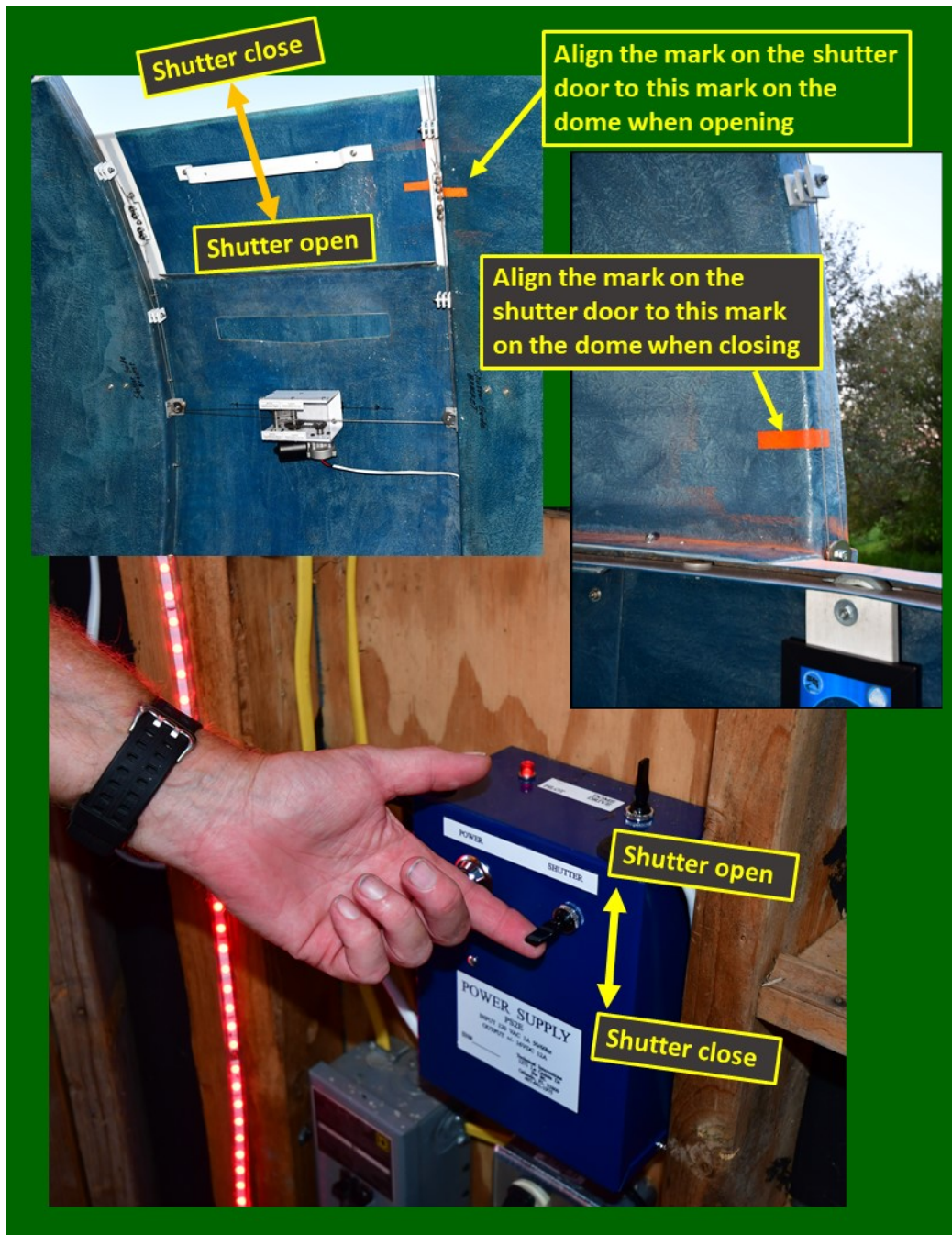


Figure 5: The shutter doors open up to reveal the heavens for viewing. Use caution when opening and closing these doors. The doors are opened by means of a motorized windlass system. Pulling the shutter switch upward causes the windlass to raise (opening) the shutter doors, conversely, pushing the switch down lowers (closing) the shutter doors. Use care so that the doors do not go either too far up or down. Note the “fully opened” and “fully closed” door positions are marked by orange marks on the inside of the dome. When the doors reach the end of free travel, return the shutter switch to the center “off” position. **Continuing to force the doors too far may cause damage. Do not attempt to operate the shutter drive system unless you understand how it operates.**

