Owl Observatory Overview

Owl Observatory is an astronomical observatory dedicated to the public education in the science of astronomy and to viewing the heavens. The name and design comes from a three part article written by Jim Krick of Great Falls Montana and featured in *Astronomy* magazine (April - June 1992).

Ground was broken on October 16, 1996 and construction of the observatory began shortly thereafter. The only work completed in 1996 was digging out the foundation and the pit for the telescope mount. After the winter months the concrete was poured, and shortly after the building was erected. The original telescope, a homemade 10" Newtonian Reflector, was finally added during the spring of 1998, which put the observatory into working order. The observatory was dedicated on August 22, 1998.

A campaign to upgrade the observatory began in the spring of 2000 when the members of the Kalamazoo Astronomical Society (KAS) purchased 1000 pair of eclipse shades to sell for the partial solar eclipse on Christmas Day. Through sales of the eclipse shades and many generous donations, the KAS purchased a new instrument one year after the campaign began and installed it on June 7, 2001.

Public observing sessions are held at the observatory twice a month from April to October. School and other similar groups will also have access to the facility. At other times, KAS members will make use of the observatory for their observing programs. The KAS owes a sincere expression of gratitude to those members and many donors who stepped forward with cash donations and in-kind support to make this facility a reality.

The observatory is located on the grounds of the Kalamazoo Nature Center, which is recognized as one of the nation's best nature centers. Since 1960, the Nature Center has been inspiring people to care about the environment by providing experiences that lead them to understand their connection to the natural world. It is located on 1,000 acres of rolling hills in southwest Michigan with a variety of habitats, including mature beech-maple forests, wetlands, and prairies.

The KAS has been holding public sessions at the Nature Center for over a decade and the observatory increases our long partnership. The Nature Center offers reasonably dark skies, yet is located only six miles north of downtown Kalamazoo.

Directions to the Kalamazoo Nature Center

From downtown Kalamazoo go north on Park Street (one way north) and follow it until it becomes Business Loop 131 and curves towards the northwest. At this curve take the exit (right turn) to Westnedge Avenue. This is also near the intersection of Mosel. Go north on Westnedge about 3 miles and look on the right for the Kalamazoo Nature Center entrance just past E Avenue.

From the north or west another access route is from D Avenue. From US 131 take the D Avenue exit (#44) and go approximately 4 miles to the Westnedge intersection. Turn south (right) onto North Westnedge Avenue and go 1 mile to the Nature Center entrance on your left. If you pass E Avenue you've gone a little too far.

From the east take Sprinkle Road north until it changes into a 2 lane country road; go 3.5 miles north of Gull Road (M43). The road makes a tight curve west and becomes D Avenue. Continue 3 more miles until the Westnedge intersection is encountered. Turn left for 1 mile to the Nature Center.

For further directions and a map visit the KNC web site:

http://www.naturecenter.org/visitorinfo/directions.htm

Mission

The mission of the Kalamazoo Astronomical Society is:

- To stimulate the pursuit and enjoyment of science and astronomy for public education;
- To inspire students and teachers in all grade levels in local schools and colleges;
- To provide family entertainment, educational lectures and informal talks about astronomy and observing the sky;
- To promote and support amateur astronomers in their quest for observing the sky;
- To contribute to the excitement of scientific inquiry and discovery. Many new discoveries are made by amateur astronomers; such as new comets, finding novae and supernovae and monitoring variable stars.

The Observatory and Equipment

Owl Observatory is a 12' x 12' building with a roll-off roof which exposes the inside to the night sky. Roll-off roof observatories have several advantages over domed observatories. Some advantages include the following:

- They are simpler and less costly to build than a dome.
- Does not require complex motors and electronics to move as the telescope follows the sky.
- Reaches thermal equilibrium faster than a dome, and does not create a chimney effect as hot air rises out the open slit of the dome.
- Permits an unobstructed view of the sky for naked eye observations and wide-field piggyback astrophotography.
- A roll-off roof building can be disguised as a shed to camouflage the expensive equipment inside.

