SP 713 Summary January 23, 2010

First, we look for Jupiter: Barker's windows (pointed more south than west); the Great Court; the front steps.

Top of the Front Steps of MIT at Massachusetts Avenue with a Telescope (8" Schmidt-Cassegrain Celestron)
Setting up the mount, locking the tube into the mount, trying to view through the misaligned spotting tube, and repositioning as Jupiter lowers. Aiming at a near light, to gauge the misalignment relation; blocking and opening the tube shows light and the way to focus (photo 1). Through the tree branches, the disc of Jupiter and one small moon (photo 2). Earth's moon above the columns (photo 3), and more challenges of sighting. Lots of stars. The moon, its darks and lights; change in the illumination of features (photo 4).
"It is like he was writing about it! Yeah! He was writing about how the light reflects, all of a sudden you will see the light! Coming over one of those things, it really happened!"
Once the moon is found, the telescope position has to be continually adjusted: "you can begin to see how he was fascinated with motion; think about how it's moving"

Della prospettiva, an artists' manuscript, 1450, mirrors and looking (photo 6).

Motions A long ramp and balls (photo 7); will the balls track on a straight line? Marking a dot, or several dots, on the side of a white ball. As it rolls on the incline, the blur of the black dot has a line, not a warble. Making a shorter ramp; a spool of tape rolling down, stays on a line; blurs. "it is getting blurrier!..I don't have a timer. But I can watch! before time keeper were invented!"
Last time with the curved ramp, we "were measuring distance but if we were measuring time we would have come up with something that challenged the idea of the time." An idea "to repeat this but to listen! And then when it she heard the top and bottom we would measure the time and we would see if the time was similar or not."

Pendulums (photos 8,9)***:*** Galileo put two together, to compare.
"the [pendulum] altitude there it will take 1 minute; if the altitude is smaller it will take the same amount of time. when the altitude is bigger it is hard to keep track; it seems faster."

Observing "I was walking to class; I looked up; the sky was blue and clear and for the first time, instead of thinking of the sky as being empty, I thought of it as blocking my view… I have never ever thought of the world that way!"

Lenses "a shadow only occurs where there is absence of light so when she had that there were parts where no light was going through this lens and that was really weird… I wonder if we take the lens and look at the shadows and see if the shadows are the same …"
"I was trying to draw why the convex lens magnify things,… so I figure telescope was pulling these lines here toward here so that is what I was trying to draw"

January 25, 2010 Summary

Discussion

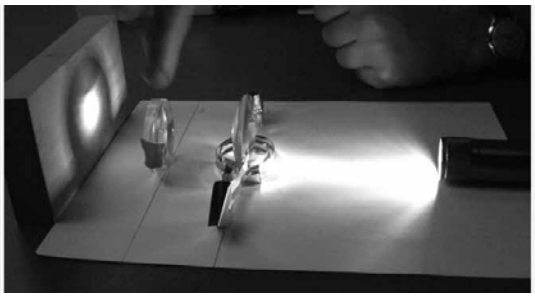
"I want to go home to see the stars!... is there a passage between Galileo and the student about telescope?"
"We are taught: observe something and immediately try to explain it... You are encouraging .. spend time just observing, not trying to interpret exactly .. instead being the observer, watching what's going on, recording without passing judgment .. followed by reflection, as opposed to doing observation and reflection at exactly the same time. .. when you do go ahead, you have a huge body of observation .." Drawing a pear: I was drawing what I thought was a pear, but I was not drawing the pear in front of me. I learned from that. Drawing is a way of observing.
"In high school lab reports, I wondered, what is the difference between results and discussion? Results: it is doing this. Discussion: what I think it is doing."
"As a professional, you will look at what no one can explain. What do you do in that case?"
"Galileo was ridiculed, he was on trial, he didn't care what other people thought."
"He was motivated by knowledge, by knowing more."
"At MIT a lot of that passion gets beaten out of people. How can we take great scientists, whose names are written on the sides of our buildings, Galileo, their personal inspiration and passion and still bring it here [fire hose]?"

Rolling experiments with the curved ramp

Runs with two different balls, one heavier. Devising a balance with string to compare the weights of the two balls.

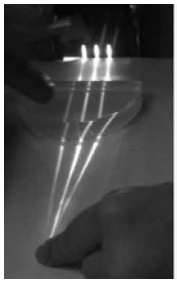
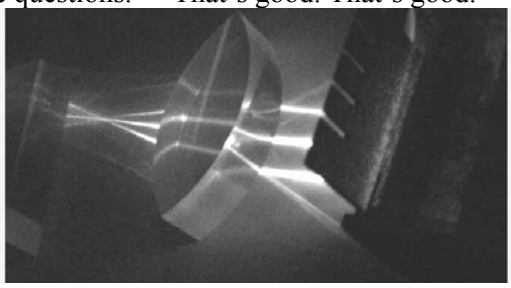
Lenses and images

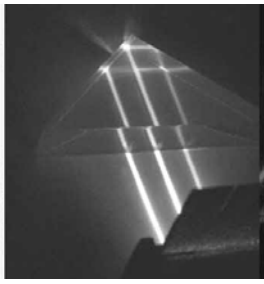
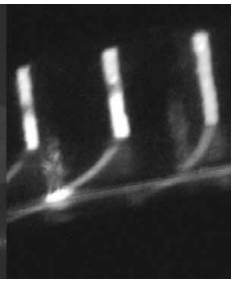
Looking at a notebook record of experiments (photo 1). Recreating the notebook experiment with two lenses, flashlight and backdrop, showing multiple images of the flashlight(photo 2). Studying the images. Trying the observation again with just one lens (photo 3). Moving the back drop back and forth, changes what is on it: a circle of light, a sharp image of light; more blurry… Moving the flashlight right and left, while watching the images; do the images move with the flashlight direction, or opposite? Putting a piece of tape on part of the flashlight (photo3), to see how image shows that altered form. Consider color; shining a dim laser pointer with a shape pattern. Reflections and the backdrop are involved in images. Looking through the lens in one direction show images different from looking through it the other way. What about a lens that is flat on one side?
"I have trouble letting go of it [interpretation]; I think letting go of it is best.. Galileo said: 'ok this doesn't work. I am going to go on.' I am having a lot of trouble personally doing that. More respect for him."
"All the information from this space crams into one tube and the tubes sort themselves out."


Three-line light source (one line in red)

"what is going on inside[lens] was not what I thought" "really interesting to look at …do you think it is the angle or the material" "when light comes through it bends in the same direction? this [lens] surface and this surface are opposite … if you look at it from the source's point of view."" like a mirror experiment .. I guess that it goes towards me—not" "this is weird, from eye level an exact reflection of the slat."
"At first I was really happy with this [light], I felt it was explaining everything I don't understand. But now I just have a lot more questions." "That's good. That's good."

EC.050 Recreate Experiments from History: Inform the Future from the Past: Galileo
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