

## Mt. Hamilton Optics Cleaning Trip 6/5/14

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### Shane 120" Telescope's M3

The first mirror cleaned was the 120" telescope's Coude M3, which was in its stand on the dome floor. We measured the reflectivity before cleaning and found it was 92% with the red filter, compared to the reference mirror, and 87% with the blue filter. Dave washed the mirror by spraying de-ionized water on it and dabbing it off, followed by an Orvus/acetone/H<sub>2</sub>O mix, more water, then ethanol. The reflectivity after cleaning didn't show much change (92% red and 87% blue) however it appeared much better visually.



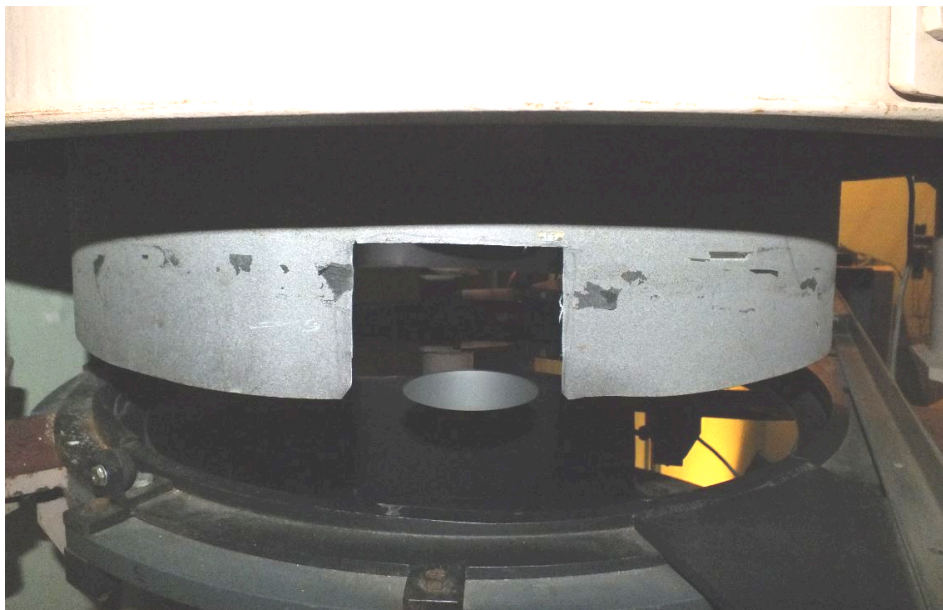
### **Coude Auxiliary Telescope Folding Mirror (CAT #2)**

This mirror is the second in the Auxiliary Telescope set and faces downward at a 45 degree angle so doesn't get as dirty as the upward-facing primary. Dave tried cleaning a small area and it had no effect so he didn't clean the rest. We measured 84% relative reflectivity with both the red and blue filters.



