A world of words: Rereading Galileo's grand book of philosophy from *Il Saggiatore*

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Abstract
One of the most famous passages in Galileo's *Il Saggiatore* is his declaration that "philosophy is written in this grand book, the universe, which stands continually open to our gaze". He opposed this book of nature with what he claimed was his opponent Orazio Grassi's understanding of philosophy – "a book of fiction, productions in which the least important thing is whether what is written there is true". This paper seeks to situate this passage within the larger debate between Galileo and Grassi about the relationship between poetry and natural philosophy over the course of their publications regarding the comet controversy of 1618. During their back and forth, Galileo had claimed that "nature takes no delight in poetry", which Grassi had turned on him by alleging that he was too serious if he could not appreciate a poetic flourish in a learned debate such as theirs. This was a major insult given how central poetry and letters were to any early modern discourse. This paper argues that Galileo's "grand book" responded to this insult by both doubling down on his poetry-nature claim and illustrating that he was more familiar with poetry than Grassi. He accomplished both by referring to debates about epic poetry in late sixteenth-century Italy. This connection sheds new light on a passage that seemingly repudiates poetry, as well as contributing to scholarship that has sought to reevaluate the mathematician's engagement with the rich world of early modern Italian poetry.

Keywords
controversy of the comets, natural philosophy, epic poetry, academies, vernacular

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Over the past decade, scholarship on Galileo has made it possible to read much of the astronomer and mathematician's work and in some cases even his life in light of early modern Europe's deep appreciation of and engagement with poetry.[1] Scholars' reconsideration of Galileo's lesser known works such as his lectures on the geometry of Dante's hell and his commentary on the epics of Ludovico Ariosto and Torquato Tasso has, in tandem with studies of his rhetorical borrowings from poetic and humanistic texts in his scientific writing, complicated the notion that Galileo's work inaugurated the bifurcation of the "two cultures" of the sciences and the humanities.[2] Despite this, however, one of his most famous passages and most prominent discussions of poetry has yet to be considered in light of this new scholarship – the description of the "grand book" of philosophy "written in the language of mathematics" from *Il Saggiatore*. This passage apparently shows Galileo at his most adversarial towards poetic texts, juxtaposing his true book of mathematical characters with "the *Iliad* or *Orlando Furioso* – books in which the least important thing is whether what is written in them is true".[3] This distinction is notable for being much starker than those found not only in the work of contemporaries but also in Galileo's own corpus, which features not only frequent poetic quotations but also dialogues and thought experiments described as *poesia* (poetry or poetic conceit) and *favola* (fable or story).[4] Rereading Galileo's "grand book" in the dual context of his debate with the Jesuit Orazio Grassi and the larger series of debates about the nature of epic poetry, however, reveals that this seeming dismissal or rejection of poetry was actually a highly sophisticated engagement with it.

This first context was literal for readers of the 1623 edition of *Il Saggiatore*, which included the entirety of Grassi's pseudonymous *Libra astronomica ac philosophica* (The Astronomical and Philosophical Balance) from four years earlier broken into sections by Galileo's frequent rebuttals, something that is less evident in many modern editions, which either separate or completely omit Grassi's text. Behind the *Libra* was a back-and-forth that had begun when Galileo issued a scathing response through one of his students to Grassi's original lecture on the comets which appeared in the skies over Europe

1 Hall, *Galileo's Reading*; Heilbron, *Galileo*, 11-27; Reeves, "Galileo, Oracle"; Peterson, *Galileo's Muse: Renaissance Mathematics and the Arts*, 67-94; Bellini, *Umanisti e lincei: letteratura e scienza a Roma nell'età di Galileo*, 1-84; Bolzoni, "Giochi di prospettiva sui testi: Galileo lettore di poesia", 157-176; Battistini, *Galileo e i gesuiti: miti letterari e retorica della scienza*, 15-181; Armour, "Galileo and the Crisis in Italian Literature of the Early Seicento", 143-170.

2 On origin of the "two cultures" and its connection to the Scientific Revolution, see Snow, *The Two Cultures*, 29-40; for the "two cultures'" connection to Galileo in particular, see Finocchiaro, *Retrying Galileo*, 306.

3 "l'Iliade e l'Orlando Furioso, libri ne' quali la meno importante cosa è che quello che vi è scritto sia vero": OG, VI, 232. English translation from Drake and O'Malley, eds., *The Controversy on the Comets of 1618*, 183.

4 Albanese, *New Science, New World*, 155-157.

in 1618. With each iteration, the exchange grew increasingly acrimonious and personal. Despite Grassi's original lecture not making any mention of Galileo or his philosophical positions, Galileo responded as if it had been a direct attack on him, likely due to the fact that his prominence as Europe's most famous astronomer had been threatened by Grassi's priority in observing and publishing on the comets. The particular point of contention that ultimately led to Galileo's "grand book" passage regarded the role of poetry in nature and natural philosophy, a debate that had begun with Galileo criticizing one of Grassi's theories about the comet as a poetic fancy, something for which nature had no place. Grassi responded in kind by mocking the philosopher for being dull and not appreciating that philosophical discourse can be adorned by poetic witticisms. The Jesuit's comments presented a serious threat to Galileo not so much because they undermined his philosophical positions but rather because they challenged his credentials as a man of letters who had gained popularity and patronage at court with his lively writing and keen sense of humor.[5]

Galileo's unveiling of the "grand book" of philosophy in *Il Saggiatore* accordingly represents a bold attempt to reassert conclusively his status as a philosopher who could simultaneously enlighten and entertain courtly audiences. In order to do so, Galileo needed to at once double down on this contraposition of philosophy and poetry and display his mastery of the "poetic flowers" that Grassi had accused him of attempting to banish from philosophical discussion. He accomplished these seemingly opposing goals by employing a very particular definition of poetry, that is poetry being necessarily fictive and thus false. This definition originated from the great debate over which contemporary vernacular poem represented the more appropriate model for epic poetry that occupied Italian men of letters for much of the later part of the sixteenth century.[6] Leonardo Salviati had introduced the idea in his defense of Ludovico Ariosto's epic *Orlando Furioso*, which the Florentine theorist saw as truly inventive, against Torquato Tasso's more historically grounded – and thus, for Salviati, derivative – *Gerusalemme Liberata*. Although Galileo's learned readers may not have been familiar with Salviati himself, they would have easily recognized that Galileo was entering the domain of poetic debate and theory when he wrote of "books like the *Iliad* and *Orlando Furioso*", two of the most prominent examples of ancient and modern epic poetry, respectively. Deploying Salviati's poetics allowed Galileo to simultaneously reinforce his ridicule of the poetic fancy in Grassi's philosophical positions and demonstrate his sophisticated knowledge of poetic discourse that were immensely important to early modern learned circles on the Italian peninsula.

5 Biagioli, *Galileo, Courtier*, 267ff.

6 Brazeau, ed. *The Reception of Aristotle's Poetics in the Italian Renaissance and Beyond*, 97-179; Weinberg, *A History of Literary Criticism in the Italian Renaissance*, 2, 954-1073.

Situating the "grand book" in these contexts provides a clearer picture of Galileo's beliefs about the place of poetry and poetic language in natural philosophy, an issue that interested but often evaded scholars of early modern science.[7] Although *Il Saggiatore* doubles down on Galileo's claim that nature itself has no place for poetic fancies, it lodges no objections against poetry being used to discuss and write about natural philosophy. Indeed, the passage itself, alongside many others scattered throughout Galileo's corpus, illustrates both the rhetorical and conceptual value of the imaginative activity that distinguishes poetry from nature: picturing the natural world as a book written in the language of mathematics, an image that Galileo employed to illustrate both the operation and superiority of his philosophical methods, would not be possible without poetic conceit. Poetry, with its graces and fictions, was for Galileo an essential set of tools for conceptualizing and communicating natural philosophy, but he drew a sharp line at confusing the means for its end; humans could use poetry to discuss and understand the natural world, but that did not mean that these poetic graces actually existed within nature itself, which is exactly what he accused Grassi of professing. In other words, although Galileo saw nature as being written in the language of mathematics, humans were still dependent on the same language that poets used to discuss and write natural philosophy.

Galileo's references to poetic debates also shed light on how the controversy of the comets involved not just the clash of two individual intellectuals but also the learned societies of which they were members and through which they delivered their responses. On one side were secular academies like the Accademia Fiorentina and the Accademia dei Lincei which communicated in the vernacular, while on the other was the Collegio Romano, which sought to duplicate the success of these institutions but within a Catholic and thus Latin framework.[8] In this way, Galileo represented Florence, which was home to many of the original academies, and its secular learned culture, while Grassi, a prominent Jesuit, stood in for Rome's religious one. The pages of *Il Saggiatore* stage this conflict visually with Grassi's Latin opposed to Galileo's vernacular responses, and his allusion to the Ariosto-Tasso debate only strengthened this opposition, as these poets and their supporters stood opposed to each other in much the same way these academies did. Florentine academicians supported Ariosto, with his sometimes irreverent approach to religion and what was seen by his proponents as a more "natural" vernacular vocabulary, while those in the ambit of Rome often preferred Tasso, whose word choice was more Latinate and who had revised his entire poem to bring it into accordance with the

7 In addition to the works regarding Galileo cited in the first footnote, see also Hallyn, *The Poetic Structure of the World*, 13-15; Bono, *The Word of God and the Languages of Man*, 193-198; Aït-Touati, *Fictions of the Cosmos*, 1-13; Marchitello and Tribble, ed. *The Palgrave Handbook of Early Modern Literature and Science*, xxv-xliv, 139-158.