The building's walls help protect observers from wind and extraneous light, but may be lowered when necessary.

The heart of the observatory is a Meade 12" LX200 Schmidt-Cassegrain Telescope (SCT). Such telescopes have become very popular among amateur astronomers and small observatories since they are compact and offer many sophisticated features.

The LX200 telescopes are computer controlled, permitting quick, automatic access to thousands of stars, star clusters, nebulae, and galaxies. The telescope is equipped with a complement of eyepieces and accessories, including astrophotography aids and a solar filter, to support a wide range of observing programs.

To facilitate serious observing, the telescope is supported rigidly on a steel pier, which, in turn, is bolted to concrete pads sunk deep into the ground and physically isolated from the rest of the building to avoid vibration and effects of wind. The telescope is equatorially mounted to provide accurate tracking of stars for astrophotography.

Gate Procedures

It is incumbent upon us to make sure the Nature Center gate is locked while the observatory is in private use. The only vehicles that should be in the Nature Center after hours are those who are members or guests of the KAS (and, of course, KNC employees). People often walk around the Nature Center after hours, but they must park outside the main gate. The Kalamazoo Nature Center will automatically lock the gate at the end of their regular business day (see www.naturecenter.org for current hours). Therefore, if you are alone back at the observatory without a key, you will likely be locked in the Nature Center until the next day. That is why a key holder must be present and responsible on a night where any members or the public will be viewing.

On Public Nights:

The gates shall be opened one-half hour before viewing begins and remain open until the session has concluded.

Signs for public nights: At the entrance, you will find a sign erected at the main gate. A second sign goes at the entrance of the parking lot. A third sign will be set up at the entrance to the service road that leads to the observatory.

On Member Nights:

The entrance gate will be unlocked, and the gate shall be kept shut after each arrival. Members will need to close gate behind them LEAVING GATE LATCHED, BUT UNLOCKED.

KAS Officers are solely responsible to make sure everyone has left the Nature Center at the end of a public or member only observing session.

Lights

Visitors should bring a red flashlight (preferably) to use for the walk from the parking lot up the service drive leading to the observatory. All lights must be off before entering the observatory. The only lights to be used within 200 feet of the observatory should be red lights only and as dim as possible.

Vehicle white headlights should be kept off if possible when entering the Nature Center parking lot. Absolutely, no vehicles with white lights are permitted to travel up to the observing area during viewing times. Some newer cars do not allow the deactivation of headlights (this can be bypassed on some models by applying the emergency brake slightly).

The Service Drive

The service drive is the dirt road that leads from the parking area up to the butterfly house, barn, and observatory. We will try to staff a KAS member at the service road entrance to dissuade people from driving up to the observatory unless they have heavy equipment. Exceptions are made for handicapped access and for making deliveries up to the observatory.

Any time you are driving down the service drive, the maximum speed is 5 miles per hour. Driving too fast could cause dust or other harmful particles to settle on visitor's telescopes. Be on the lookout for children playing near the picnic area or butterfly house.

If you must drive to and from the observatory and parking area at night, watch for stargazers who may be using the field. USE EXTREME CAUTION AND GOOD JUDGMENT.

Rules of Conduct

Owl Observatory exists to promote astronomy and for your enjoyment of the sky. This facility was built and is maintained entirely from donations and much hard work on the part of the members of the KAS. All we ask, to promote safety, protect equipment, and to enhance everyone's enjoyment, is that you follow the Code of Conduct:

- Alcoholic beverages are never permitted within the Kalamazoo Nature Center.
- Smoking is also not allowed on the Nature Center grounds. (Smoking is not only bad for you; it is horrible for delicate optical surfaces.)
- Aerosol bug spray repellent may only be applied outside the observatory. (Sprays produce a fine mist which can settle on optical surfaces which can become very difficult to clean.) Make sure your hands are clean before handling the telescope or any eyepieces.
- Minors under the age of 16 must be accompanied by a parent or guardian at all times.
- Anytime Owl Observatory is used, the log should be filled out by the key holder for that evening. Please list the number of guests as well.
- Never touch the optics of any telescope or eyepiece! Periodic cleaning will be performed only by a trained member.
- No parking on grass, except to unload equipment.
- Remove any trash and keep the premises clean.
- Borrowing of items from Owl Observatory is strictly prohibited.
- No white lights or automobile lights are allowed after dusk. Use red flashlights to preserve night vision and please keep them pointed downward! You could inadvertently ruin someone's carefully guided astrophotograph!

