

SP713 January 13, 2010 Summary

Harvard Collection of Historical Scientific Instruments

-“Ben Franklin went to Europe to buy instruments with Harvard’s money, as much as he could spend!”- “I wouldn’t mind!”

Looking at Galileo’s geometrical compass (photo 1); has an arc with angles (not on ours); the arc has to be removed to do calculations. Drawing the sighting instruments (photo 2); examining the pendulum clocks (photo 3); elegant orrery (photo 4).

Looking into the eyepiece of a telescope inside the showpiece (photo 5), there is something in the view that looks like a tile with grout; trying to sight along and find what the telescope is aimed at (photo 6), even going outside.

-“we built a telescope yesterday..in the library!”- “It magnifies only 30 percent”



An electromagnetic tuning fork (photo 7)

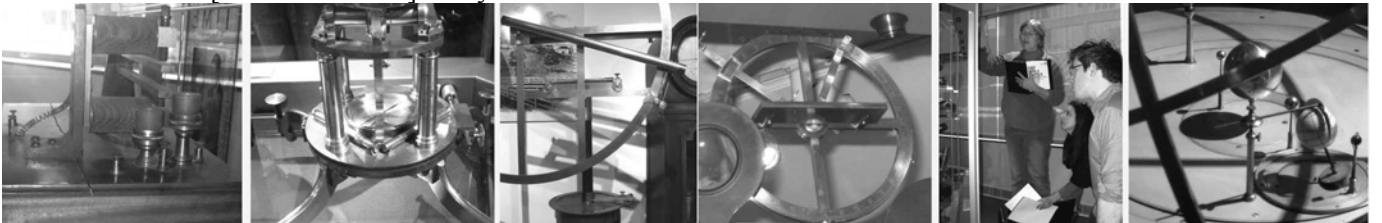
-“I am curious how that [coil] pulls the tuning fork up.. what they were machining [then]? What was the quality of lathes? What do you use to build this piece? I am not sure how they make those? I really appreciate the technical quality of the work.”

A magnetic compass and levels at the base of an instrument (photo 8) -“the tubes [bubble level] at the sides of the compass, so they can make sure it is put in flat” *Another sighting instrument (photo 9)* has a level and -“right angle, this is another telescope. So you locate the star in order to know their location of their ship and also the time... which of the stars they are looking for ...to tell the time ...

“An apparatus to measure angle of incidence made by Benjamin Martin in England; Benjamin Franklin bought it” (photo 10) “I would think you would be putting something on that plate..” -“What if you put an object on; see where the light?”

-“We were trying to measure all kinds of things! We either didn’t have enough hands or enough instruments!”

Orrery (photo 11) The earth is oversized. “When did they discover that Mars had moons? None of these instruments have [moons for Mars]. They didn’t know?”



Houghton Library

Nicolai Copernici *De revolutionibus orbium caelestium* 1543. Houghton fGC5 C7906 543d

Niccolo Tartaglia, *La noua scientia* ...Venice 1550[later?] Houghton *IC5 T1788 B555n

Daniel Barbaro, *La pratica della perspettiva* Venice 1569. Houghton Typ 525.69.195 F

Johannes Kepler, *Astronomia nova .. Tychoonis Brahe...* Prague 1609. Houghton *85-775F

Galileo Galilei, *Siderevs, nuncijs* Venice 1610 Houghton *IC6.G1333.610sa Frankfurt. 1610. Houghton *IC6.G1333.610sb

Johannes Kepler, *Dioptrice*, 1611. Houghton *GC6 K4436 611d (A)

Galileo Galilei, *Istoria e dimostrazioni intorno alle macchie solari* (sunspots) Rome, 1613. Houghton *IC6.G1333.613i

Christoph Scheiner, *Rosa Vrsina*, Bracciani, 1630. : Houghton Astr 6206.30*

Galileo Galilei, *Dialogo dei massimi sistemi*, (Dialogue) Florence, 1632 Houghton *IC6 G1333 632d (B)

[Inscribed: All’ Ill.mo et Ecc.mo Sig:r Sebastiano Veniero Pro. l’Autore.]

Galileo Galilei, *Discorsi .. à due nuoue scienze*, (Two New Sciences) Leyden 1638. Houghton *90W-89

Johannes Hevelius, *Machina coelestis*, Gedani (Poland), 1673-1679. Houghton Typ 620 73 451 F

[also requested- but not provided?]

Lorenzo Sirigatti, *La pratica di prospettiva* Venice 1569. Houghton Typ 525.69.195 F

Salomon de Caus, *La perspective : avec la raison des ombres et miroirs* London 1612 Houghton Typ 620.19.264 F

Johannes Hevelius, *Selenographia, Lunae descriptio*. Gedani (Poland) 1647 Houghton f *GC6.H4902.647s [at Pusey exhibit]

-“We can touch the book!”

In *Tartaglia’s book*, the canon with an instrument like Galileo’s attached to the opening. Canon drawings where a line comes out showing where the cannonball went: the path of the line –is it tipped or straight? “Visual sight line”

Galileo’s sunspot drawings: following the labeled sunspots from page to page, day to day in his drawings shows how the sunspots went in his observations: “the image positions move; it goes down, and then to the side.”

Another sunspot is similar. If the sunspot is in the center of the sun, it moves over more to the right by the next drawing. If it is near the edges of the sun, it moves less from one day to the next. The drawings of the sunspots show that the sunspots are going with the sun; the sun is a revolving sphere!

Barbaro table drawing: the experiment that we did; we had our lines like this; his perspective drawings are like ours. “Why would it do that?” [a drawing]

Copernicus – he put his diagram (the sun at the center of planets) at the beginning of the book!

Galileo’s Dialogue inscription: Galileo wrote it – in his handwriting! with his hands.

Galileo is only one; there were ordinary people, crafts people, who did a lot of efforts. The whole society is part of the science.

Kepler’s Dioptrics diagrams like with our lenses

Galileo’s Two New Sciences Drawing shows the bone of a dog and the bone of a horse: scale; “scaling is not necessarily proportional”. “A dog can carry a dog on its back; a horse cannot carry a horse on its back.”

Kepler’s New Astronomy – the sun described like a magnet; like Gilbert’s magnet.

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