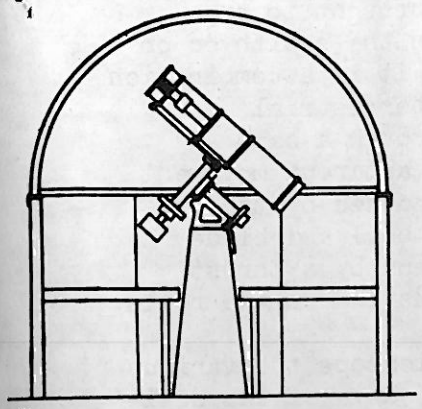
BUFFALO ASTRONOMICAL ASSOCIATION INC.
BUFFALO MUSEUM OF SCIENCE
HUMBOLDT PARKWAY
BUFFALO NEW YORK 14211



The Spectrum

*D E C E M B E R *1 9 7 0

DECEMBER MEETING: Traditionally we devote our December meeting to the more social aspects of our Association. As in the past, Ed and Olga Lindberg will start the program on the more serious side with an illustrated talk on "Sundials and Clocks", while Edith Geiger will then entertain us with her annual round-up of candid views of the membership . Our Chistmas Party will conclude what should be a very enjoyable evening. As an added attraction we will have on display. a Porter Garden Telescope (see below), owned by the Buffalo Society of Natural Sciences. Come all and bring your friends - December 11, 1970, 8:00 PM at the Museum. It is with pleasure that we welcome Ed and Olga Lindberg, and Edith Geiger!

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* A GARDEN TELESCOPE * By Russell W. Porter
from: Popular Astronomy 32: 273-280, 1924

Any efforts toward the popularizing of the telescope would seem to be amply justified, and any improvements tending to simplify its use among amateurs as an astronomical instrument are, of course, to be desired.

One of the drawbacks to the amateur is the setting up and dismantling of his telescope whenever he finds an opportunity for an evening with the stars. The new Garden Telescope has removed this obstacle by a form of mounting that, once set up and placed in proper adjustement, remains a permanent fixture in the garden, requiring no further care. It is always ready to use. Incidentally, the mounting which is an equatorial one, has been so designed as to produce a beautiful garden ornament on solid statuary bronze. Optically the Garden Telescope is a modified Newtonian reflector of six inches aperture, with a focal length of approximately two feet and is provided with eyepieces giving 25, 50 and 100 magnifications. The parabolic mirror is a disc of glass three-quarters of an inch thick silvered on its concave, or front surface. This mirror is provided with a cast bronze cover with machined edges for protection when not in use. The mirror may or may not be taken indoors for safe keeping. At the plant where this instrument is being manufactured (Jones & Lamson Machine Co., Springfield, Vermont) the mirror was left outdoors in its mounting through the rigors of a Vermont winter without appreciable deterioration.

It will be seen from the photographs that the familiar telescope tube has disappeared and that the reflecting prism and eyepiece are held in their proper relation to the mirror by a bronze arm in the form of a leaf. The prism and eyepiece rotate around the end of this arm so that it may be brought to any convenient observing position, whether the object viewed be in the zenith or on the horizon. The mounting itself has several unique features. It is a combination alt-azimuth and equatorial mounting. That is, for day use on terrestrial objects, it may be swung around a vertical axis maintained through a ball bearing track at the base. But for use at night to follow the apparent movement of the stars the base is clamped and the equatorial motion produced by the rotation of the bell. The axis of this bell which carries the bowl and blade is the polar axis of the instrument and is maintained at one end by a thrust bearing and at the other end by a circular track on its rim resting on two rolls.

In the illustration showing the details of the Garden Telescope the various members comprising the mounting are indicated. The declination axis of the bowl turns in bearings cast on the rim of the bell. The bowl is hollow and filled with lead to exactly counterpoise the blade. The declination circle envelops the bowl, on which the declination of the star is laid off. Around the rim of the bell is an eleven inch hour circle graduated into hours and coarse ten minute intervals. In use, the observer gets his watch to running on local star time, and by applying the right ascension of the star to his watch reading, turns off the hour angle by means of the hour circle, into the east or west as the case may be. The object will then appear in the field of view of the eyepiece and its apparent motion across the sky is followed by turning one of the rolls on which the bell rim rests. The instrument is first adjusted so that the axis of the bell is parallel to the earth's axis. For this pupose the latitude plate supporting the bell has a machined spherical seat, which allows a range from latitude 25 to 55 (north or south of our equator). This embraces all of our states as well as Europe, excluding parts of Scandinavia, South America, New Zealand, etc.

A convenient method of accomplishing this adjustement is upon the north star at a certain time during any clear evening, and is described in the printed instructions accompanying the telescope. The declination axis is brought horizontal. Polaris' declination is set off on the declination circle and clamped. The spherical seat is then freed and the base allowed to turn on its horizontal track. Polaris is then brought to the center of the field of view of the eyepiece and the base and spherical seat are then clamped with the set screws provided, and the telescope is in very good equatorial adjustement. It is not disturbed thereafter. In principle this is the customary way of finding obscure celestial objects with astronomical telescopes. The positions of many double stars, multiple stars, clusters and nebulae, within the range of the Garden Telescope as well as a table for setting one's watch to star time, with various examples worked out, are given in the setting up instructions. For day use, however, the telescope is simply sighted at the object as one would point a rifle. Two open sights on the back of the blade are brought to bear on the object whose image will then be found in the eyepiece.