PLEASE NOTE: Access to Owl Observatory and its equipment is a **privilege**, not a right. Remember that countless hours of volunteer work went into designing and building the observatory, as well as the long fund raising campaign to raise the money to purchase the telescope and its accessories.

Rules for Observatory Use

To use Owl Observatory equipment you must:

1. Be a member of the KAS, in good standing for at least six (6) months. This grace period may be waived at the discretion of the KAS Board.
2. Have your dues paid in full for the current year.
3. Have successfully completed the observatory training and orientation.
4. Have demonstrated competence in using the observatory telescope and proper opening and securing of the facility.
5. Observatory and Nature Center gate keys will be issued after authorization of the KAS Board. Keys may never be duplicated nor loaned; NO exceptions.
6. Any violation of these rules or of the Code of Conduct will result in suspension of observing privileges.

For safety purposes, it is highly recommended that two people are present at the observatory for at least the first two years.

Only elected officers hold keys to the Nature Center gate and observatory. In order to use Owl Observatory, you must obtain the keys from a KAS Officer (see current officer

listing in the latest issue of *Prime Focus* or visit KAS Online - www.kasonline.org).

Observatory Opening Procedures

You must have a total of three keys to gain access to the observatory (one for the Nature Center's main gate and two for the observatory). To obtain the keys you must make arrangements to meet with a KAS Officer. You must then show the officer your KAS membership card and observatory training certificate card. The Director of Public Programs at the Nature Center must also be notified before 4:00 pm on the day you intend use the observatory. Contact the Public Program Director at 381-1574 (ext. 27).

Before unlocking the observatory door, you must deactivate the alarm system. The alarm lock is located to your left as you face the door.

There are two locks on the observatory door (dead bolt and door knob); one key works on both locks.

To roll the roof off, unlatch the red pulley straps located at all four corners of the observatory. These must be left hanging from the lower eye hooks on each corner.

CAUTION: NEVER UNDO THE STEEL HOOKS AT EACH CORNER OF THE OBSERVATORY WHILE THE ROOF IS ON. THESE HAVE NOTHING TO DO WITH THE ROLL-OFF SYSTEM, BUT COULD POTENTIALLY CAUSE THE ROOF TO COLLAPSE ON TOP OF YOU OR CAUSE SEVERE DAMAGE TO THE TELESCOPE AND OBSERVATORY.

Verify that the roof track is cleared of any obstacles.

Use the large pole to push the roof off the observatory. There is a safety stop at the end of the track, but you should only need to roll the roof far enough for it to clear the inside of the building.

A second person must be with you to lower the walls should that be necessary. DO NOT ATTEMPT TO LOWER THE WALLS BY YOURSELF. VIOLATION OF THIS REQUIREMENT COULD MEAN THE TEMPORARY OR PERMANENT SUSPENSION OF YOUR OBSERVATORY PRIVILEGES.

