Music in Galileo's Life/Work

Adrian B. Lucy

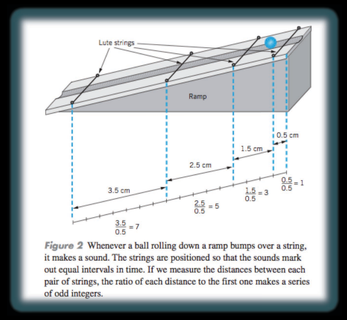
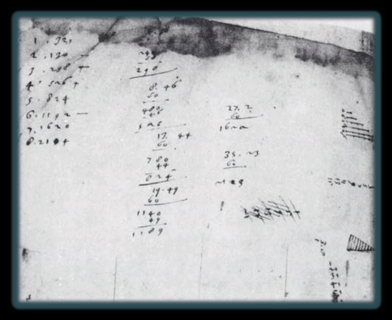


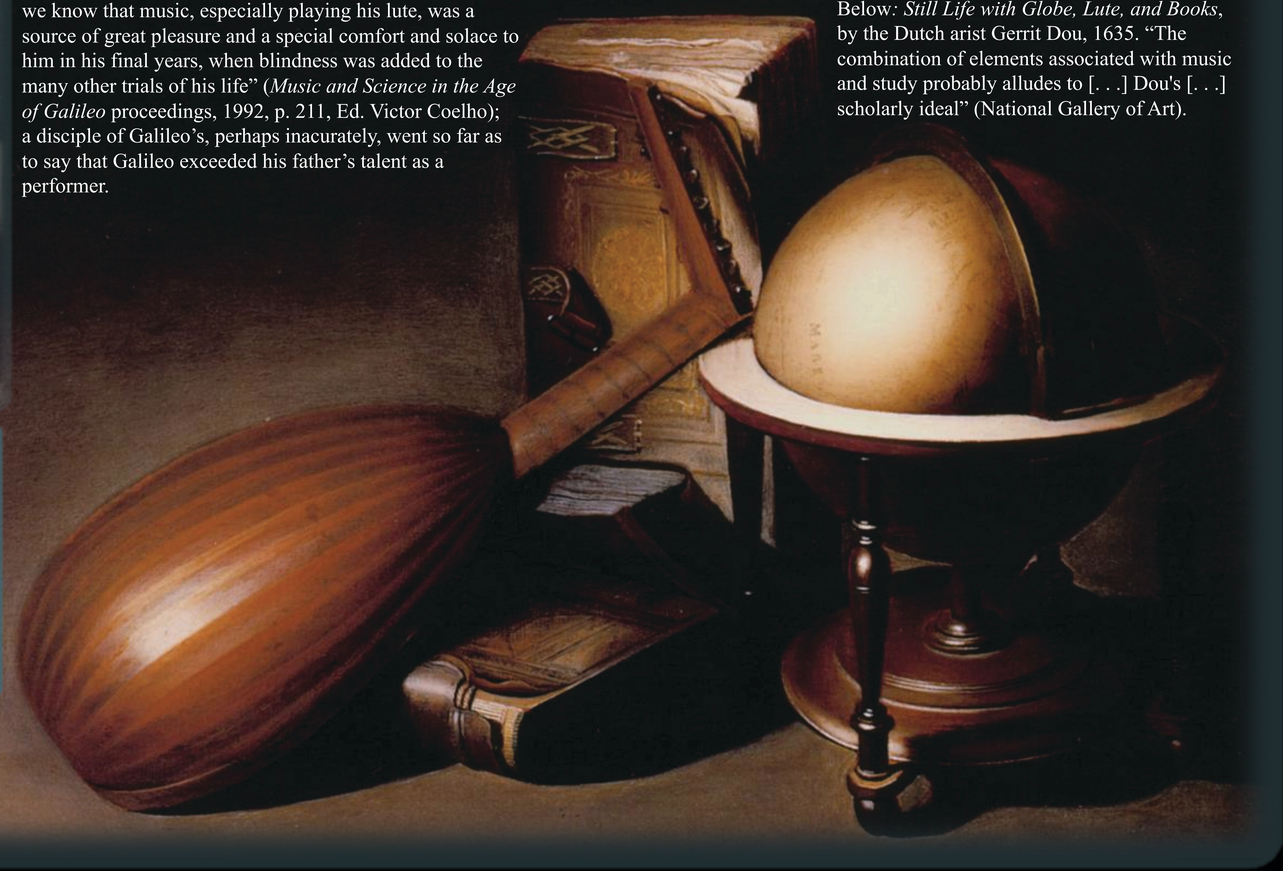
Figure 2 Whenever a ball rolling down a ramp bumps over a string, it makes a sound. The strings are positioned so that the sounds mark out equal intervals in time. If we measure the distances between each pair of strings, the ratio of each distance to the first one makes a series of odd integers.