8 Biagioli, *Galileo, Courtier*, 258-260.

post-Tridentine church's teachings. Galileo's use of Salviati, who had also boldly declared the superiority of the modern vernacular culture of Florence over the ancient Latin one based in Rome, showed that Florence and its academies continued to be a source of inspiration and support to the philosopher, even as he set his eyes on Rome and the grander patronage its clerical elite could offer. Salviati's influence on *Il Saggiatore* thus provides an opportunity for a more nuanced understanding of Galileo's relationship with Florence's academies than that offered by earlier scholars who tended to see Galileo's involvement in these institutions as little more than the philosopher seeking out credentials and forums for self-promotion.[9]

The debate within a debate regarding poetry's place in natural philosophy began with the Jesuit mathematicians' widely acclaimed public oration delivered by Orazio Grassi shortly after the comets' appearance in 1618, which was published as *De tribus cometis anni MDCXVIII disputatio astronomica* in 1619. Employing a variety of philosophical and mathematical techniques, Grassi presented a number of ways of making sense of the comet as an astronomical phenomenon while being careful to resort to neither the superstition that had surrounded comets as omens of coming disaster nor that Copernican cosmological ideas that had been prohibited by the Index in 1616. Galileo had received a request for his opinion on the matter from Archduke Leopold of Austria, but, bedridden, the astronomer was unable make a response or even observe the comets. The Jesuit treatise presented a major threat to Galileo not only in its priority in both observation and publication but also because it effectively employed a courtly philosophical style that combined lively, entertaining prose with astronomical and mathematical explanation. This had been Galileo's trump card in his earlier encounters with academic philosophers and their dryer style. Grassi was not only a natural philosopher but also an architect who designed the church of Sant'Ignazio in Rome, a dramatist who wrote and staged plays to great acclaim at the Collegio Romano with machinery of his own design, and a skilled orator who would later be invited to deliver the sermon for Pope Urban VIII's celebration of the Good Friday liturgy in 1631.[10] Grassi's cultural toolkit thus resembled Galileo's own closely and presented him with a grave challenge even though the *Disputatio* did not name Galileo directly.[11]

Another flashpoint between Grassi and Galileo was to be the former's use of the ideas and findings of Tycho Brahe. Although the Jesuit's treatise only mentions the famous Danish astronomer explicitly once, it makes use of the vast trove of astronomical data and interpretations that Tycho had made on his island observatory of Uraniborg a number of times.[12] The system Tycho ultimately developed, in which other planets orbit the Sun that

[9] McNeely, "The Renaissance Academies between Science and the Humanities", 257; Biagioli, *Galileo, Courtier*, 118-120.

[10] Preti, "Grassi, Orazio".

[11] Biagioli, *Galileo, Courtier*, 269-273.

[12] Drake and O'Malley, *The Controversy on the Comets of 1618*, 5-6, 115, 361-362.

in turn orbits a static Earth, went against the centrality of the Sun and the double motion of the Earth proposed by Copernicus, but his observations and calculations, the precision of which was unprecedented, also definitively refuted many aspects of Ptolemaic system, such as the existence of crystalline spheres around the orbits of the planets.[13] Thus is was not only Tycho's adherence to a geocentric cosmos that would have made him more acceptable to a Jesuit natural philosopher like Grassi, but also the accuracy and abundance of his astronomical data.[14] With the Jesuit's own detailed observations of the comet, which he conceded were not as accurate as those that Tycho would have been able to make with his highly specialized equipment, it is evident that Grassi sought to employ the techniques and some of the findings of the new astronomy to update and improve on traditional natural philosophy, while also adhering faithfully to Catholic orthodoxy.[15]

Galileo responded to the Jesuit's treatise through his student, Mario Guiducci, a friend and consul of the Accademia Fiorentina. Guiducci delivered Galileo's thoughts on the comets to the Accademia in the vernacular in 1619, which was later printed as *Discorso delle comete*. The manuscript reveals that the treatise was largely written by Galileo, a point which Grassi picked up on quickly.[16] Threatened by the Jesuits' priority, Galileo took a decidedly contentious approach, attacking not only Grassi's observations on comets but also those of Tycho Brahe. In this response, as well as in his later response in *Il Saggiatore*, Galileo took almost exactly the opposite approach that Grassi had. In contrast with his earlier works, Galileo, unable to observe the comet himself, could offer no new observations or discoveries of his own, nor could he use his heliocentric opinions to contest Grassi's, so his only option was to critique and undermine his opponent's findings and conclusions.[17] He did so by employing not only the iconoclastic attitude towards ancient philosophical authority that had become a hallmark of his work but also a stark skepticism of Grassi's observations, at one point going so far as to suggest that the comets were nothing but an atmospheric illusion caused by vapors rising from the Earth's surface.[18] It was Grassi's use of Tycho, however, that received some of Galileo's harshest critiques, no doubt because the Tychonic system stood to supplant the now prohibited heliocentric model Galileo had championed publicly since his 1610 telescopic discoveries.

It is in one of these attacks on Tycho that Galileo first broached the subject of nature and poetry: "Tycho says in effect that such an arrangement of the heavens [i.e. the multiplicity of spheres for different comets to pass through] suffices for such pranks of Nature and playthings of the true stars, for though infirm they have a natural inclination to follow

13 Christianson, *Tycho Brahe and the Measure of the Heavens*, 147.
14 Graney, *Against All Authority*, 39-42.
15 Biagioli, *Galileo, Courtier*, 273; Drake and O'Malley, *The Controversy on the Comets of 1618*, viii-ix.
16 Drake and O'Malley, *The Controversy on the Comets of 1618*, xvi-xvii.
17 *Ibid*., xiv.
18 *Ibid*., 53-54.

every manner and custom of the skies. This savors much more of poetic grace than of scientific soundness and rigor, and deserves no consideration from you whatever, as nature takes no delight in poetry".[19] The bitterness of this attack on Grassi's rhetorical flourishes and poetic usages illustrate that Galileo felt threatened by Grassi and the Jesuits encroaching his courtly turf.[20]

Grassi, this time under the anagrammatic pseudonym Lothario Sarsi, responded in kind to Galileo's attacks before the end of 1619 with his *Libra Astronomica et Philosophica*. Just as the mask of his student enabled Galileo to employ a more aggressive style, Grassi adopted the fictional identity of one of his students to expand his polemical options without the attendant risks to his personal reputation or that of his religious order.[21] He made use of this wider field of play early on by calling Galileo out for being the true author of the *Discorso* with a devastating pun on Guiducci's consular position at the Accademia and Galileo "dictating" to him: "since the same Mario ingenuously confessed that he, very trustingly, was willing to proffer what he had not discovered but what he had received from, as it were, the dictation of Galileo, I have determined, not without justice, that my dispute about those matters is with the dictator rather than the consul".[22]

This backhanded satire characterizes much of the Grassi's reply, and he did not miss the opportunity the fully exploit Galileo's poetry-nature claim. He began by calling out Galileo and his assertion for simply being no fun: "Truly I would never have expected that that courteous gentleman, such as all know him to be, would shun certain witty and facetious remarks which had been employed in our discourse and that he, with greater severity and dislike than Cato himself, would reply scornfully that nature takes no delight in poetry".[23] Grassi developed this even more further down in the passage by suggesting that Galileo was attacking the notion that philosophical discourse should contain any adornment or

[19] "Il dire con Ticone, che come a stelle imperfette e quasi scherzi della natura e trastulli delle vere stelle, ma però, benchè caduche, d'indole ad ogni modo e di costume celesti, basta una tale quale condizion divina; ha tanto più della piacevolezza poetica che della fermezza e severità filosofica, che non merita che vi si ponga considerazione alcuna, perchè la natura non si diletta di poesie": OG, VI, 87-88. English translation from Drake and O'Malley, *The Controversy on the Comets*, 49-50.

[20] Biagioli, *Galileo, Courtier*, 277.

[21] Wilding, *Galileo's Idol*, 117ff.

[22] "cum idem Maius peringenue fateatur, non sua se inventa, sed quae Galilaeo veluti dictante excepisset, summa fide protulisse, patietur, arbitror, non inique, cum Dictatore potius me de iisdem, quam cum Consule, interim disputare": OG, VI, 114. English translation from Drake and O'Malley, *The Controversy on the Comets*, 70.