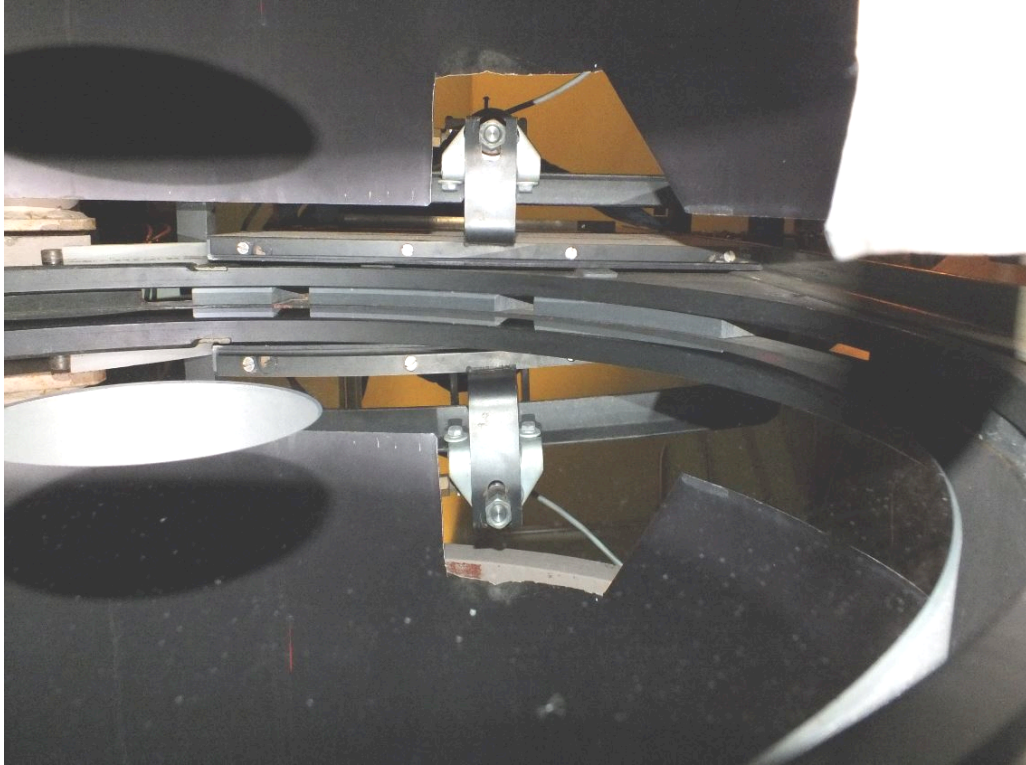
### **CAT Primary (CAT #3)**

The third mirror in the Auxiliary Telescope set, the primary is known to get dirty quickly due to being upward-facing, and this trip was no exception. It was blown off with canned air then cleaned with water, followed by Orvus/acetone/H<sub>2</sub>O then ethanol. The small access hole doesn't allow room for our bulky reflectometer to be used without excessive risk to the mirror, so no measurements were made.