Above: *"He [Galileo] tied gut frets around his grooved plane, as frets are tied on the neck of a lute, so that they are snug but can be moved as needed; to set their initial positions it sufficed to sing a march tune, release the ball on one beat, and mark its approximate positions at the following beats. With the frets roughly in place, the ball made a sound on striking the plane after passing over each one; they were then adjusted until each of those sounds was judged to be exactly on a beat. It remained only to measure their distances from the point at which the resting ball touched the plane."* –S. Drake (1978, p. 89)'s reconstruction of Galileo's data collection (above right, with a schematic diagram above-left from E. Cavicchi, 1997), which correctly ascertained that successive distances traveled by a body falling along an inclined plane are odd number multiples of the first distance traveled. I suggest we recreate this experimental setup for exhibit attendees to try out.

Left: Perhaps the youngest extant painting of Galileo; since much of music's influence on Galileo occurred when he was young (his father died when Galileo was in his late twenties), I suggest the use of this painting in the exhibit. The subject's identification as Galileo is tentative (Molaro 2012, Astron. Nachr., 333, 2, 186), but this may be a chance to collaborate with the art history department on communicating the historical method of portrait identification.

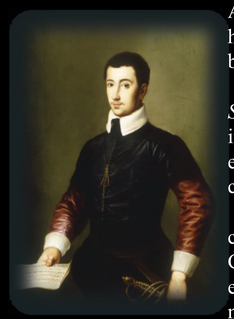
According to R. Lundberg, "from Galileo's many letters we know that music, especially playing his lute, was a source of great pleasure and a special comfort and solace to him in his final years, when blindness was added to the many other trials of his life" (*Music and Science in the Age of Galileo* proceedings, 1992, p. 211, Ed. Victor Coelho); a disciple of Galileo's, perhaps inacurately, went so far as to say that Galileo exceeded his father's talent as a performer.



Below: *Still Life with Globe, Lute, and Books*, by the Dutch arist Gerrit Dou, 1635. "The combination of elements associated with music and study probably alludes to [. . .] Dou's [. . .] scholarly ideal" (National Gallery of Art).

Right: A Renaissance era family of lutes, all constructed in Padua, largely during the time of Galileo's stay at Padua (Lundberg p. 224). Their relationship to each other follow Pythagorean harmonics; R. Lundberg has delved deep into the math and art of their construction, and I refer the reader to his work.

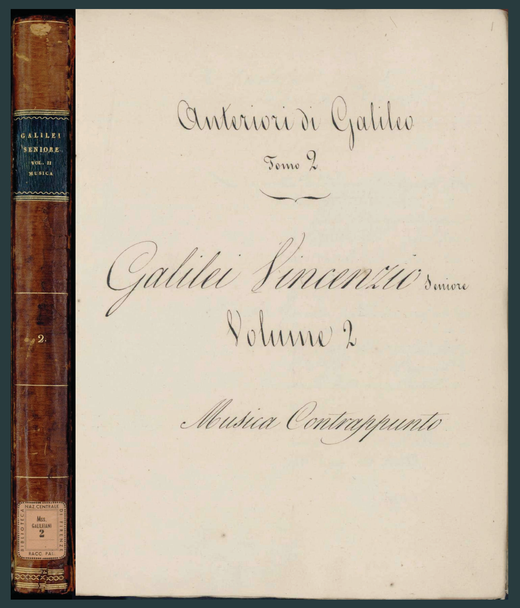
Right: Several of Vincenzo Galilei's compositions for lute are available to listen to online, and can be found as sheet music in both transcribed and original manuscript form. Larry Hammett, director of guitar studies at OU, regularly plays the lute, and I hope to enlist him and his students to have periodic small performances in the exhibit room.