[23] "illud ab homine perhumano, qualem illum omnes norunt, expectassem profecto nunquam, ut, vel ipso Catone severior, lepores quosdam ac sales, apposite a nobis inter dicendum usurpatos, fastidiose adeo aversaretur, ut irrideret potius, ac diceret naturam poëticis non delectari": OG, VI, 116-117. English translation from Drake and O'Malley, *The Controversy on the Comets*, 72.

digression, aspects which were key to making it palatable to a wider audience: "But, oh, how far I am from this opinion! I have always considered nature as poetry. Certainly, nature scarcely ever produces apples and other fruits without also putting forth flowers as sources of pleasure. Who would ever have thought that Galileo is so harsh that he would order that pleasant things, as the very spices of grave matters, ought to be far removed from them? This is the stoic rather than the academician".[24] Grassi described not so much an epistemology of nature in relation to poetic flourishes but more an aesthetics of natural philosophy. Exploring, describing, and knowing the "fruits" of nature was accompanied by "flowers" that produce pleasure, which reflected the ideal of courtly discourse in which the content or "fruit" is occasioned by entertaining witticisms and flourishes or "flowers". At the same time that he suggested that Galileo had no appreciation for this courtly intellectual discourse, Grassi depicted himself as having mastered it.

Grassi's jabs revolving around poetry and rhetorical flourishes might seem like light jokes, but taking into account the importance of poetry for early modern learned readers illustrates these comments constituted major insults. Galileo and Grassi's audience in courts and academies were intimately familiar with poetic quarrels and would have likely seen their dispute in the same genre but with natural philosophical content instead of poetic, so to be accused of being unable to appreciate the "poetry" of nature or witty arguments was particularly damning.[25] By depicting Galileo as stripping natural philosophy of its flowers, Grassi suggested Galileo wanted to deprive learned discussion of its attendant pleasures, which would be to render it into the dull, pedantic discourse carried out in universities – the opposite of that of the courts. Grassi transformed Galileo's nature-poetry assertion from a misstep into the very antithesis of courtly discourse. As Grassi notes, Galileo emerged as an austere, isolated stoic, not a witty courtier-cum-academician.

Grassi's *Libra* presented Galileo with nothing less than a challenge to his status as a courtier and a philosopher. To successfully respond, Galileo needed to reassert both his courtly and philosophical credentials. The stakes only grew as Galileo took longer to produce a reply, as he ran the risk of letting people think he had admitted defeat. Over three years later and after significant prodding from his supporters at the Accademia dei Lincei, Galileo finally published his rebuttal, the time of which was particularly serendipitous, as Maffeo Barberini, one of Galileo's Florentine admirers, had just been elected Pope. The

[24] "At ego, proh, quantum ab hac opinione distabam! Naturam poëtriam ad hanc usque diem existimavi. Illa certe vix unquam poma fructusque ullos paris, quorum flores, veluti ludibunda, non praemittat. Galilaeum vero quis unquam adeo durum existimasset, ut a severioribus negotiis festiva aliqua eorum condimenta longe ableganda censeret? Hoc enim Stoici potius est, quam Academici": OG, VI, 117. English translation from Drake and O'Malley, *The Controversy on the Comets*, 72.

[25] Biagioli, *Galileo, Courtier*, 290-91; McNeely, "The Renaissance Academies between Science and the Humanities", 228.

Lincei dedicated the work to Urban VIII, who was evidently so fond of the work that he had it read aloud to him during mealtimes.[26] Part of what made the work so entertaining was the way Galileo presented his criticism of Grassi; instead of replying directly to the Jesuit (or his pseudonymous student), Galileo wrote his condescending commentary in the form of a letter to his friend and fellow Lincei member Virginio Cesarini. The text of *Il Saggiatore* reproduces in its entirety that of the *Libra*, broken into numbered sections punctuated by Galileo's comments. This segmentation creates a series of mini disputes which scholars have noted share similarities to duels or other chivalric contests not unlike those found in epic poems like the *Orlando Furioso*.[27] Mario Guiducci, in his own brief response to Grassi written in 1620, described the "controversies of letters" in which Galileo and Grassi were involved as contests in which "popular favor… always proclaims that man the victor who contends the most pertinaciously".[28] In *Il Saggiatore*, Galileo was careful to stage each encounter so he emerged triumphant, something that is particularly evident in the sections regarding poetry's place in natural philosophy.

Galileo's responses to Grassi's ridicule of his lack of poetic appreciation were divided into the sixth and seventh sections of *Il Saggiatore* in such a way that enabled to preempt the worst of Grassi's insults before they appeared. The sixth section opens with Grassi's objection to Galileo's criticism of Tycho in which Grassi asked whose doctrine Galileo would have them follow with Ptolemy discredited by recent discoveries and Copernicus banned by the Church. Galileo responded by first taking another opportunity to attack Tycho and then critiquing Grassi for his reliance on textual authorities in natural philosophy:

> It seems to me that I discern in Sarsi a firm belief that in philosophizing it is essential to support oneself upon the opinion of some celebrated author, as if when our minds are not wedded to the reasoning of some other person they ought to remain completely barren and sterile. Possibly he thinks that philosophy is a fantastical book of some man (*un libro e una fantasia d'un uomo*), like the *Iliad* or *Orlando Furioso* – books in which the least important thing is whether what is written in them is true.[29]

[26] Biagioli, *Galileo, Courtier*, 75.

[27] Hall, *Galileo's Reading*, 71ff; Biagioli, *Galileo, Courtier*, 280, 301-303.

[28] "proclama sempre per vincitore colui che più pertinacemente contende": OG, VI, 185. English translation from Drake and O'Malley, *The Controversy on the Comets*, 135.

[29] "Parmi, oltre a ciò, di scorgere nel Sarsi ferma credenza, che nel filosofare sia necessario appoggiarsi all'opinioni di qualche celebre autore, sì che la mente nostra, quando non si maritasse col discorso d'un altro, ne dovesse in tutto rimanere sterile ed infeconda; e forse stima che la filosofia sia un libro e una fantasia d'un uomo, come l'Iliade e l'Orlando Furioso, libri ne' quali la meno importante cosa è che quello che vi è scritto sia vero": OG, VI, 232. English translation, with minor changes, from Drake and O'Malley, *The Controversy on the Comets*, 183.

After these words, Galileo launched immediately into his description of the "grand book" that stood opposite these false poetic ones: "Well, Sig. Sarsi, that is not the way matters stand. Philosophy is written in this grand book – I mean the universe – which stands continually open to our gaze, but it cannot be understood unless one first learns to comprehend the language and interpret the characters in which it is written. It is written in the language of mathematics, and its characters are triangles, circles, and other geometrical figures, without which it is humanly possible to understand a single world of it; without these one is wandering about in a dark labyrinth".[30] Describing the natural world as a book, as well as comparing it to manmade texts with lesser veracity, had had a long tradition before Galileo, who had himself employed the strategy earlier to mock those who were resistant to his telescopic discoveries in a 1610 letter to Kepler: "These kind of people think that philosophy is some book like the *Aeneid* or the *Odyssey*, and that truths are to be sought not in the world or in nature but in the comparison of texts (to use their words)".[31] The "grand book" Galileo introduced in *Il Saggiatore*, however, was far more developed, with the addition of geometrical characters, an fuller explanation of poetic texts' contrast, and an even sharper satire of the opponent in question. Earlier scholars have argued that this "grank book" emerged from Galileo's methodological ambitions or from his ongoing debate with the Church about Scripture's authority in the interpretation of nature, but situating the passage within the dual contexts of Galileo's debate with Grassi and the larger debates about the nature of epic poetry will show that it was poetic concerns that played the foremost role in the particular shape the "book of nature" trope would take in *Il Saggiatore*.[32]

Before readers have even encountered the passage from the *Libra* describing Galileo as a dour "stoic" seeking to pluck the "poetic flowers" from philosophical discourse, Galileo's "grand book" imagery shows with gusto that he was anything but. He began by putting on display his poetic credentials with his discussion of *Orlando Furioso* and the *Iliad*, pro-

[30] "Sig. Sarsi, la cosa non istà così. La filosofia è scritta in questo grandissimo libro che continuamente ci sta aperto innanzi a gli occhi (io dico l'universo), ma non se può intendere se prima non s'impara a intender la lingua, e conoscer i caratteri, ne' quali è scritto. Egli è scritto in lingua matematica, e i caratteri son triangoli, cerchi, ed altri figure geometriche, senza i quali mesi è impossible a intenderne umanamente parola; senza questi è un aggirarsi vanamente per un oscuro labirinto": OG, VI, 232. English translation from Drake and O'Malley, *The Controversy on the Comets*, 183-184.

