

Similarities Between Scientific Language and the Language of Literary Criticism in Two of Galileo's Works¹

1. The vernacular as weapon

In September 1610 Galileo's life comes to a turning point: after 17 years in Padua (1592–1610), he moves to Florence to work for the government of the Grand Duke Cosimo de' Medici. For the first time, at the age of forty-seven, Galileo is offered the possibility and financial support to dedicate himself to research, free of teaching obligations. For the Tuscan scientist this seems a dream come true, but within philosophico-scientific circles, his discoveries and successes are met with increasing animosity. In order to gain official recognition for his work, Galileo decides to go to Rome (April 1611) and to submit the results of his research for endorsement by the highest scientific Catholic authority of his time: the Roman College of the Society of Jesus. In Rome, Galileo is received with great honour – Prince Cesi nominates him member of the Lynx Academy, and the Pope himself shows him friendship. Despite these appearances, Galileo's ideas are evaluated and pondered within the Holy Office (It. Sant'Uffizio), which does not underestimate their subversive potential. In May, a month after Galileo's arrival in Rome, the Holy Office is already discussing whether

¹ The Italian mathematicians and historian of science Antonio Favaro (1847–1922) is the editor of the monumental (twenty volumes) *Edizione nazionale delle opere complete di Galileo Galilei sotto gli auspici di Sua Maestà il Re d'Italia* (*National Edition of the Complete Work of Galileo Galilei Under the Auspices of His Majesty The King of Italy*), which was composed between 1890 and 1909. Due to its completeness, precision and philological rigor, Favaro's work still remains unequalled and a reference model for any study concerning Galileo. The source of most of the excerpts from Galileo's works in this article is the digital edition of Favaro's work.

Galileo could be associated with Cesare Cremonini, who was put on trial for atheism a few years before; Galileo had worked with Cremonini during the period of the Studio of Padua. Within a year, then, Galileo turns from the relative tranquillity of Padua to the spotlight of the judgment of the ‘international scientific community’, and is forced to cope with the first really serious disputes of his career. The commitments on many fronts and his strong response to every objection directed to him appear clearly in the introduction of the *Discorso intorno alle cose che stanno in su l’acqua* (*Discourse on Floating Bodies*, 1612) in which Galileo, addressing Cosimo II, explains with an inner urgency the reasons that pushed him to write the *Discorso*. The ‘scientific community’ had been expecting a completely different kind of work from him, and the Jesuit Father Cristoforo Scheiner – under the pseudonym of *Apelles latens post tabulam* – originated the controversy by questioning Galileo’s discovery of sunspots²:

Because I know, Your Highness, that when I will publish the present treatise – whose subject is so different from what many people have been expecting and which I, according to what I wrote in my *Avviso Astronomico*, should already have published – one could believe that I gave up dealing with my new celestial observations, or that perhaps I am wading through them; I thought it would be correct to explain as well the reasons of deferring the latter work as the reasons that urged me to write and publish the present one [...] many reasons pushed me to write the present treatise, whose subject is the dispute I had with some literati in town, some days ago, concerning which many discussions followed, as Your Highness knows.³

² About the paternity of the discovery of the sunspots, see Walter M. Mitchell, *The History of the Discovery of the Solar Spots* (1916), in *Popular Astronomy*, Carleton College Goodsell Observatory, Vol. 24, pp. 562–570. The article is also accessible on-line at <http://articles.adsabs.harvard.edu/full/seri/PA.../0024//0000562.000.html> (accessed November 9, 2010). On the same subject matter see also Girolamo Tiraboschi, *Storia della letteratura italiana* (1833), Milano: Nicolò Bettoni e Comp., Vol. IV, pp. 444–445. The volume is also accessible on-line at http://books.google.it/books?id=dUJDAAAAYAAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false (accessed November 9, 2010).

³ “Perch’io so, Principe Serenissimo, che il lasciar vedere in pubblico il presente trattato,

Straight after the publication of the *Discorso*, the awaited treatise *Istoria e dimostrazioni intorno alle macchie solari* (*Letters on Sunspots*, 1613) comes out as a reply to the aforementioned Cristoforo Scheiner. It is well known that neither the *Discorso* nor the *Istoria* are the first works Galileo wrote in vernacular. Nevertheless, in the famous letter to Paolo Gualdo, dated 16th June 1612, Galileo, by referring to the *Istoria*, emphasizes that he wanted to write that work in vernacular in order to make it as widely known as possible: “[B]ecause I need every single person to be able to read it, and for the very same reason I wrote this short treatise in the same language”⁴. In another famous letter, written one week after the aforementioned one, to Giuliano de’ Medici, ambassador in Prague, Galileo refers to the *Discorso*, and writes: “It was convenient for me to write this discourse in Italian, so that it might be understood – at least the greater part of it – by the whole city [...]”⁵