It will be noted that a part of the bell has been removed to prevent interference with the blade when used on southern stars. This permits the telescope pointing to any part of the heavens above the horizon. The telescope proper being swung between the declination axis bearings instead of overhanging one end, together with the wide three point support of the bell, provides an extremely stable and rigid form of mounting.

The Garden Telescope functions with considerable accuracy as a timekeeper.

If the telescope is brought to bear on the sun by projecting the sun's image on a card just outside the eyepiece, sun time is read off directly on the hour circle to the nearest minute, to which, of course, the equation of time must be applied to obtain local mean time. Nearly all sun dial pedestals are suitable for supporting the Garden Telescope, as they are of about the right height and size. Some owners prefer to make their own pedestals of brick, stone or poured concrete. The manufacturers, however, provide, if desired, a pedestal with a locking device for securely fastening the instrument to the pedestal top. There being no iron in the instrument's construction, there is nothing to rust. The surfaces slowly take on a dark olive color of statuary bronze, remaining unaffected by the weather.

The large light grasp of the mirror produces a very brilliant and colorless image and the eyepieces are the best obtainable, being the Hastings positive astronomical oculars by Brashear. Recently the manufacturers have added as an accessory an additional eyepiece, so that two persons may view the same object simultaneously. Each eyepiece is independent of the other, has its own prism, and takes its half of the light producing image. There is a considerable advantage in this double ocular, for two people may then discuss what they are seeing without one's having to remove his eye to give the other a look.

The cost of the Garden Telescope, while considerable for the amateur, is far below that of a refractor of the same aperture. The mirror may be returned to the makers when desired, for resilvering at nominal cost. The silver coating is covered with a lacquer of gun cotton and amyl acetate to preserve its lustre without detriment to its optical properties. With care the silver coat will last for years.

Readers of Popular Astronomy who have followed the writer's various articles on speculum making will be interested to know how the mirrors of the Garden Telescopes are made, when turned out on a production basis. A full description of the process is a whole story by itself. It is sufficient here to state that a machine has been designed to bring to a complete polish a number of glass discs, holding their surfaces very close to that of a concave sphere, the knife-edge test being carried out at the center of curvature of the glass. The parabolizing is then carried on with a specially designed machine, the knife-edge tests now being at the focus, parallel light as from a distant star having been produced in the laboratory. The parabolizing is perfected until all rays reflected from the mirror cross the axis of the glass within one hundredth of an inch of each other. This is equivalent to saying that with the Garden Telescope properly focused on a star, a movement of the eyepiece one hundredth of an inch either way would impair the image. The writer must admit, however, his inability to completely parabolize by machinery. To bring the figure within the specifications he has laid down for these mirrors a certain amount of hand work seems unavoidable.

NOTE: The illustrations which appeared with the above article have not been reproduced here since the telescope itself will be on display at the December meeting. Apparently only about 100 Garden Telescopes were sold prior to 1926 and as far as is now known, only a few are still in existence. The Museum's telescope carries the serial number 52. The Garden Telescope carries U.S. patent No. 1,468,973, September 25, 1923. Contrary to what Porter says about the mirrors in the preceeding article, all mirrors for the Garden Telescopes were made by Wilbur Perry of Springfield, Vermont. These telescopes were generally f/4, and were provided with eyepieces of 1", ½" and ¼" focal lengths. eeb.

* SECOND B.A.A. ASTROPHOTOGRAPHY EXHIBIT * As was announced some time ago in the Spectrum, we plan to have a second exhibit of astrophotographs taken by our members. As yet we have not set a date for this exhibit, but we plan to have an announcement at the December meeting. We encourage all of our members to submit photographs as soon as possible (either bring them to the next meeting or send them to E. Both, Buffalo Museum of Science, Buffalo, N.Y. 14211). The preferred size is 8 X 10 inches, glossy paper, although other sizes will be accepted. We plan this year to mount the photographs behind glass, to reduce damage and theft. eeb.

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A NOTE CONCERNING THE SPECTRUM: The Spectrum is YOUR newsletter. What appears in the Spectrum should, to a certain extent, reflect the wishes and needs of the membership. It is virtually impossible for the editor to know what these wishes or needs are, unless YOU enlighten him. So why not drop him a note and tell him what you think about the Spectrum (good or bad), what you would like to see in the Spectrum, etc. Members are encouraged to submit articles, news-items concerning their astronomical activity, observations, etc. Other members are interested to find out what YOU are doing, so let them know. Get involved. Write something for the Spectrum and send it to E. Both at the Museum. eeb.

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THE OBSERVER'S HANDBOOK FOR 1971 WILL BE ON SALE AT THE DECEMBER MEETING * * * * * * *

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