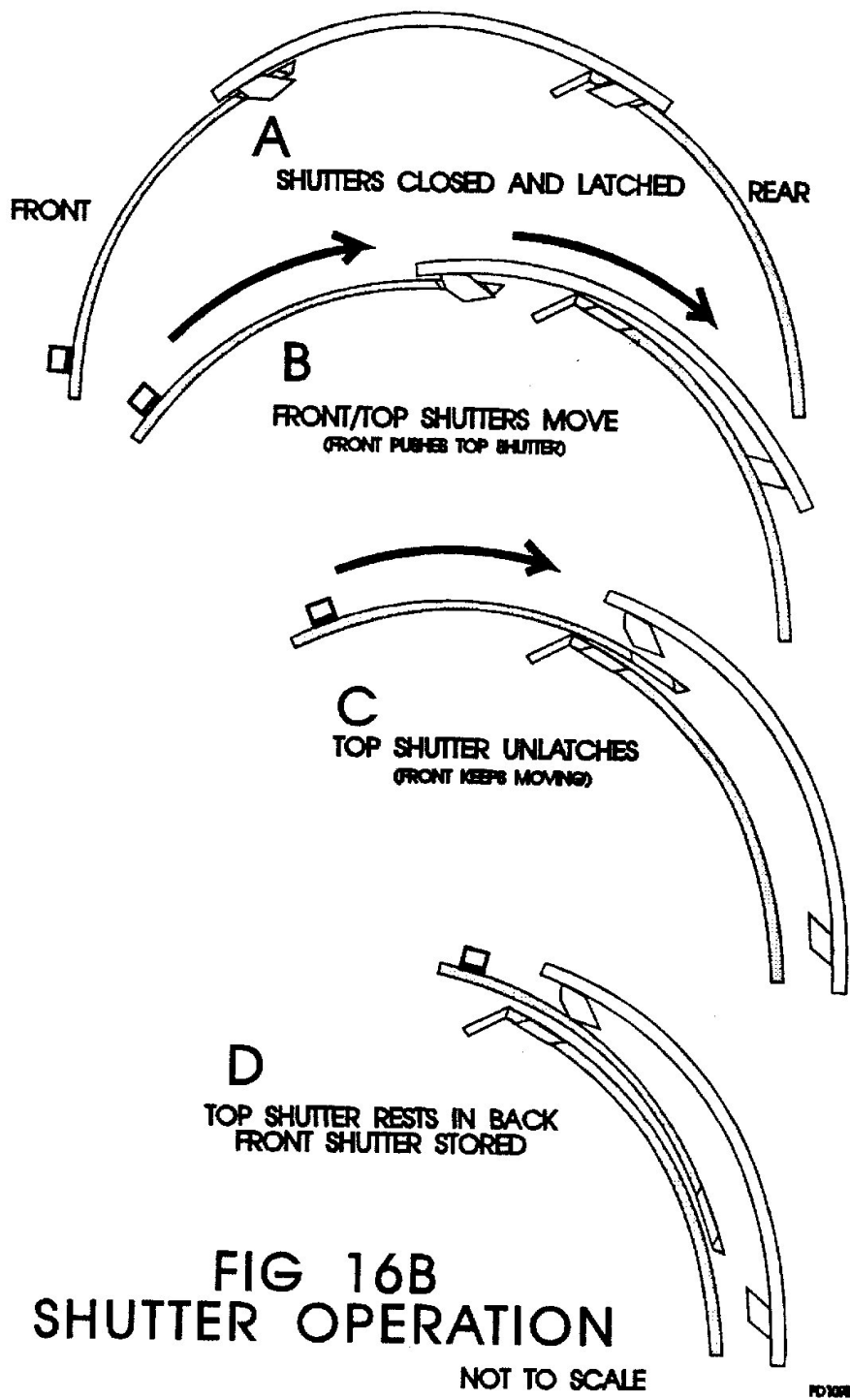


Figure 6: This schematic diagram shows the basic operation of the shutter doors.