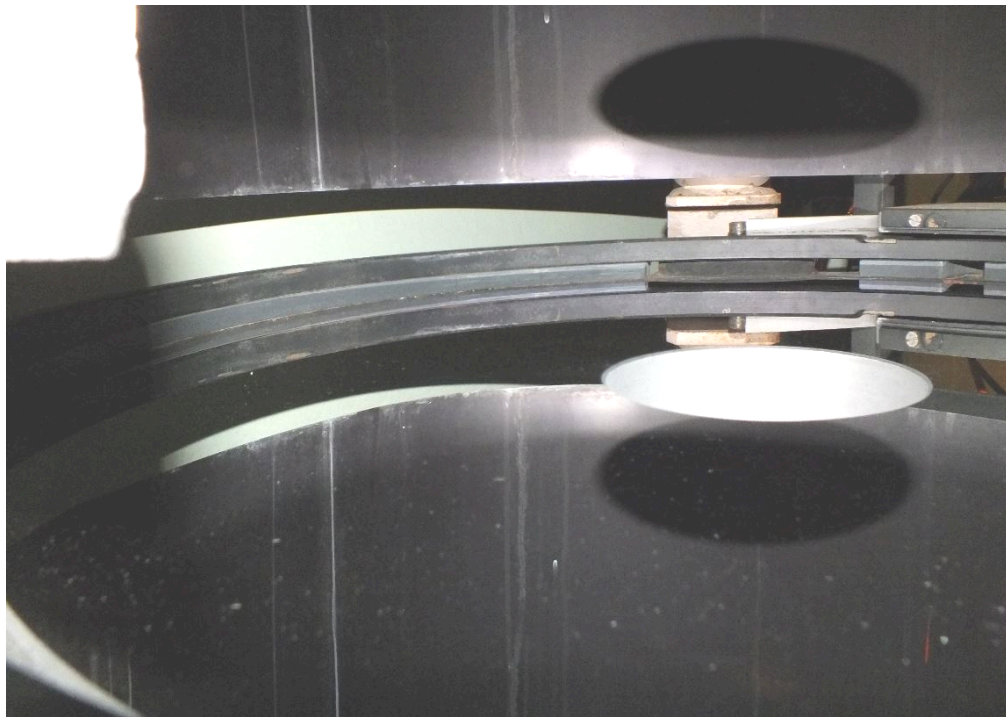


**CAT Primary Mirror After Cleaning (1)**





**CAT Primary Mirror After Cleaning (2)**



**CAT Primary Mirror After Cleaning (3)**

### **CAT Siderostat (CAT #1)**

The first Coude Auxiliary Telescope mirror is housed in a shed-like structure outside the 120" dome. It has a robust coated surface so is cleanable. We measured 84% reflectivity in the red before cleaning and 86% in the blue. After cleaning it was measured to be 87% red and 90% blue. It was cleaned by blowing it off with canned air, then using sprayed-on de-ionized water followed by Orvus/H<sub>2</sub>O (without acetone), more water, then ethanol.

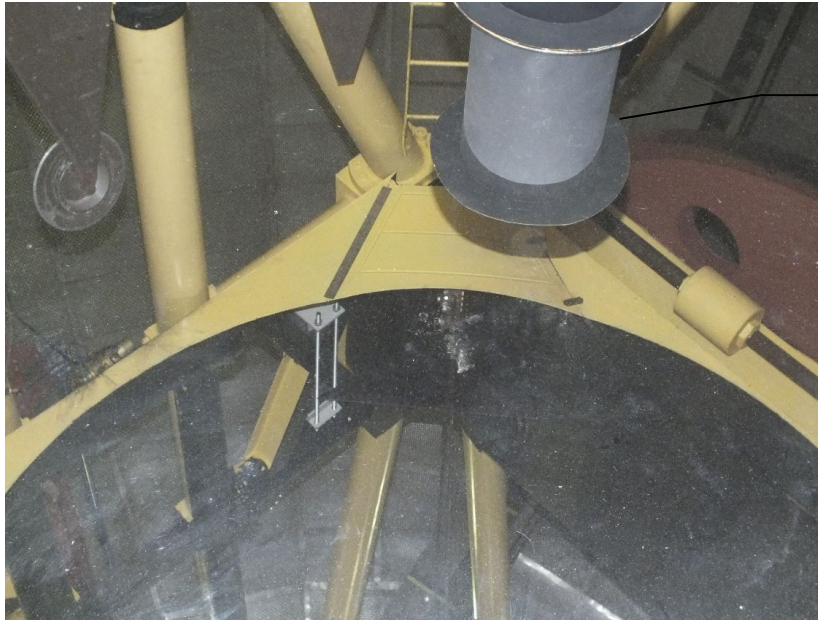






## 120" Shane Telescope Primary

The 120" primary was a little dusty but not too bad. It could probably stand to be CO2-cleaned. There were no notable oil spots since we last washed it in February.