[31] "Putat enim hoc hominum genus, philosophiam esse librum quendam velut Eneida et Odissea; vera autem non in mundo aut in natura, sed in confrontatione textuum (utor illorum verbis), esse quaerenda": OG, X, 423, translation my own. See also Curtius, *European Literature and the Latin Middle Ages*, 319-326.

[32] For the methodological interpretation of the passage, see Drake and O'Malley, *The Controversy on the Comets*, xxiii-xxiv; for the interpretation of the passage emerging from Galileo's debate with the Church, see Biagioli, *Galileo's Instruments of Credit*, 219-259.

ceeded by critiquing Grassi for the derivative nature of his philosophical assertions, and concluded by presenting a vivid metaphor of the world as a grand mathematical text, of which he suggested he himself was an expert reader. Meanwhile, Grassi was left to wander blindly in the "dark labyrinth" of false poetic books and unoriginal philosophic texts. The virtuosic display of sharp rhetoric, biting satire, and imaginative language disarm Grassi's threats before they even appear, and when they are quoted in the following section, Galileo was able to pass over them almost as an afterthought: "Hurrying over in a few words what is written here, I say that Sig. Mario and I are not so austere as to be revolted by jokes or poetic graces".[33]

Galileo concluded his attack by bringing it back to the definition of poetry that he had earlier introduced: "This is what Sig. Mario rejects when he quite correctly and truly says that nature takes no delight in poetry. This proposition is quite true, even though Sarsi shows that he does not believe it, and pretends not to recognize either nature or poetry and not to know that fables and fictions are in a sense essential to poetry, which could not exist without them, while any sort of falsehood is so abhorrent to nature that it is no more possible to find one in the other than to find darkness in light".[34] Here Galileo went even further in relating poetry with the false and the fictive. When he mentioned "book[s] like *Orlando Furioso* and the *Iliad*", he described them as texts in which the truth does not matter, which suggested that they did not necessarily preclude the truth, but in this passage, he stated plainly that fictive elements were an essential part of poetry and were, in contrast, impossible to find in nature. This reiteration and strengthening of this association also illustrates what Galileo aimed to achieve with it, which was not only to undermine Grassi's philosophical positions, particularly those tied to Tycho, but also to demonstrate that it was his opponent and not he himself who was the one who did not appreciate poetry. By employing a definition of poetry that situated it opposite natural philosophy, Galileo was able to accuse Grassi of not "recogniz[ing] either nature or poetry" while at the same time presenting himself as a skilled interpreter of both.

This second section also illustrates that Galileo's description of poetry is not just a foil for natural philosophy's veracity but rather a poetics in its own right; it is a statement not just of what poetry is vis-à-vis nature but also of what poetry should be, namely "fables and

[33] "in poche parole sbrigandomi, dico che nè il Sig. Mario nè io siamo così austeri, che gli scherzo e le soavità poetiche ci abbiano a far nausea": OG, VI, 233. English translation from Drake and O'Malley, *The Controversy on the Comets*, 185.

[34] "questo è quello che il Sig. Mario rifiuta, e con ragione e con verità dice che la natura non si diletta di poesie: proposizione verissima, ben che il Sarsi mostri di non la credere, e finga di non consocer o la natura o la poesia, e di non sapere che alla poesia sono in maniera necessarie le favole e finzioni, che senza quelle non può essere; le quali bugie son poi tanto abborrite dalla natura, che non meno impossibil cosa è il ritrovarvene pur una, che il trova tenebre nella luce": OG, VI, 234. English translation from Drake and O'Malley, *The Controversy on the Comets*, 186.

fictions". Given that Galileo wished to prove that, in contrast to Grassi, he understood and appreciated not only nature but also poetry, it only makes sense that he borrowed a poetic model that would have been recognizable as such by his learned readers. This was not a particularly difficult task, as the reemergence of Aristotle's *Poetics* and its translation into Latin and the vernacular in the mid-sixteenth century had spurred widespread debate of the proper form, subject, and aim of poetry.[35] One of the liveliest controversies was over epic poetry, not only because it was a major consideration of Aristotle but also because the sixteenth century saw the publication of two very popular yet very different vernacular epics – Ludovico Ariosto's *Orlando Furioso* in 1532 and Torquato Tasso's *Gerusalemme Liberata* in 1580.

An important part of the popularity of these debates that took place in academies and in print that was read throughout the Italian peninsula was that they involved much more than the correct way to compose poetry. Although both poets borrowed heavily from the epics of Homer and Virgil, Ariosto took more license with classical models, whereas Tasso labored to have his poem conform to the principles of Aristotle's *Poetics*. The *Furioso*, although it borrowed some themes from ancient epic poetry, has the narrative structure of a romance or *romanzo*, in which the various plots interrupt each other canto by canto, with the conclusion to individual actions only to be found in later cantos.[36] In contrast, the *Liberata*, despite featuring its fair share of digressions, attempts to adhere more closely to the Aristotelian notion of unity of action, often seen as the central aspect of epic poetry, by focusing on one event, the conquest of Jerusalem during the First Crusade. Related to this, Tasso, who wrote in the wake the Council of Trent, aimed for ethical cohesion as well: while Orlando is at the mercy of his passions (and hence *furioso*), the characters of the *Liberata* struggle to control their desires and ultimately prevail in fulfilling their duty as Christians. The poems also have important linguistic differences as well: Tasso's word choice used more Latinisms, while Ariosto relied more heavily on a Tuscan vocabulary, which (Tuscan) critics would later identify as purer.[37] In short, discussing the merits of the two poems provided opportunities to wade into other debates in fields ranging from philosophy and ethics to the quarrel of the Ancients and the Moderns and the ever popular *Questione della lingua*, the dispute over which direction vernacular poetry and speech should take on the Italian peninsula. It is not hard to understand why, then, so many learned Italians, including Galileo, became interested and took part in these controversies.

It was in this context that Leonardo Salviati entered into the quarrel in the wake of the publication of Tasso's epic in the 1580s. Salviati (1539-1589) was a man of letters born to an important Florentine family closely tied with the branch of the Medici that had ascended

[35] Brazeau, *The Reception of Aristotle's Poetics in the Italian Renaissance and Beyond*, 1-17.
[36] Javitch, "*Cantus Interruptus* in the *Orlando Furioso*", 71.
[37] Weinberg, *A History of Literary Criticism in the Italian Renaissance*, 2, 954-1073.

to the throne with Duke Cosimo I, despite which Salviati was not particularly wealthy and, much like Galileo, was always in search of patronage. He interests ranged from oratory to leading a project to produce a revised edition of Boccaccio's *Decameron* that could get past the Index, but what tied his activities together intellectually and socially was his active participation in the two Florentine academies devoted to studying and advancing the Florentine dialect. The Accademia Fiorentina elected him consul in 1566, and he was a founding member of the Accademia della Crusca in the early 1580s. The Crusca was particularly important to his involvement in poetic quarrels; he published much of his polemical writing on poetry pseudonymously, but the Crusca either countersigned or endorsed his texts.[38]

Salviati first introduced his ideas about the essentially fictive nature of poetry in an early 1584 dialogue, named for one of its interlocutors Lasca, subtitled "in which it is demonstrated that it does not matter whether histories are true and incidentally some things against poetry are discussed".[39] As this subtitle suggests, Salviati devoted most of the work to showing that the goal of histories was to encourage good governance and that bending the truth to make pedagogical points was acceptable, but he used poetry, particularly the epic variety which bears the most resemblance to history with its recounting of heroic deeds, as a foil by insisting that poetry, in contrast to history's potentially fictive parts, was entirely made up, the consequence of which was that it often entertained but rarely instructed readers. The interlocuters only discuss contemporary epic poetry in one instance, when Deti, the character most in favor of the falsity of poetry, remarks that that it is easy to recognize the fallaciousness of poetry "when you read in the *Orlando Furioso* of the hippogriffs, the shield of Atlantis, the horns of Astolfo, [and] the enchantments of Alcina".[40] Despite there being no mention whatsoever of Tasso and his poem, the conception of poetry Salviati advanced in the work seemed in many ways spurred by Tasso, whose goals were the opposite for his *Gerusalemme Liberata* – to direct his readers to moral edification by representing in epic format the history of the First Crusade.