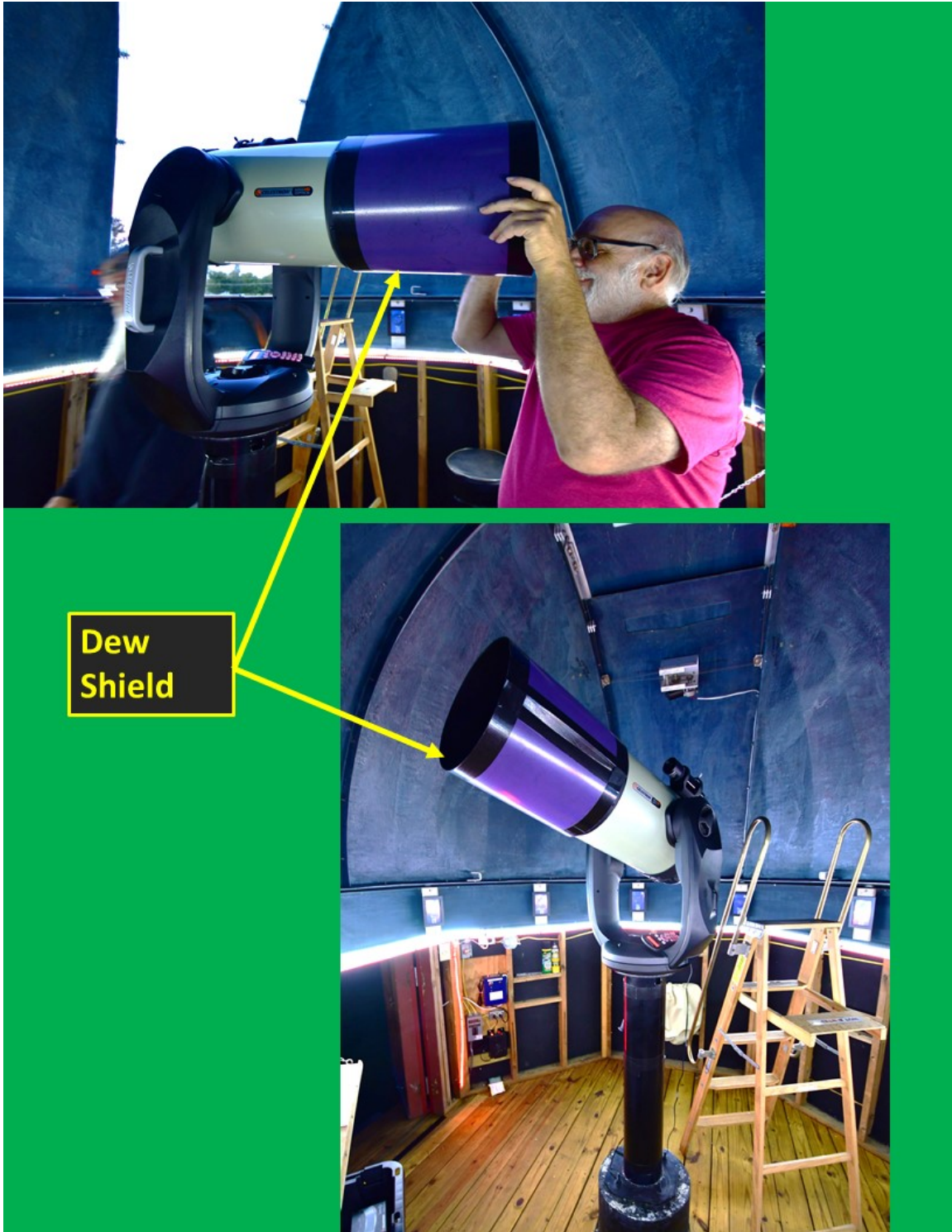


Figure 7: The Dew Shield. During late night observing sessions as the ambient temperature falls, it is possible for moisture to condense on the telescope's objective lens. To prevent this, install the dew shield shown here. Simply slide this over the front end of the telescope at the beginning of your observing session.