LX200 Telescope Start Up Checklist

1. Remove the solar cover from the telescope.
2. Plug in the extension cord to the outlet located on the east wall.
3. Set Kendrick Dew Controller to medium. If it is extremely humid, you may adjust the heaters higher. Keep an eye on the telescope's corrector plate to see if any dew is forming.
4. Remove all dust caps from the telescope, finderscope, and diagonal.
5. Attach the dew cap.
6. Turn on the power to the telescope. Wait 30 seconds.
7. Align the finderscope on the side of the telescope. When you center a bright object in the center of the finderscope, it should appear in the center of the eyepiece (start with a 26 mm eyepiece or lower power, 32 mm, etc). The object in the eyepiece should be in the center of the finderscope. If it is not, you will need to tweak the screws on the finderscope until it is centered exactly on the crosshairs of the finderscope. Keep in mind that the image in the finder is reversed (left to right) and upside down. Do not over-tighten the screws on the finderscope.
8. Press STAR on the telescope's keypad.
9. Select Enter on keypad.
10. Move the cursor to the word NAME and press Enter.
11. Select a bright star (near the meridian and close to overhead, preferably) and center it in the eyepiece.
12. Verify this is the correct star, first in the finderscope, then in the eyepiece of the main telescope.
13. Press Enter and hold the Enter key until it beeps.
14. To improve the LX200's search ability, you can activate the Hi Precision Search Mode. Push the Mode button on the keypad if you are not already in the menu that says Telescope. Hit Enter then scroll to "9 Hi Precision" and press Enter. The words HI PRECISION will now be in CAPS. This indicates that when you search any Messier or NGC object, the LX200 will first center on a bright star. This refines the search and assures the object you are looking for will be centered in the telescope. Generally, the telescope is very accurate without Hi Precision Mode.
15. Become familiar with the LX200 manual. A copy can be found in the desk. Additional copies are available in the KAS Library. You may borrow one for no longer than one month.

PLEASE NOTE: In temperatures of 20**°** F or below the LX200 may not function properly. If the telescope's motors sound like they are strained then please don't use the telescope. This could cause severe damage to the drive system. The LX200 Keypad will be very difficult to read in low temperatures as well.

Observatory Shut Down Checklist

1. Always turn off telescope power first on base of LX200.
2. Turn off the Kendrick Dew Controller.
3. Remove the dew cap.

4. Replace all dust caps to the telescope, finderscope, and diagonal.
5. Return LX200 to its home position and place the solar cover over the telescope
6. Close roof (MAKING SURE THE WALLS ARE UP).
7. Secure all four corners with the red tie downs.
8. Clean up observatory.
9. Verify all eyepieces and accessories are returned and placed in their appropriate containers.
10. VERIFY TELESCOPE IS POWERED OFF. Then unplug the telescope's extension cord.
11. Secure observatory door, then engage the alarm system.
12. Upon exit, verify the door is secure (again).
13. Verify upon leaving that the gate entrance is locked.
14. Return the keys to the appropriate KAS officer ASAP.

Observing Priorities

The observatory will also be used by members for their observing projects and school groups. Programs are listed below in order of highest priority for use of the observatory:

1. Scheduled public programs.
2. Official Members group observing.
3. School/Scout or similar scheduled groups.
4. First-come basis (but please share the facility).

Check the "Schedule of Events" page on KAS Online or contact the President of the Kalamazoo Astronomical Society for observatory availability.

Telescope Magnification & Field of View Chart

To calculate the magnification of a telescope, you use the following equation:

$$Mag = \frac{Telescope Focal Length (in\ mm)}{Eyepiece Focal Length (in\ mm)}$$

Focal Length of Meade 12" LX200 Schmidt-Cassegrain Telescope: **3048 mm**

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To calculate the actual field of view of an eyepiece, you use the following equation:

$$Actual\ \ Field\ \ of\ \ View = \frac{Apparent\ \ Field\ \ of\ \ View}{Magnificat\ ion}$$

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The following is a table of precalculated values for the eyepieces kept in Owl Observatory:

Eyepiece	Magnification	Apparent Field	Actual Field
6.4 mm	476x	52º	0.11º
9.7 mm	314x	52º	0.17º
12.4 mm	246x	52º	0.21º
15 mm	203x	52º	0.26º
20 mm	152x	52º	0.34º
26 mm	117x	52º	0.44º
32 mm	95x	52º	0.55º
40 mm	76x	44º	0.58º

Owl Observatory

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