Later that year, Camillo Pellegrino (1527-1603), a Capuan man of letters, published *Il Carrafa o vero della epica poesia* (The Carrafa or of epic poetry), a dialogue, like Salviati's, named for one of its interlocutors, that argues, among many other things, the exact opposite. *Il Carrafa* brings together a vast amount of material on Ariosto, Tasso, ancient epics, and their theorists to show exhaustively that Tasso's poem was superior to Ariosto's according to both ancient and modern criteria. As one of the first to compare comprehensively the two poets, Pellegrino reconstituted a wide set of loosely connected poetic debates in which men of letters usually praised or critiqued either poem into a monolithic

38 Brown, *Lionardo Salviati*, 183-204; Gigante, "Salviati, Lionardo".

39 Full title in Italian: *Il Lasca dialogo, cruscata, ouuer paradosso d'Ormannozzo Rigogoli, riuisto e ampliato da Panico Granacci, cittadini di Firenze, e Accademici della Crusca; nel quale si mostra, che non importa, che la storia sia vera, e quistionasi per incidenza alcuna cosa contra la poesia.*

40 Salviati, *Il Lasca dialogo, cruscata, ouuer paradosso d'Ormannozzo Rigogoli*, 14.

discourse in which one poet must be chosen over the other; his attempt to bring these debates to a close instead started a much larger one.[41] Pellegrino was in favor of Tasso's poem as the best contemporary epic over Ariosto's for a number of reasons, most of which revolved around Aristotle's precepts for poetry in his *Poetics*, but one of his criteria turned the idea Salviati had expressed in his *Lasca* on its head – that Ariosto's poem was inferior because it was based off of false events, while Tasso's was superior since it imitated true ones. For Pellegrino, poets like Ariosto who tried to make an epic out of things that were not real were not worthy of the title of epic poet.

Salviati and the Crusca wasted no time in replying, issuing a response just months after the *Carrafa* had appeared entitled *Degli Accademici della Crusca Difesa dell'Orlando Furioso dell'Ariosto contra'l dialogo dell'Epica poesia di Cammillo Pellegrino Stacciata prima* (The Accademia della Crusca's Defense of Ariosto's *Orlando Furioso* against Camillo Pellegrino's dialogue on epic poetry). Just as Galileo would later do with his response to Grassi, Salviati reproduced the entirety of Pellegrino's text interspersed with his line-by-line rebuttal, an even more impressive feat given that the *Carrafa* was already a dialogue. In his critique, he gave a wide-ranging critique of Tasso's obscure style, non-Tuscan vocabulary, and strained verisimilitude. Salviati's defense of Ariosto and polemics against Tasso provoked a number of responses – one from Tasso himself – and in 1585 and later again in 1589 Salviati returned with replies of his own written under his academic name at the Crusca, the *Infarinato*, meaning "the floured one", a pun on the Crusca's grain-based title.[42] In these responses, Salviati doubled down on and further developed an idea he had used to distinguish poetry from history into a comprehensive poetics.

In defining poetry, Salviati singled out the importance of imitation. This alone was not particularly controversial, as imitation was the basis of Aristotle's inquiry into poetry writ large, but Salviati's understanding of what exactly constituted imitation was diverged significantly from other theorists, including Aristotle (despite which Salviati insisted his understanding of poetry was orthodoxly Aristotelian). Following his distinction he had introduced in the *Lasca*, poetic imitation was not the retelling of known events, which would be history, but rather the "invention" of new ones: "The poet is not a poet without invention; therefore, if he writes history, or upon a story already written by another, he loses his being completely… Imitation and invention are one and the same thing as far as the plot is concerned".[43] Salviati borrowed the term from the classical rhetorical concept of *inventio*, which is not the creation of things but rather the finding of them, but as Salviati continued to

41 Weinberg, *A History of Literary Criticism in the Italian Renaissance*, 2, 991.

42 Brown, *Lionardo Salviati*, 206-210.

43 "il poeta non è poeta senza la'nvenzione: per o scrivendo storia, o sopra storia stata scritta da altri, perde l'essere interamente. […] L'imitazione, e la'nvenzione sono una cosa stessa, quanto alla favola": Salviati, *Degli Accademici della Crusca Difesa dell'Orlando Furioso dell'Ariosto*, 3. Quoted and translated in Weinberg, *A History of Literary Criticism in the Italian Renaissance*, 2, 1005.

develop the term, he blurred the line between its classical definition and the more modern one.[44] For Salviati, the historical basis of the *Liberata*, "which is a story stolen completely, as everyone knows", made Tasso unworthy of the title of poet: "the author in that work is not a poet, but a reducer of somebody else's story to verse".[45] A true poet like Ariosto came up with his own plot. The characters of Ariosto's poem came from Matteo Boiardo's unfinished romance *Orlando Innamorato* and, before that, the *Chanson de Roland* cycle, but the creation of new events and plots for these characters saved the poet from the charge of lacking all-important *invenzione*. In Salviati's *Lasca*, the thoroughly fictive nature of a poem like the *Furioso* made it inferior to history, but in his attempt to defend Ariosto and attack Tasso, the poem's invented plot was exactly what made it a good one.

In subsequent responses, Salviati further clarified and advanced the centrality of invention to poetic imitation. Moving closer to the traditional rhetorical meaning of *inventio*, he explained that "invention is of things not previously found; or are such that the finder does not know that they have been found before".[46] This seems to suggest that poetic imitation, which is to say invention, could be of true but unknown events, but in the following lines, Salviati closed this potential loophole: "the poet's invention, taken as it should be, is not … of true things [*cose vere*], but considering them composed together (as it is right that they should be considered), invention is of false things [*cose false*]. Of these false things, poetry chooses for its subject only those which appear true, and it calls them fictions [*finzioni*]".[47] This passage captures most completely the ideas Galileo echoed in his final rebuttal of Grassi's comments about nature and poetry in *Il Saggiatore* – "that fables and fictions are in a sense essential to poetry" while "any sort of falsehood", by which Galileo meant the *cose false* without which poetry could not exist, is "abhorrent to nature". Indeed, Salviati's reference to the verisimilar in poetry ("those [things] which appear true"), a concept that was an important one for Galileo in his own critiques of Tasso, seems to be between the

44 Lausberg, *Handbook of Literary Rhetoric*, 119.

45 "la quale è storia tolta di peso, com' ognun sa. Onde l'Autore in quell'opera non è poeta, ma riducitor d'altrui storia in versi" Salviati, *Degli Accademici della Crusca Difesa dell'Orlando Furioso dell'Ariosto*, 13. Quoted and translated in Weinberg, *A History of Literary Criticism in the Italian Renaissance*, 2, 1006.

46 "La'nvenzione è delle cose non trovate, ò di quelle, che chi le truova non sa che sieno state trovate prima". Lionardo Salviati, *Dello Infarinato, Accademico della Crusca: risposta all'Apologia di Torquato Tasso intorno all'Orlando Furioso, e alla Gierusalèm liberata*, 40-43 quoted and translated in Weinberg, *A History of Literary Criticism in the Italian Renaissance*, 2, 1017.

47 "la'nvenzion del poeta, prendendosi, come si dee, non e … di cose vere, anzi considerandole composte insieme, come e diritto, che si consideri, la'nvenzione e di cose false. Delle quali cose false quelle solamente, che paion vere, s'elegge per suo soggetto la poesia, e chiamalo finzioni": Lionardo Salviati, *Dello Infarinato, Accademico della Crusca: risposta all'Apologia di Torquato Tasso intorno all'Orlando Furioso, e alla Gierusalèm liberata*, 40-43 quoted and translated in Weinberg, *A History of Literary Criticism in the Italian Renaissance*, 2, 1017.

lines of his ridicule of Grassi and explains why it is both vicious and effective: by claiming that nature takes delight in poetry, Grassi conflated that which is true with that which appears – but, according to Salviati, is not – true. Salviati's definition of poetry allowed Galileo to reinforce his philosophical claims while simultaneously reasserting his credentials as someone not only knowledgeable but also deeply engaged in the world of poetry.

Elsewhere in *Il Saggiatore*, Galileo even provided a counter example of unproblematic use of poetry, citing "the various charming things inserted very airily by Father Grassi in his treatise of which Sig. Mario has not breathed a word in reproach" as evidence that he was not so "austere" that he was unable to enjoy poetic graces in philosophic discussion.[48] Galileo wrote "how it was delightful to read" of Grassi's comparison of the comet's duration to the human lifecycle and the comet appearing as a lit candle to illuminate the supper meeting of the Sun and Mercury, which offered "no offense" even though "that we know that where the sun is, candles are superfluous and useless, and that this was no supper but merely luncheon; that is a feast by daytime and not by night, which time of day is unknown to the sun".[49] This backhanded compliment insinuated that Grassi's poetic fancies were neither particularly apt nor graceful, but it established that Galileo believed that poetic adornment, even when fictive, could be acceptable in philosophical discourse, which stood in line with his own use of metaphor, as the natural world, for example, is not literally a book. Galileo, however, contrasted these poetic conceits with Grassi's use of Tycho's theories: "But now, in a fundamental and very difficult question, Sarsi tries to persuade me, all joking aside, that there exists in nature a particular celestial orb for comets, and whereas Tycho was unable to untangle himself in his own explanation of the irregularity of his comet's apparent motion, Sarsi expects my mind to be satisfied and set at rest by a little poetic flower which is not followed by any fruit at all".[50]

Turning Grassi's own aesthetics of philosophical debate against him, Galileo laid out how poetry ("flowers") could acts as signifiers for philosophical truths ("fruits") but should not be confused for those truths themselves. This diverged slightly from Salviati's assertion that poetry was necessarily false, but Salviati dealt with poetic narrative as a whole while

[48] "l'altre vaghezze interserite molto leggiadramente dal P. Grassi nella sua scrittura, delle quali il Sig. Mario non ha pur mosso parola per tassarle": OG, VI, 233. English translation from Drake and O'Malley, *The Controversy on the Comets*, 185.