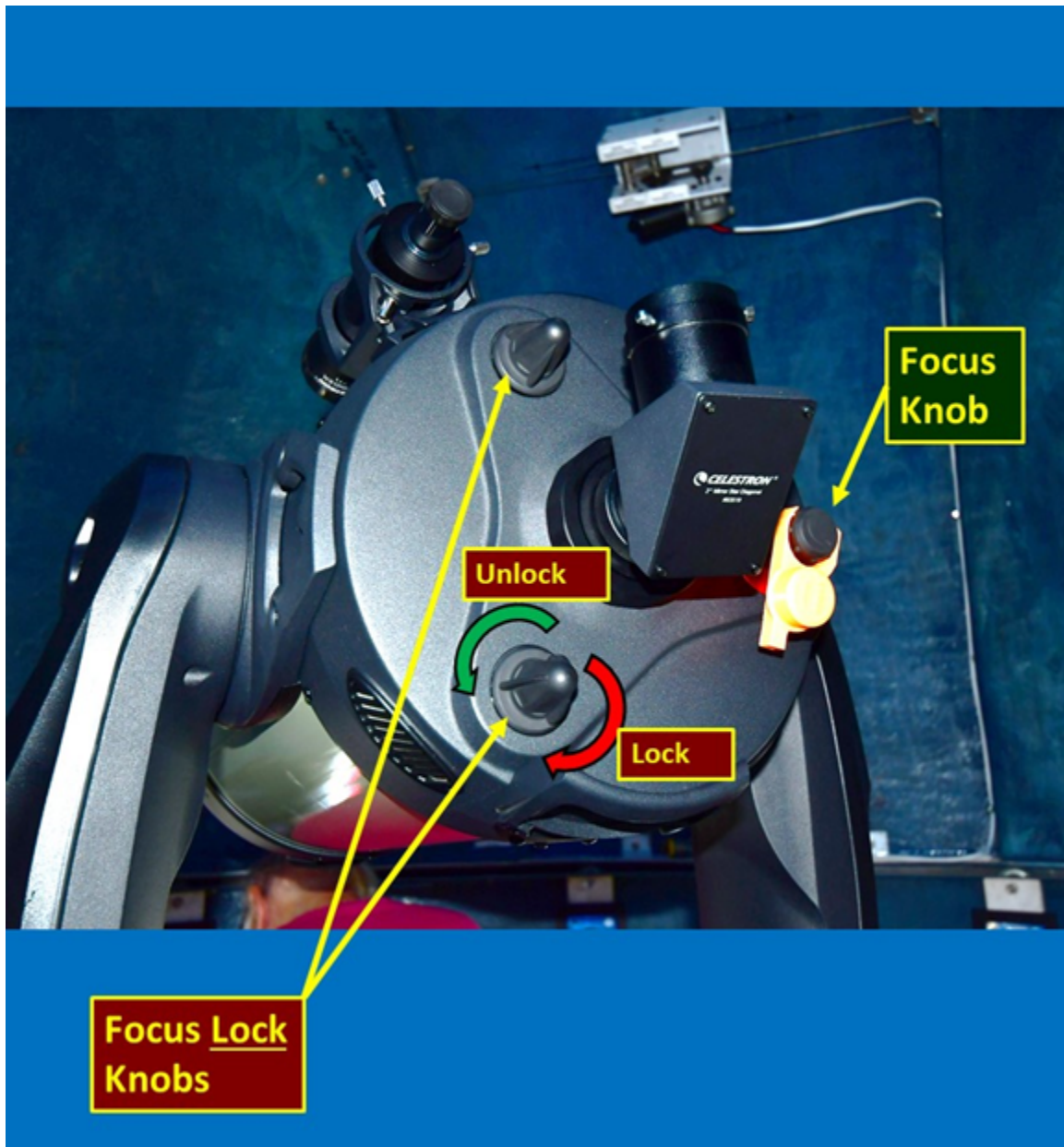


Figure 8: Focus Lock operation. In some situations, such as astro-imaging with a camera attached to the telescope, it may be desirable to “lock” the focus mechanism to prevent mirror shift as the telescope is pointed in different directions and elevations. Once the telescope has been focused to provide a sharp image for the camera, the primary mirror can be locked to avoid the need to refocus each time the telescope is repositioned on a new object. This is done with the Focus Lock Knobs as shown above. Always remember to “unlock” the Focus Lock mechanism after you are finished using it. It is not possible to focus the telescope with the Focus Lock engaged (knobs tightened in the clockwise direction). **When you are finished with an imaging session, always “Unlock” (both knobs loosened counterclockwise) so that the next person to use the telescope will be able to focus again.**



Figure 9: Before closing and clamping down the shutter doors, rotate the dome to align the orange colored markings shown. This “home position” marks the correct position for insertion of the J-hook clamps to secure the shutter doors.



Figure 10: Before fully closing the shutter door, insert the foam cushion shown to prevent entry of birds and insects. Carefully compress the foam under the door as it is closed. Then insert the J-hook bolts as shown in the next Figure.



Figure 11: Once the shutter door has been closed, insert the two J-hook bolts over the handle of the door and through the holes in the flange of the dome support ring as shown. Use washers and tighten the wing nut snugly to secure the shutter door.