Top Hat in center of mirror

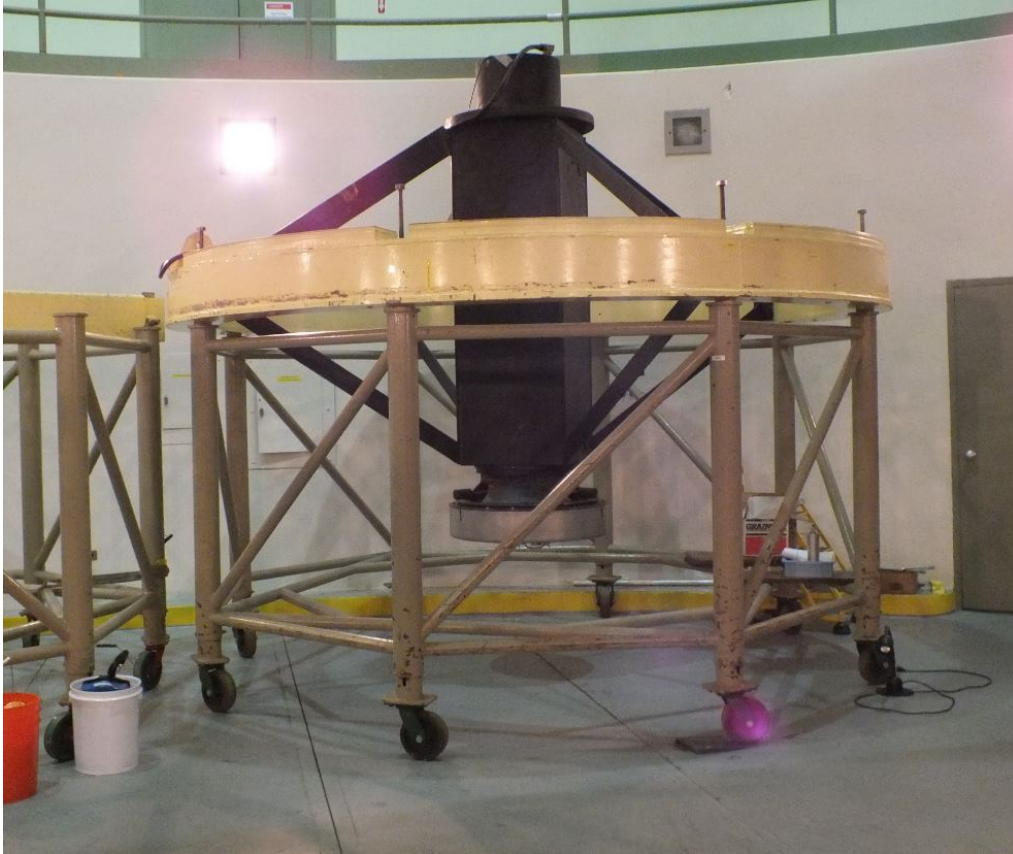


Top Hat in center of mirror



## Coude M2

This secondary mirror for the Shane 120" telescope was on the dome floor. It is known to have a fragile coating that is not safely cleanable. The coating is also pitted. We measured 90% reflectivity with both the red and blue filters.



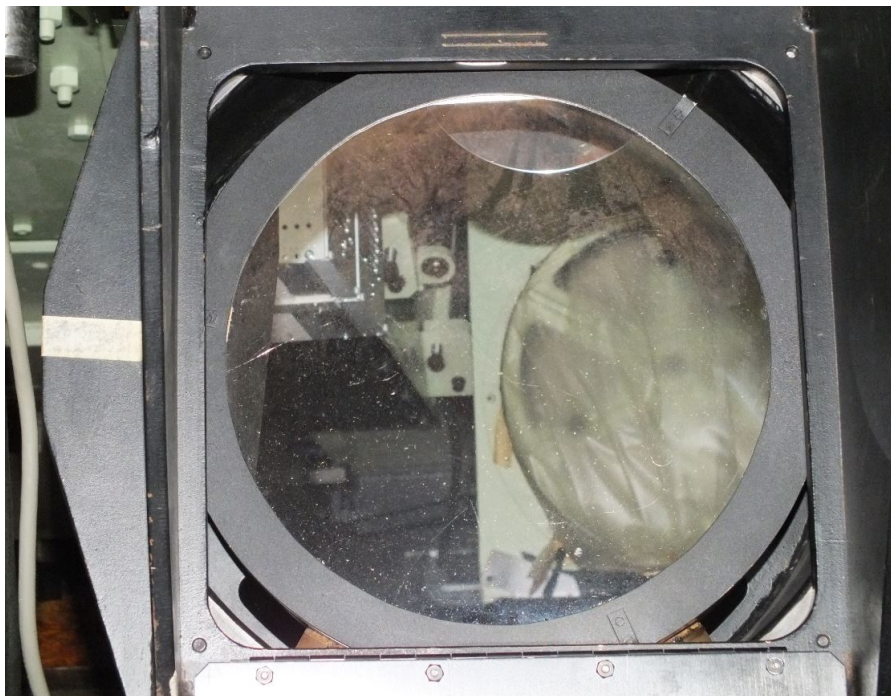


**Coude Secondary Mirror Pitting Example**



## Hamilton Collimator

This mirror is behind a magnetically-closed cover. It has a known bad surface that has been seen to return to its poor condition even after re-coating. Note the brownish discoloration at the top of the mirror in the photo. The coating is also too fragile to clean.