[49] "nè meno il sapere che dov'è il Sole, le candele son superflue ed inutile, e ch'egli non cena, ma desina solamente, cioè mangia di giorno, e non di notte, la quale stagione gli è del tutto ignota": OG, VI, 233. English translation from Drake and O'Malley, *The Controversy on the Comets*, 185.

[50] "Ma che in una questione massima e difficilissima, qual è il volermi persuadere trovarsi realmente, e fuor di burle, in natura un particolare orbe celeste per le comete, mentre che Ticone non si può sviluppar nell'esplicazion della difformità del moto apparente di essa cometa, la mente mia debba quietarsi e restar appagata d'un fioretto poetico, al quale non succeed poi frutto veruno": OG, VI, 234. English translation from Drake and O'Malley, *The Controversy on the Comets*, 186.

Galileo's discussion of "poetic flowers" was more about individual poetic phrases or conceits. This distinction between the acceptable and incorrect use of poetry in natural philosophy is important because it nuances Galileo's use of the fictive nature of poetry as a foil to the veracity of natural philosophy, which he employed not only to set up his "grand book" image in *Il Saggiatore* but also over a decade earlier in a 1610 letter to Johannes Kepler in which he wrote of philosophers who buried their heads in "the Odyssey and the Iliad" and refused to observe the world around them. Galileo's need to reassert his poetic credentials in the wake of Grassi's ridicule no doubt in large part motivated the astronomer to develop his thoughts on the subject of poetry in natural philosophy, but especially in his discussion of the acceptable use of poetry, there seems to be a recognition that the imaginative elements of poetry were essential to natural philosophy on both a rhetorical and a conceptual level. The conceit of the natural world being a "grand book", for example, allowed Galileo not only to convince his readers of the superiority of his way of philosophizing but also to illustrate in relatively simple terms how his methods were supposed to work.

Galileo elaborated further on these themes in his 1632 *Dialogo sopra i due massimi sistemi del mondo* when the interlocuters discuss the authority of Aristotle and the proper way of carrying out philosophy. Simplicio, Galileo's Aristotelian strawman, claims that to philosophize effectively according to Aristotle's method, one must be well acquainted with the entirety of his corpus and prepared "to combine this passage with that, collecting together one text here and another very distant from it".[51] Sagredo, in response, points out how the absurdity of this method by observing that it could be used on any set of texts: "since you believe by the collection and combination of the various pieces you can draw the juice out of them, then what you and the other brave philosophers will do with Aristotle's texts, I shall do with the verses of Virgil and Ovid, making centos of them and explaining by the means of these all the affairs of men and the secrets of nature".[52] He humorously brings this line of thought to its logical conclusion by noting that one could simply use the alphabet rather than relying on the works of a poet: "But why do I speak of Virgil, or any other poet? I have a little book, much briefer than Aristotle or Ovid, in which is contained the whole of science, and with very little study one may form from it the most complete ideas. It is the alphabet, and no doubt anyone who can properly join and order this or that vowel and these or those consonants with one another can dig out of it instruction in all

[51] "saper combinar questo passo con quello, accozzar questo testo con un altro remotissimo": OG, VII, 134. English translation from Galilei, *Dialogue Concerning the Two Chief World Systems*, trans. Drake, 108.

[52] "Che voi crediate con l'accozzamento e con la combinazione di varie particelle trarne il sugo, questo che voi e gli altri filosofi bravi farete con i testi d'Aristotile, farò io con i versi di Virgilio o di Ovidio, formandone centoni ed esplicando con quelli tutti gli affairi de gli uomini e i segreti della natura": OG, VII, 135. English translation from Galilei, *Dialogue Concerning the Two Chief World Systems*, 109.

the arts and sciences".[53] He concludes by comparing this use of the alphabet to a painter who can use colors on a palette to paint a bird instead of resorting to collecting feathers to recreate its likeness.

At a superficial level, Sagredo's words convey the same criticism that Galileo wrote to Kepler twenty years earlier – that most philosophers are more concerned with the authority of ancient texts than making and communicating new observations about natural world. Below the surface of this commonplace critique, however, is a nuanced discussion of how humans represent their observations of and thoughts about the world around them, or as Sagredo puts it, "the whole of science". The passage points to the absurdity of relying exclusively on individual books and authors to do so, but it also highlights how all of these, whether they are poetry or philosophy, true or false, ancient or modern, are made of the recombination of the same essential building blocks – words and letters. There are better combinations and worse combinations, and sometimes apt and elegant ones are to be found in the works of ancient philosophers and poets, but as Sagredo explains, limiting oneself to these works alone is to introduce an unnecessary obstacle. Indeed, the comparison to painting suggests that to philosophize is to be a poet or an artist of sorts and to combine letters or colors as one sees fits to best represent reality. The concerns Galileo dealt with in this passage are quite distant from those treated by Salviati in his poetic criticism, but the philosopher's fascination with how the same words and letters can used to reach very different ends just by being arranged differently echoed the idea that had kickstarted the controversy that embroiled Salviati and the Crusca – that is, how similar words and narratives can be combined in different ways to arrive at epic poetry on one hand and history on the other. Even if the universe was written in the language of mathematics, Galileo recognized that the philosopher was bound to using the same, sometimes fallible, tools of communication as the poet and the historian.

Galileo elsewhere exhibited that he not only understood the imperfect nature of language but also knew how to exploit it. In 1618, for example, he shared with Archduke Leopold of Austria an early version of the *Dialogo*'s Fourth Day, which contained his thoughts on the tides and their relation to Earth's motion – material that was prohibited under the Church's 1616 injunction against discussing Copernicanism. Galileo wrote to the Archduke that "I consider this writing which I send to you … to be merely a poetical conceit or a dream (*come una poesia overo un sogno*), and hope that your Highness may receive it as such. Still, because sometimes poets value some of their fantasies, I think something of

[53] "Ma che dico io di Virgilio o di altro poeta? Io ho un libretto assai più breve d'Aristotile e d'Ovidio, nel quale si contengono tutte le scienze, e con pochissimo studio altri se ne può formare una perfettissima idea: e questo è l'alfabeto; e non è dubbio che quello che saprà ben accoppiare e ordinare queta e quella vocale con quelle consonanti o con quell'altre, ne caverà le risposte verissime a tutti i dubbi e ne trarrà gli insegnamenti di tutte le scienze e tutte le arti": OG, VII, 135. English translation from Galilei, *Dialogue Concerning the Two Chief World Systems*, 109.

this vanity of mine".[54] As Galileo explained later in the letter, he hoped that with this treatise in the hands of those like the Archduke, who were above suspicion from the Church, they would be able to testify that he "was the first to dream of this chimera" in case anyone, especially those philosophers outside the Catholic Church who did not have to operate under the same prohibition, tried to claim it had been their idea.[55] In this letter, Galileo initially used *poesia* to designate something as fictional, but as he proceeded, it becomes clear that his use of the category indicated a more unstable and variable relationship with the truth. By evoking *poesia*, Galileo situated his work to exist in either space – fact or fiction – and to move between them rapidly depending on the context and the reader, just as within the domain of natural philosophy, poetic language could readily represent things true or false. Despite presenting his *Dialogo* in a similarly fictive manner when he published it in 1632, he was ultimately unable to convince ecclesiastical authorities that the work was only a *poesia* or a *sogno*. Regardless, his employment of *poesia* in situating his dialogues illustrates that in addition to his rhetorical and conceptual use of poetic conceit, Galileo utilized it on a higher strategic level as well.

Galileo's interest in poetry and involvement in the sites in which it was discussed and debated, especially in his early life, illustrate why he was keen to show off his poetic acumen, as well as the ample opportunity he had for exposure to Salviati and his ideas. It is even probable that the young Galileo knew Salviati personally or had at least met him. Although Galileo was not elected to the Crusca officially until 1612, after his telescopic discoveries brought him to prominence, his father Vincenzo Galilei, a noted musical theorist, was a member in the 1580s and moved in many of the same social and intellectual circles in Florence as Salviati. The younger Galileo was also close friends with the leading members of the Accademia degli Alterati, a literary academy to which Salviati also belonged, and there is evidence to suggest that Galileo himself was a member.[56] Additionally, Galileo's good friend and scientific collaborator Filippo Salviati belonged to the same Florentine family as the poetic theorist. After Galileo had returned to Florence in 1610, Filippo had hosted him at his villa outside of Florence, where the two collaborated on what would later become Galileo's *Discourse of Floating Bodies* (1612) and *History and Demonstration Concerning Sunspots* (1613), for which the mathematician later immortalized Salviati as one of the interlocuters in his famous dialogues.[57] Galileo's connections to Florence's learned elites and academies would have given him ample opportunity to familiarize him with the poetic debates in which they were involved.