Figure 12: Before placing the cloth cover over the telescope (before leaving the observatory), install the telescope's objective lens cap, the lens caps for both ends of the finder scope and the dust cover for the eyepiece diagonal. Then position the telescope pointed down as shown here. Note: The Lens Cap for the Objective must be rotated to engage and lock it to the front of the telescope.

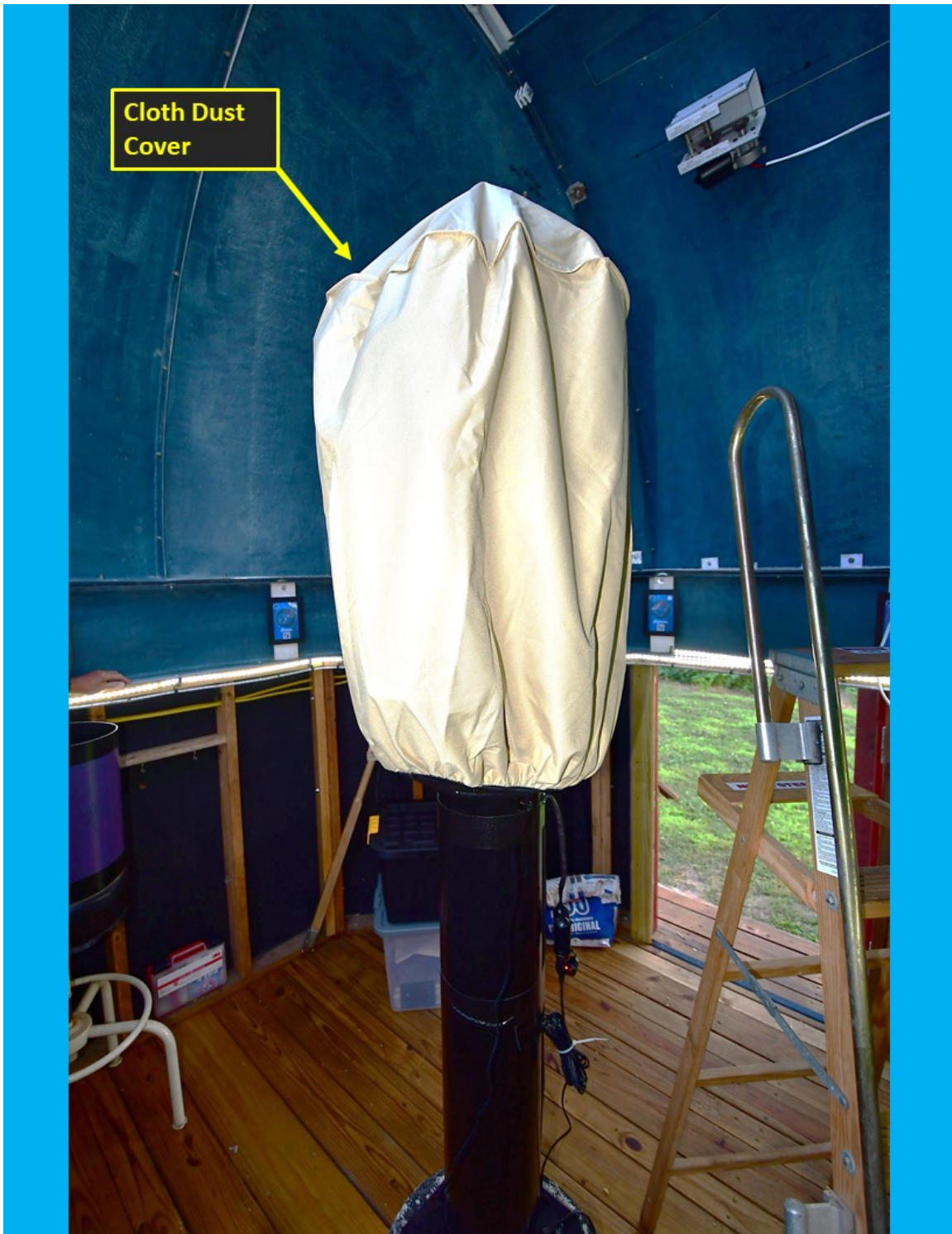


Figure 13: After positioning the telescope as shown in Fig. 12, place the cloth dust cover over the telescope as shown here. This keeps dust from collecting on the exterior of the telescope when the observatory is not in use.



Figure 14: Overall view of the observatory showing the major components including the Power Distribution Panel, the Shutter Opener (above), the Telescope and of course some astronomers!