

Astronomical Adventures

An Occasional Series on Building, Outfitting and Operating a Remote Observatory

By Manny Leinz

Episode 1 of this series detailed my dream of building an astronomical observatory far from city lights, including establishing the site (outside of Mariposa, Ca.) and arranging construction (with Scott Horstman—www.backyardobservatories.com). We were on the threshold of starting the build when fire threatened not only our plans, but the whole town of Mariposa including our vacation home. You can read Episode 1 in the March edition of Prime Focus (Volume 130, Issue 03).

Episode 2 – Fire to First Light

The Fire and the Eclipse

The plan was for our roll-off roof observatory to be built in late July, 2017 to take advantage of the BYO crew already being in California for other builds. Then on Sunday, July 16, 2017 a spark from an unknown “firearm-related incident” started a grass fire near Lake McClure, 20 miles North of our home. Although it was initially of little concern, by Thursday morning the fire had consumed over 70,000 acres, 58 homes had been destroyed, and the town of Mariposa was under mandatory evacuation orders. Our home, which is outside of the town, was in a contingency evacuation area. There were some very tense days, but by the following weekend the worst of the danger had passed. However by then we’d already decided to delay construction.

For us, as for many other astronomy enthusiasts, the month of August 2017 had only one priority: the Great American Solar Eclipse. We had already made plans to travel to Oregon with family and friends; Scott Horstman and his team were eclipse chasing as well. We had missed the construction window; it would be November before Scott and his team would be back in California.

Finally, The Build!

The big day finally arrived on November 13th. Scott and crew arrived right on time and we discussed the final details of construction. The observatory was to be oriented with the long side of its 8x15 foot

dimension running along a north-south line. We decided to have the roof roll off to the East, in the “wide” direction, toward our home and away from the street (making the structure less obvious as an observatory to potential ne’er-do-wells). We intend to later disguise the roof support structure as a pergola and fashion a deck in front of the observatory door. Therefore aesthetically it made the most sense to have the deck face the house.

I long ago made the decision that the observatory would ultimately have two piers, each of which would have AC power, as well as one inch flex conduit for control cables to facilitate telescope operation. The latter was not within Scott’s work scope so I quickly ran to the hardware store to pick up materials and we got the conduit installed as the build progressed.

By the end of Day One the footings were poured, the floor deck was installed and the walls were up! Day Two saw completion of the roof including support structure and rails. On Day Three the pier footings were poured, the electrical wiring, siding and roof motor were installed, and the door was hung. The observatory build was now complete, save for installation of the north pier (also provided by BYO), which was completed in a couple of hours on the morning of Day Four. (The South pier will be installed at a later date, to allow simultaneous optical observing and astrophotography without reconfiguring telescopes.)



Nightfall, Build Day 3. The Observatory is Nearly Complete!

First Light

Although the observatory structure was now in place, a little more work was required before the telescope could be installed. Specifically, an adapter is required to interface between the observatory pier and the telescope mount (a Celestron CGEM-1100). Adapters are commercially available, but they are rather expensive, and generally not kept in stock.



Pier Footings and Pier (North at Top)



North Pier Installed, With Custom CGEM Adapter

I decided to fabricate an adapter instead, and made a CAD drawing based on some rough sketches that I found online. I bought a surplus aluminum disk at a scrap yard and a friend who lives locally machined it to specifications. Unfortunately by the time the adapter was complete, it was time to head back home to Southern California.

On January 18, 2018 we were back at our mountain home, and after a last run to the hardware store to obtain the proper length bolts, I installed the telescope mount to the adapter/pier. The sky was perpetually overcast for two days (naturally), but on January 20th the aperture cover finally came off the telescope for the first time.

I polar aligned the scope and took some initial peeks at the Moon and the Orion Nebula. Temperatures were in the 30's and dew quickly covered every metal surface, so it was a short night. I parked the scope, closed the roof and was heading to the house

in less than five minutes—one of the advantages of an observatory! Despite the limited winter viewing opportunities, I was happy; my long held dream of having an astronomical observatory was finally a reality!



My 11 Inch Celestron Scope Ensnconced in Its New Home

Although the engineer/handyman part of me sometimes wonders if I should have built the observatory myself, my pragmatic side knows that having a professional build it was the right move.

There would be lots more work needed to make the observatory an efficiently operating facility, and even more before the goal of full remote operation is achieved.



"First Light" Image (Cell Phone Photo Using Eyepiece Projection)

Those initial steps in outfitting the observatory will be a topic for the next installment of this series.

Next Episode: From Usable to Functional

P. S. You can see a time-lapse video of the observatory build process—three days in 60 seconds—here: <https://youtu.be/UjKLMNPRSJc>