FRANCESCO PAOLO DE CEGLIA

ADDITIO ILLA NON VIDETUR EDENDA: GIUSEPPE BIANCANI, READER OF GALILEO IN AN UNEDITED CENSORED TEXT

ARISTOTELIS LOCA MATHEMATICA: ON THE TRACKS OF CENSORSHIP

> I love and admire Galileo, not only for his singular learning and inventions, but also for the lasting friendship I struck up with him in Padua, where I was overcome by his courtesy and affection, that bound me to him. No one, I believe, has spread and defended his findings, both in public and in private, more than I have.[1]

The author of this somewhat less than spontaneous display of affection is Giuseppe Biancani, a Jesuit mathematician who was also proficient in astronomy, mechanics, acoustics, and geodesy and who, though born in Bologna, adopted as his own the city of Parma.[2] A disciple of Clavius in Rome, and the teacher of Bettini, Cabeo, and Riccioli in Parma, Biancani appears to have shared with Galileo a more complex relationship than the above expression of esteem might suggest. In fact, on at least two occasions Biancani assumed an attitude of outright ambivalence towards Galileo: first, in 1611, with respect to Galileo's claim concerning the height of the lunar mountains,[3] and, two years later, during the priority dispute over the discovery of sunspots.[4]

One aspect of their relations, however, is undisputed: what united the Jesuit mathematician and the "father of modern science" was their confidence in a quantitative study of nature. Such an attitude – not at all unusual among Jesuit circles – manifested itself in the tenor of Biancani's work. One of his theoretical essays makes such a commitment equally clear. In fact, Biancani was one of the protagonists of the *quaestio de certitudine mathematicarum*,[5] as the debate over the logical and epistemological status of the mathematical sciences was called, which was not limited to the Jesuit intellectual milieu. Biancani's contribution to the debate came in the form of *De mathematicarum natura dissertatio*, a small work published in 1615 together with his *Aristotelis loca mathematica*.[6]

As an experienced Jesuit, Biancani was deeply familiar with Aristotle and his interpreters, both ancient and modern. Yet, at times he preferred a subjective reading, so much so that he was faulted for his alleged arbitrariness. For example, in his *Dissertatio*, he appears to make the Stagirite pronounce the exact opposite of what the text actually says. A case in point is when Biancani argued that mathematical definitions are *essentiales* – real, not nominal – and that a

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declaration to the contrary is wrong. Unfortunately, Aristotle maintained the exact opposite![7] It is tempting to argue that Biancani was influenced by Platonism, which often informed those interested in the quantitative study of nature during the sixteenth and early seventeenth centuries. Yet, interestingly enough, Biancani did not espouse any specific Platonist point of view in the *Dissertatio*; rather, assuming the guise of an Aristotelian, he attempted to rework Aristotelianism from within.

What, then, was Biancani's aim in the *Dissertatio*? And what were the results he attained? In the tradition of Clavius,[8] Biancani attempted to construe mathematics in a logical structure peculiar to syllogistics – built upon dialectical figures such as the demonstration *a priori* or *a posteriori*, *quod* or *propter quid*. Mathematical demonstration and logical demonstration, however, do not converge and Biancani categorically maintained the superiority of the former since mathematics, unlike logic, conforms to the order of nature. For him here, and in mathematical demonstration more generally, essence precedes accidents and cause the effects.[9] Equally to the point, since for Biancani the superiority of a science is measured not only by its object and structure, but also by the kind of knowledge it supplies, mathematics – which guarantees both evidence and truth – may be considered queen of the sciences. As Biancani put it in the *Dissertatio*: "It absolutely follows that mathematics is superior to all other sciences, in the same way that truth is superior to opinions."[10]

If Biancani was audacious in his defense of pure mathematics, his theories were even more original and unorthodox when he sought to extend them to include mixed mathematics.[11] In truth, he wrote, they, too, make use of *demonstrationes potissimae*. Indeed, the Jesuit was fascinated by the potential offered by mechanics which, at the time, was undergoing a profound revolution:

> Why has the wedge so much strength? Because it is a double lever. From whence does the screw derive so much strength? From its composition of a wedge and a lever. What is actually more admirable than the fact that any weight, even the universe, can be raised by the strength of an ant? And then, as Aristotle says, overcoming nature itself, even against its will. How subtle is that which Archimedes and, recently, Commandino and Luca Valerio, have demonstrated regarding the center of gravity![12]

In early 1615 there appeared Biancani's *Aristotelis loca mathematica*, a compendium of that part of the Aristotelian corpus which was (or could be) treated mathematically. At the outset, Biancani offered an explanation for producing such a difficult exegesis, thereby articulating the contemporary state of investigation into *de rerum natura*: "I, too, began devoting myself to Aristotle's writings, so that the passages concerning mathematics that are scattered throughout his work, collected and explained by me, could be useful, above all, to those students of philosophy who, having renounced the ancient custom without a knowledge of mathematics, dedicate themselves to philosophy to the detriment to their studies."[13]

Intelligenti pauca. Such was Galileo's attitude. And the latter's irritation with those traditionalists who practiced, or advocated, a non-mathematical philosophy, is well-documented:

> I already seem to hear some people say that dealing with things physically is one thing, mathematically something else, and that geometers are supposed to stay within their abstract lucubration [*girandole*], and not be familiar with philosophical subjects, whose truths are different from mathematical truths. They do that as though geometry nowadays does not let one know the true philosophy, as though it were impossible to be at the same time geometer and philosopher, so that as a necessary consequence one should infer that he who is a geometer can neither know physics, nor talk nor deal with physical subjects in physical terms.[14]

The affinity between the mathematician of the Grand Duke of Tuscany and the Jesuit becomes even more pronounced when the actual scientific practices of the latter are examined. In the *Provincia Veneta*, Biancani was the instigator and promoter of a research school that manifested itself in, among other things, its embrace of the principles of physico-mathesis and its patient engagement in experimental practice.[15]

The first pages of the *Loca* appear quite conventional: the dedication is followed by an address to the reader wherein Biancani, in a rhetorical tirade, bemoans the wretched state to which mathematics has sunk and calls for its revitalization. Under sixteen headings, he announces "Some of the most important things, either new or restored, treated in this exposition."[16] The third involves Archimedean hydrostatics and the so-called problem "of the crown of Jero of Syracuse" which, Vitruvius recounts,[17] Archimedes had solved: "On floating bodies with an addition of a new demonstration on the problem of Archimedes, who, although he did not fuse the crown, analysed the metals that composed it."[18] Further on, in the index of those Aristotelian passages to be considered in the text – and in the middle of the entries concerning book IV of *De caelo* – we find "Text 44 and following, why some bodies heavier than water float."[19]

Such allusions would have attracted those interested in hydraulics wishing to go beyond the scanty offerings of *De caelo*. However, any attempt to track down the relevant passages in the *Loca* would have been frustrating for, apart from the inviting programmatic statements, absent is any reference either to Archimedean hydrostatics or to the new solution to the problem of Jero's crown. If the disillusioned reader then wished to turn to Biancani's own analysis of the last part of *De caelo*, he would have found merely a reference to Galileo's *Discorso intorno alle cose che stanno in su l'acqua o che in quella si muovono*:[20] "At this point a commentary on the last chapter of *De caelo* is needed. In its place the reader is referred to the Italian treatise of Galileo Galilei on bodies which float on, or move in, water, where toward the end many things are presented in an explanation of this chapter."[21]

How should we interpret this? As a sign of unbounded confidence in Galileo's

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