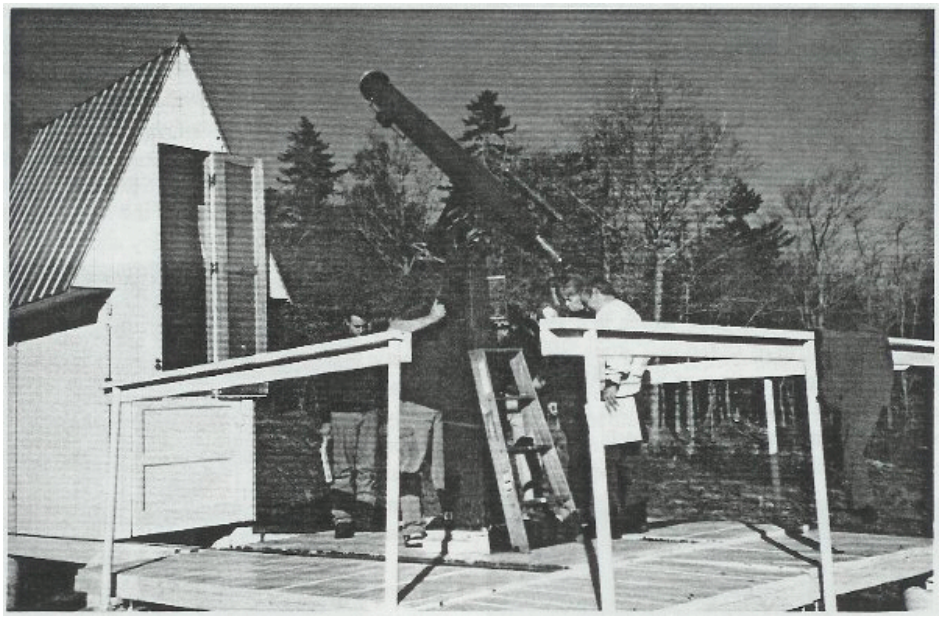
Wave Front
The Star Watch Bulletin Board
Edited by Joe Zuraw

How To Use The Gaertner Refractor – Part 1



One of the benefits of belonging to Star Watch is the privilege of owning a set of keys to the club house and Gaertner telescope. With this privilege comes the responsibility of using the telescope correctly. Let's take a look at the Gaertner telescope.

The Arunah Hill 6 1/4 inch Gaertner refractor is a classic example of turn-of-the-century machining and casting. Build by the Gaertner Company of Chicago in 1912, it was designed to provide years of trouble-free service to an institution of higher learning. When the company received the order for this telescope, from Smith College in Northampton, MA, it discovered that it had neither the lens or the time to grind one. Rather than be embarrassed by having to back out of the order, the Gaertner Company subcontracted the company of the famous optician Charles Brashear to create the lens. Thus the telescope became one of only two Brashear/Gaertner telescopes ever made.

The Gaertner telescope was donated to Arunah Hill in September of 1993. A major effort was launched to restore and provide a housing for the priceless refractor. It was decided that only trained members of Arunah Hill would be allowed access to the instrument and so the Star Watch was born.

The Telescope Housing

The rollaway building is a pioneering effort by Arunah Hill to provide the finest possible observing conditions for the telescope.

It is a proven fact that for two identical telescopes, with one in an observatory building and the other in an open area, the telescopes in the open will always perform better. Buildings, even ones with roll-off roofs, are notorious for creating thermal disturbances due to their warmer temperature when compared to ambient conditions. To compound this problem, any flow of air over the building will create vortices and waves through which the telescope must look. It is no wonder that amateur astronomers in an open field enjoy better seeing than their counterparts in a building. But a large, permanent telescope requires a solid housing to help it survive the harsh weather conditions that prevail on a mountain top such as Arunah Hill

The rollaway building which houses the Gaertner is the best and most cost-effective solution. The most distinctive characteristic of the observatory building is that the entire housing is raised approximately three and a half feet off the ground. This provides three important advantages. First, it allows air to move freely under the structure, allowing the minimal foundation to quickly cool to ambient air temperatures. Secondly, this open framework does little to impede the flow of air and its related disturbances. Third, and most importantly perhaps, it raises the telescope above the winter snow that would otherwise render it unusable.

The telescope itself is anchored to a two foot diameter column that is sunk down into bed rock. This column is isolated from the rest of the building to minimize vibration. Efforts were made to keep the size of the rollaway building as small as possible so as to allow one person to move it. Rather than make a building that could cover the entire 16 foot by 12 foot platform, the structure was build as four hinged sections that fold out of the snow and weather and hook to the rollaway to further anchor it in high wind conditions.

The greatest virtue of the design is of course the fact that the building can be rolled away on a 24 foot long track, effectively removing it from the air flowing around the telescope. The building rides on four 6 inch diameter urethane shod wheels that fit into a 1.5 inch groove in the track which rests on trestles to the north of the telescope. By moving the building north, it opens the complete sky to the south, down to about -40 degrees, well below Sagittarius and down into Corona Australis. To the north, the building is distant enough to allow an unobstructed view of Polaris.

To minimize the thermal signature of the observatory structure, four things were done. The first, as mentioned earlier, was to minimize the extent of the foundation while still maintaining a sturdy long-lasting base. This was accomplished by sinking 20 concrete columns into the ground down to bed rock. This allowed a considerable reduction in the amount of concrete needed for the project and maximized the surface area available for rapid cooling. Rather than use large amounts of masonry in the walls, the structure was build largely of wood, thereby reducing the thermal mass. All the exposed surfaces were painted white to cut down on solar gain. A grassy meadow is maintained around the area.

To protect the Gaertner telescope from wind, four chains are anchored to the framework of the building and attached to concrete columns when the telescope is not in use. Under extremely windy conditions, the Gaertner refractor should not be used. One of the greatest fears is that the rollaway building could be blown off its track. Never end a observing session without securing the building if there is any chance of inclement weather. Before you leave the mountain, double check to make sure that the chains are secure and tight!

(To Be Continued)