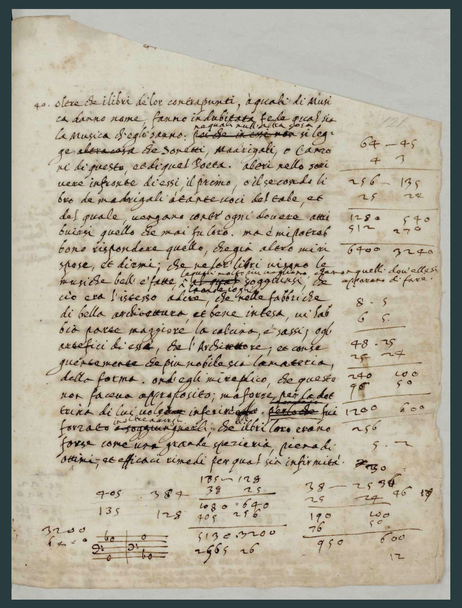


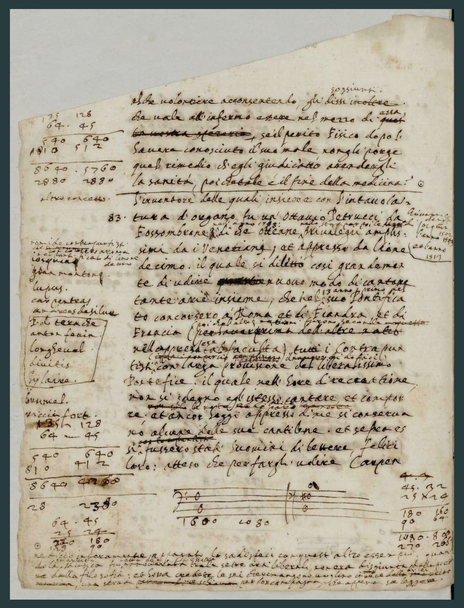
Left: Possibly a portrait of a young Vincenzo Galilei (ca. 1520 – 2 July 1591), Galileo's father, by Alessandro Allori (though I cannot find a reliable reference for this identification). Vincenzo was a prominent and historically important lutenist, composer, and music theorist, and Michelagnolo, another of his sons, also became a lutenist and composer.

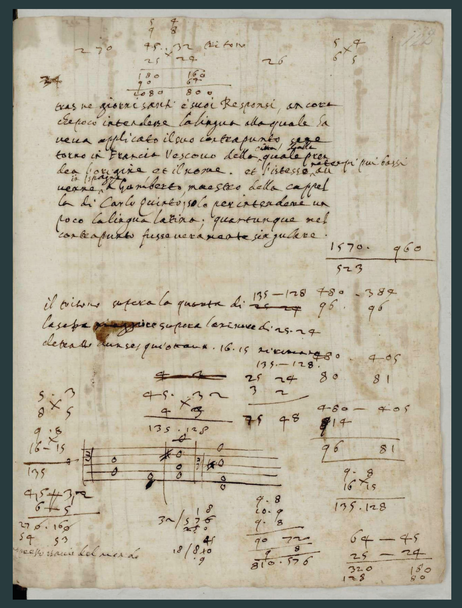
Various authors, including S. Drake and C. Palisca (e.g., see V. Coelho's 1992 conference on *Music and Science in the Age of Galileo*) have argued that Vincenzo's work balanced theory and practice in a way that influenced Galileo's empiricism. Vincenzo, arguably a pioneering scientist himself, conducted acoustical experiments on strings, which Galileo later continued, and had a career-defining, bitter-turning dispute with a colleague (his former mentor), Gioseffo Zarlino. In at least some ways, the son's life was an echo of his father's.

Galileo kept many of his father's manuscripts, which were arranged and bound by Vincenzio Antinori and called the Anteriori. These are all digitized online, under Mss. Gal. 1-8 (+9?), by the Biblioteca Nazionale Centrale di Firenze (*Galileo Makes a Book*, 2011, p. 54, Ed. Bredekamp). Among these is *Fronimo*, a Galileo-esque "dialogue between a teacher (Fronimo) and his pupil (Eumatio) [. . .] in which be contained the true, and necessary rules for the intabulation of the Music for the Lute" (for more information on all the Vincenzo manuscripts, I direct the reader to R. Goldberg's recent dissertation, available upon request).









Left: I had initially hoped to find what Lundberg calls "a manuscript tutor especially written for Galileo by Vincenzo, which contains marginalia by Galileo consisting of mathematical analyses of the music" (Lundberg p. 211, referencing a personal comm. with S. Drake). Both Lundberg and Drake are deceased, and the closest I got were these pages from Ms. Gal. 2.

I asked R. Goldberg about these notes; he responded that these were written by Vincenzo himself: "in this case he is complaining about composers who will not acknowledge and fix their own errors. Galilei wrote out the equations in the margin to show that some musical intervals are not the size that others say they are" (personal comm.). There is as yet no English translation of these pages, but there is a transcription. I suggest we include these pages in the exhibit, ideally with a translation, to demonstrate Vincenzo's mathematical bent and the his influence on Galileo's attitude to his philosophical colleagues.

The tutor I had hoped to find does not appear to be in Gal. 1-9 of the Biblioteca Nazionale collection, which encompasses all commonly known Vincenzo manuscripts; if there are others, neither P. Canguilhem nor R. Goldberg are aware of them, though the latter has hope that the tutorial may somewhere exist (personal comm.). I have an email out to Victor Coelho, who organized the conference at which Lundberg mentioned the tutor, and I still retain some hope of finding this elusive document.