### 36" Refractor

The 36" refractor's objective lens had been lowered to a reachable height and the lens access holes had been opened before our arrival. Dave inspected them and blew the dust off the outermost surface with canned air.

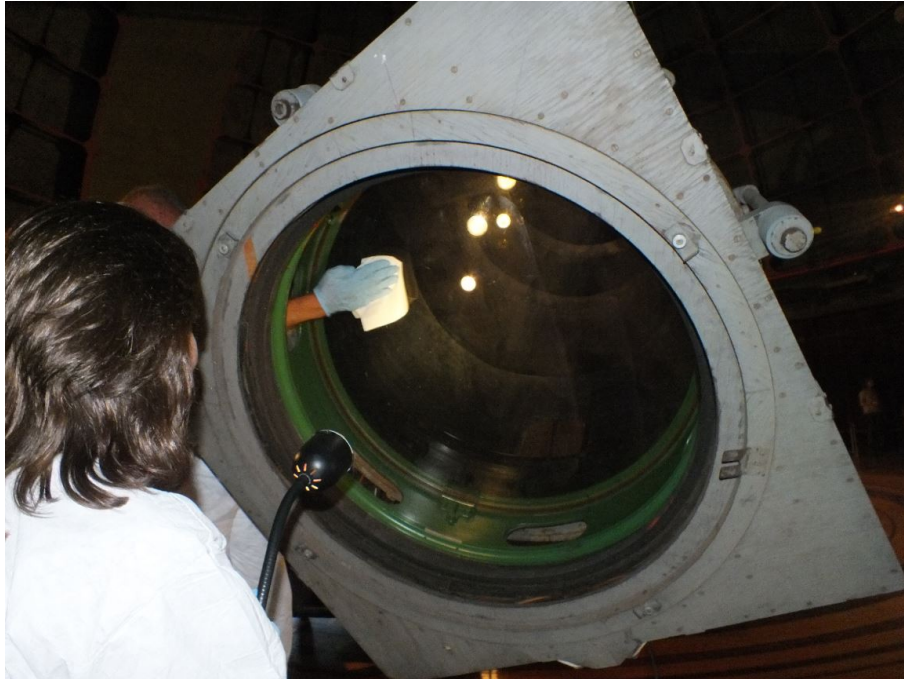




Then he sprayed on de-ionized water and dabbed the dust off. Following that he used Orvus/H2O mix (without acetone) followed by a dry wipe to get rid of soap smears. The back surface was known to have started crizzling, but there was nothing to be done about it but observe its progression.



He blew the dust off the inner surface and cleaned that with Orvus/H2O as well, reaching through the limited access holes.



**Crizzling of the 36" Refractor**



After the access holes were all closed Donny lowered the other end of the telescope to near the floor so that the eyepiece and spotting scope could be cleaned. Ellie removed the eyepiece and brought it to a desk at the base of the telescope's mount where Dave cleaned it by first putting Orvus/H<sub>2</sub>O on a tissue and the following up with a dry tissue.



## 40" Nickel Telescope

Dave cleaned and eyepiece or two and blew off the dusty primary. The water stain on the primary was not worse than it had been. The secondary was not examined closely on this trip but is known to have a film on its coated surface.



40" Primary Mirror



## KAIT – Katzmann Automatic Imaging Telescope

This telescope is in a separate dome that is off the main highway a little past the 120" telescope. It is operated remotely, from Berkeley if I'm not mistaken. Its primary mirror gets dirty relatively quickly and has a permanent stain from a water rivulet, located below a strut. Before cleaning we measured the reflectivity to be 90% with the red filter and 82% with the blue. After cleaning with water and Orvus/H<sub>2</sub>O it improved to 98% in the red (relative to the reference) and 85% in the blue.



The secondary has spots that are permanent stains. Dave cleaned the surface as best he could by dabbing, given that struts crossing the mirror made a wiping motion virtually impossible.