[54] "reputo questa presente scrittura che gli mando… come una poesia overo un sogno, e per tale la riceva l'A.V. Tuttavia, perchè anco i poeti apprezzano tal volta alcuna delle loro fantasie, io parimente fo qualche stima di questa mia vanità": OG, XII, 390-391.

[55] "io ero stato il primo a sogniare questa chimera": *ibid.*, 391.

[56] Heilbron, *Galileo*, 11-12.

[57] Caracciolo, "Salviati, Filippo".

Another intellectual and social link between the Leonardo Salviati and Galileo comes through Jacopo Manzoni, a philosopher by trade known more widely known for his defense of Dante's *Divine Comedy*. Mazzoni first struck up a friendship with Salviati in Rome in the late 1570s, and he joined Salviati as one of the early members of the Crusca when he moved to Tuscany to teach philosophy at Pisa, where he would later meet and become a sort of a mentor to a young Galileo teaching mathematics. In 1587, Salviati encouraged Mazzoni to defend Dante's poem from a number of recent detractors, some of whose complaints were in response to a treatise on Dante Mazzoni had published earlier in 1572.[58] Delivering his opinions both in print and in lectures to the Accademia Fiorentina, Mazzoni focused in particular on defending the verisimilitude of the Comedy on the basis of his own definition of poetic imitation that had many parallels to Salviati's. The Accademia would call on Galileo later that same year to back up the credibility of the *Inferno* by illustrating that the design of Dante's hell was geometrically sound.[59] It was later Mazzoni to whom Galileo wrote his earliest defense Copernicanism in 1597.[60] The centrality of verisimilitude in Galileo's subsequent critique of Tasso suggests Mazzoni influenced not only his philosophy but also his poetics; indeed, Vincenzo Viviani would later report in his biography of Galileo that Mazzoni had encouraged the mathematician to publish his commentary. Viviani was at least in part mistaken as Mazzoni died in 1598, roughly ten years before Galileo finished his work on the work, but it suggests that Viviani saw Mazzoni, who was in turn connected with Salviati, as closely related to Galileo's interests in poetry.[61]

Although Galileo appreciated Dante, it was Ariosto who was Galileo's favorite poet, so much so that both his early biographers recount that he had much of the 46-canto *Furioso* memorized.[62] A recent biography of Galileo even suggests that the astronomer thought of himself as one of these gallant characters in his various courtly engagements.[63] The most solid evidence of Galileo's familiarity with Salviati's work and the larger controversies of which it was part comes, however, from the detailed commentaries on both Ariosto and Tasso that Galileo worked on primarily in the first decade of the seventeenth century.[64] In these commentaries, Galileo criticized Tasso and celebrated Ariosto for many of the same

58 Dalmas, "Mazzoni, Jacopo".

59 Galileo, *Due lezioni all'Accademia Fiorentina circa la figura, sito e grandezza dell'Inferno di Dante*; Heilbron, *Galileo*, 15-16, 28-33; Dalmas, "Mazzoni, Jacopo".

60 Heilbron, *Galileo*, 111-114.

61 Gattei, *On the Life of Galileo*, 53; for the importance of verisimilitude to Galileo, see Heilbron, *Galileo*, 20-22.

62 Peterson, *Galileo's Muse*, 15ff; Heilbron, *Galileo*, 16-17. Viviani's description of Galileo's poetic interests is the most detailed, even mentioning Galileo's commentary on Tasso and his consideration of publishing it; see Gattei, *On the Life of Galileo*, 53.

63 Heilbron, *Galileo*, 16-27.

64 Wlassics, *Galilei Critico Letterario*, 17; Reeves, "Galileo, Oracle", 7-10.

reasons Salviati did. Indeed, their reasoning, preferences, and the viciousness with which they attacked Tasso are so similar that one early scholar mistakenly attributed Galileo's *Considerazioni al Tasso* to Salviati.[65] These texts illustrate not only Galileo's familiarity with these poetic debates but also his investment in them. Galileo never ultimately published either of the commentaries, but he circulated them widely enough that Paolo Beni, a Tasso apologist, rushed his commentary to press when he heard that Galileo was producing his own.[66] Although Galileo did not touch directly on the truth value or fictive quality of poetry, the sharpness and wit with which he ridiculed the supposed clumsiness of Tasso's verse and narrative highlights a thread between Salviati's poetics and Galileo's employment of them in *Il Saggiatore*.

Leonardo Salviati's defense of Ariosto and critique of Tasso, however, were just one small part of his work on language and literature, and Galileo's usage of Salviati speaks to other tensions at play in his exchange with Grassi that went beyond the issue of poetry. Their debate was not just between two thinkers with clashing approaches to natural philosophy; Galileo, as a Florentine active in the city's academies, and Grassi, as a Jesuit in the seat of the Church and a member of the Collegio Romano, represented two sets of institutions with very different cultural commitments. Florence and Rome, despite being unevenly matched in terms of politics and economics in the seventeenth century, have had a long and famous rivalry for cultural supremacy among Italian states, and although Galileo was aiming for Roman ecclesiastical patronage when he was writing *Il Saggiatore*, these tensions still bubbled up at points.[67]

This friction was first and foremost linguistic; even as academies became interested in discussing the sciences in the seventeenth-century, their primary original and contemporary interest was language. As Guiducci wrote in his response to Grassi in 1620, "The Florentine Academy (as I believe you well know, reverend Father) was instituted by our elders to the end that the Academicians should exercise themselves in speaking and should cultivate and increase the beauty of our language".[68] When Galileo decided to respond to the Jesuit's initial oration on the comets given to a Roman audience in Latin with a oration in the Florentine vernacular delivered by the Consul of the Florentine Academy, he was sending a very specific message. Starting with Grand Duke Cosimo I's reign a century earlier,

[65] Wlassics, *Galilei Critico Letterario*, 38-44.

[66] Armour, "Galileo and the Crisis in Italian Literature of the Early Seicento", 157-159; Gattei, *On the Life of Galileo*, 53.

[67] Biagioli, *Galileo, Courtier*, 245-266. For a description of the Rome-Florence struggle and its continuation in the wake of Galileo's trial, see Rowland, *The Scarith of Scornello*, 92-93.

[68] "Fu l'Accademia Fiorentina, come credo benissimo esser noto all P.V., in stituita da' nostri maggiori a fine che gli Accademici s'esercitassero nel dire, e coltivassero e aggrandissero la vaghezza della nostra favella": OG, VI, 186. English translation from Drake and O'Malley, *The Controversy on the Comets*, 136.

glorifying the Florentine vernacular and its celebrated literary models from the fourteenth century – Dante, Petrarch, and Boccaccio – became an important part of the Medici political program of restoring and aggrandizing Tuscany's cultural prestige.[69] By the seventeenth century, Tuscan was, as Guiducci put it, a language with the "capacity… to be understood not only throughout Italy but anywhere that good literature is appreciated".[70]

This program had consisted not only of making classical texts available in the vernacular, but also of lifting Tuscan letters to the level of the much-studied and revered texts of ancient authors in Latin and Greek, and no one was a bolder or more radical exponent of this than Leonardo Salviati.[71] Indeed, his call to arms in the *Orazione in lode delle fiorentina favella* (Speech in praise of Florentine speech) went so far as to advance a kind of anti-classicism: according to Salviati, Florentine civilization, and thus its language as well, had surpassed that of the ancients, so the great effort required to learn classical languages and the reverence of ancient knowledge represented a needless subservience to antiquity that only hindered the advancement of the present age.[72] One of the specific targets of this polemic was Rome's classical heritage through the Latin language, which Salviati suggested was derivative of Etruscan, the ancient language that many early modern Florentines saw as the true precursor of both Latin and the Tuscan vernacular: "It is not just now that our homeland has started to hold the position of a flourishing language. It has been more than two thousand years that those most powerful Romans have made use of the language that we speak in this province".[73]

By replying to a Latin oration coming out of Rome with a vernacular treatise addressed to the same institution at which Salviati delivered his praise of the Florentine language in 1564, Galileo was not simply being glib and ignoring the language his opponent used, as he had done with Christoph Scheiner in the sunspot letters in 1613. Rather, he was attaching himself to an established tradition of Florentines contesting Rome's and Latin's cultural supremacy. Indeed, the debates that this attitude spurred were still very much alive during Galileo's times. One of the most ambitious ways the Accademia della Crusca sought to realize Salviati's dream of legitimizing the vernacular, especially vis-à-vis Latin with its established grammar, was to begin compiling the first dictionary or *vocabolario* of

[69] Sherberg, "The Accademia Fiorentina and the Question of the Language", 28-30; Moyer, *The Intellectual World of Sixteenth-Century Florence*, 123-174.

[70] "l'abilità di quest'idioma ad esser inteso non solo per tutt'Italia, ma ancora in ogni parte ove sieno in pregio le buone lettere": OG, VI, 186. English translation from Drake and O'Malley, *The Controversy on the Comets*, 136.

[71] Brown, *Lionardo Salviati*, 53ff.

[72] *Ibid*., 66.

[73] "Non comincia pure ora questa nostra contrada a tenere principato di fiorito idioma. Sono più di due mila anni che i Romani potentissimi a quella lingua che in questa provincia si parlava in quel tempo pubblicamente attendevano". Quoted in Brown, *Lionardo Salviati*, 68, my translation.

Tuscan with examples of usage drawn from Florence's most famous authors, chief among which were Dante, Petrarch, and Boccaccio. This project took over thirty years to complete, with the first edition being published in 1612, the same year that Galileo would join the Crusca's ranks.[74]

Hailed as a massive achievement by many, it was still not without its detractors, one of whom was Galileo's would-be sparring partner, Paolo Beni. A proponent of the vernacular, Beni may have been sympathetic to the spirit of the Crusca's project, but he took major issue with many parts of its execution, not least of which was the *Vocabolario*'s exclusion of Tasso as an exemplar. He offered a wide range of critiques, such as pointing out the Crusca's excessive reliance on fourteenth-century authors at the expense of sixteenth-century ones, both Tuscan and non-Tuscan.[75] Despite Beni's support of the vernacular, he did not agree with the Crusca's view that it should stand above and independent of Latin; he insisted instead that speaking and writing Italian eloquently required mastery of Latin, the language that he saw as the origin of the vernacular.[76] Not surprisingly, these complaints fell on deaf ears in Florence, including Galileo's, who when a friend wrote informing him that Beni planned to continue his critique in further volumes, he ironically remarked that they were "anxiously awaited by all scholars", but they show that the vernacular's status in relation to Latin was still a hotly contested subject.[77]

It is unclear whether Grassi and the Jesuits appreciated all the nuance and history behind Galileo's gesture of having his treatise delivered in the Tuscan vernacular to the Accademia Fiorentina, but the *Libra* makes clear that they understood Galileo's rough gist. Just as Grassi had ridiculed Galileo for replying to him through intermediaries, he made a jab at the Tuscan philosopher for being provincial by addressing just one academy by noting that, in contrast, he was replying "not merely to one academy but to all of them and to all who understand Latin".[78] Grassi highlighted that Latin was a cosmopolitan language capable of reaching all of Europe while Florentine seemed to barely be able to stretch beyond the borders of Tuscany, a comment that drew on Latin's long tradition of being considered a sort of universal language that early modern European scholars and clergy (at least within the Catholic Church) could use to cut across differences in regional vernaculars, just as the language had been spoken throughout the Roman Empire in antiquity.[79] Later on in the text, right after he had accused Galileo of being a "Stoic rather than an Academician", Grassi poked fun at him for forbidding light, jest-filled discourse: "However, the acade-

74 Parodi, *Quattro Secoli di Crusca*, 11-51.
75 Diffley, *Paolo Beni*, 98-103.
76 Beni, *L'anticrusca*, 98-99; Diffley, *Paolo Beni*, 139-141.
77 Diffley, *Paolo Beni*, 122
78 "non uni tantum Academiae, sed reliquis etiam omnibus qui latine norunt, exponere": OG, VI, 114. English translation from Drake and O'Malley, *The Controversy on the Comets*, 70.
79 Waquet, *Latin or the Empire of a Sign*, 257-263.

mician forbids. We do not obey. And what if this urbanity of ours [*nostra haec urbanitas*] is not to his taste? We have many erudite friends whom it pleases".[80] Once again, Grassi made Galileo's commitment to Tuscany seem provincial by juxtaposing it with the Roman academicians' *urbanitas*, a word which in Latin has special connections to Rome since, in antiquity, Rome was the only true *urbs* or city in the Empire. Grassi further added to these barbs by putting them elegantly into Latin, thus showing that even in terms of ridicule, Latin in no way lagged behind the vernacular.

Galileo did not explicitly engage with these attacks in *Il Saggiatore*'s text, but he left a number of hints to his Tuscan readers that Rome had not yet bested Florence. One part of this no doubt was his subtle allusions to Salviati's criticism of Tasso and his poem. It may have been unlikely that readers would have recognized the references to Salviati's work in particular, but they would have only had to been roughly familiar with the different sides of the debate to recognize the larger cultural conflicts to which Galileo referred. Tasso's closer adherence to the poetic principles practiced by the ancient epic poets and codified by Aristotle in his *Poetics*, alongside his liberal use of non-vernacular Latinisms, put him squarely in the camp of the ancients, whereas Ariosto's irreverent use of the epic tradition and non-classicizing language made it easy for moderns to appreciate his poem.[81] In other words, Galileo's engagement with poetry in *Il Saggiatore*, specifically his mention of the *Orlando Furioso*, and in his other works like his poetic commentaries clearly placed him among the proponents of Tuscany and its vernacular. Thinking more materially and holistically about the text, however, illustrates that Galileo staged this conflict between Latin and Tuscan visually as well: the pages of the book flip back and forth between Grassi's Latin and Galileo's vernacular, almost as if the individual blocks of text are engaging in their own duels. For those that would proceed to read the text carefully, it would be clear that in each of these engagements, Florence and its vernacular emerged triumphant.

In light of the Florentine Maffeo Barberini's election to the papacy just as *Il Saggiatore* was being printed, it would be easy to think that Galileo was aiming to further ingratiate himself with the poetry-loving Tuscan prelate with his poetic allusions. During the text's actual composition, however, this outcome was by no means certain, and in any case, Barberini and his circle, which included two prominent Lincei, Virginio Cesarini and Giovanni Ciampoli, were part of a didactic, moralizing school of poetry that would have had little affinity for the assertion that poetry was essential false.[82] Galileo would have known this too, as the then Cardinal had dedicated a poem to him celebrating his astronomical

[80] "Vetat enimvero Academicus. Non paremus. Et si illi nostra haec urbanitas non sapit. Plures habemus, non minus eruditos, quos delectat": OG, VI, 117. English translation from Drake and O'Malley, *The Controversy on the Comets*, 72.

[81] Weinberg, *A History of Literary Criticism in the Italian Renaissance*, 2, 1005ff.

[82] Heilbron, *Galileo*, 226-229; Rietbergen, *Power and Religion in Baroque Rome*, 107-109.

discoveries in 1620.[83] Entitled *Adulatio perniciosa* (Pernicious adulation), the poem was included in Barberini's celebrated collection of Latin poems, the *Poemata*, which was published for the first time in Paris in 1621 and many other times after Barberini became pope in 1623, including a grand papal edition illustrated by none other than Gian Lorenzo Bernini.[84] Barberini's poems, with their religious themes and highly wrought allegories, aim not just educate but also to philosophize; as one of Baberini's adoring commentators noted, his poems show that true "philosophizing is poetic… [and] writing true poetry is philosophical".[85] Another commentator, Tommaso Campanella, even tried to develop a curriculum based on the poems to bring philosophy back to the forefront of the schools.[86] Both these projects were from after the Cardinal became Urban VIII, but they illustrate that it was unlikely that Galileo's comments on poetry in *Il Saggiatore*, which questioned both the true value of poetry and its place in philosophy, were written for Barberini's benefit or really for that of anyone else in Rome.

Galileo's use of Salviati, a prominent member of the Fiorentina and the Crusca and one of the strongest proponents of the superiority of Tuscany's vernacular, to fight back against Grassi's attacks suggest instead that the mathematician had his mind on Florence, its vernacular, and its academies. This in turn demonstrates how Florence and its particular learned culture continued to be culturally and intellectually significant for Galileo even as he set his aspirations on Roman patronage. Mario Guiducci's official response to Grassi on behalf of the Fiorentina meant that Galileo did not need to address explicitly Grassi's affront to Florence's learned society, but the way he employed Salviati's poetics from nearly 40 years earlier to show that his opponent was incapable of understanding "either nature or poetry" illustrated, arguably more effectively, the breadth and the depth of the erudition of Florence's academies and their members, past and present.

[83] For a complete English translation of the *Adulatio perniciosa*, see Gattei, *On the Life of Galileo*, 281-308.

[84] Rietbergen, *Power and Religion in Baroque Rome*, 128-131.

[85] "philosophandum esse poeticé…vero poetandum esse philosophicé": Dormeuil, *In Maphaei SRE cardinalis Barberini nunc Urbani PP VIII Poemata*, 12.

[86] Salvarani, "Revaluating Philosophy: Campanella's Commentaria and the 'Collegio Barberino Project'", 385-401; Rietbergen, *Power and Religion in Baroque Rome*, 119-128.

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