Except for the revolutionary *Sidereus Nuncius* (*The Starry Messenger*, 1610) and a few other previous works, Galileo wrote mainly in vernacular. Yet he now feels compelled to emphasize this fact. Considering the pressure he is under, this is more than understandable. In any case, the use of the vernacular does not seem to be connected with the purpose of a broader diffusion of knowledge. Rather, its use supplies Galileo with the tool – apart from his science – he needs more than anything else at that very moment: a *vis*

d’argomento tanto diverso da quello che molti aspettano e che, secondo l’intenzione che ne diedi nel mio Avviso Astronomico, già dovrei aver mandato fuori, potrebbe per avventura destar concetto, o che io avessi del tutto messo da banda l’occuparmi intorno alle nuove osservazioni celesti, o che almeno con troppo lento studio le trattassi; ho giudicato esser bene render ragione sì del differir quello, come dello scrivere e del pubblicare questo trattato [...] molte cagioni m’hanno mosso a scrivere il presente trattato, soggetto del quale è la disputa che a’ giorni addietro io ebbi con alcuni letterati della città, intorno alla quale, come sa V. A., son seguiti molti ragionamenti.” Galileo Galilei, *Discorso intorno alle cose che stanno in su l’acqua*, from *Edizione digitale delle opere complete di Galileo Galilei* (*Digital Edition of Galileo Galilei’s Complete Works*), Vol. IV, p. 63–65, <http://pinakes.imss.fi.it:8080/pinakestext/home.jsf> (accessed November 2, 2010). The translation from Italian of all the excerpts from Galileo’s works in this article is my own.

4 “perché ho bisogno che ogni persona la possa leggere, e per questo medesimo rispetto ho scritto nel medesimo idioma questo ultimo mio trattatello”, Galileo Galilei, “Letter to Paolo Gualdo”, *ibid.*, Vol. XI, p. 327, (accessed November 2, 2010).

5 “Mi è convenuto scriver questo discorso in lingua italiana, acciò possa esser inteso, almeno in gran parte, da tutta la città”, Galileo Galilei, “Letter to Giuliano De’ Medici”, *ibid.*, Vol. XI, p. 335, (accessed November 2, 2010).

polemica of rare, disruptive efficacy. It is not by chance that in the same letter to Gualdo, Galileo asks Gualdo himself, and, by his intercession, Signor Sandeli, to translate the first of the three letters which form the *Istoria*, in order to give not only ‘Apelle’ (alias Scheiner), but also the scientific community abroad the ability to understand its content:

[...] I should also like Apelle and the others [the scientists] who live over the Alps to have the possibility to see it [Galileo is referring to the first of the three letters]; and as I am very busy I would ask Your Excellency and Mr. Sandeli a favour; and I especially ask him to be so kind as to translate it into Latin as soon as possible and then to send it back to me, since in Rome there is someone who will take care of publishing it, together with some other letters of mine.⁶

The intention is not to determine whether, and how well, Galileo was versed in Latin; *Sidereus Nuncius* is sufficient testimony to remove any doubt in this sense. Of course, the request to the addressees to ‘translate’ the letter into Latin seems proof of the fact that Galileo felt the urge to announce (to his opponents above all) his own position on a specific scientific dispute. But the aim of the translation of the letter is also to impress and possibly upset his opponents by showing them all the potential power that characterizes Galileo’s setting-out of the debate, the power of pure dialectic irony. It is precisely this dialectic irony that constitutes a fundamental expression of Galileo’s ‘literature’. Perhaps the fact that *Sidereus Nuncius* is the last of Galileo’s works written in Latin is not a coincidence.

After writing this essay, Galileo left Padua to settle in Florence, and thereafter countered all opposition by using the vernacular, not because Latin was inappropriate, but because he seems to feel that, in his own politically delicate situation, Latin is not guaranteed to support scientific reasoning. By using the vernacular Galileo adds

⁶ “vorrei che anco l’Apelle e gl’altri oltramontani potessero vederla [the letter]; e qui, per esser io occupatissimo, avrei bisogno del favore di V.S. e del S. Sandeli, il quale mi facesse grazia di trasferirla quanto prima in latino e mandarmela poi subito, perché in Roma è chi si è preso cura di farla stampare insieme con alcune altre mie.” Galileo Galilei, “Letter to Paolo Gualdo”, *ibid.*, Vol. XI, p. 327, (accessed November 3, 2010).

to his works a dialectic organization that, together with scientific reasoning, is meant to win public favour (“because I need every single person to be able to read it”) in a sort of dialectic ‘propaganda’ that goes beyond mere scientific reasoning. As a matter of fact, the strictly technico-scientific parts of Galilean works are hardly comprehensible for a non-specialized reader, even though they are presented in vernacular. Galileo did not use the vernacular as a simple ethical issue connected to the broader diffusion of knowledge; if so, he could have employed – in the two aforementioned letters – more appropriate expressions than “because I need every single person to be able to read it” and “It was convenient for me to write this *Discourse* in Italian”. The words Galileo uses seem rather to refer to a sphere of political expediency, that is, to the necessity of arousing great interest in his own works and of drawing positive criticism from the largest possible part of the public in order to defend himself against the threat of influential personalities. Indeed, consciousness of his own dialectic ability might have endowed the Tuscan scientist with the compelling strength with which, in spite of the trial and the sentence of 1616, he overcame the difficulties of that period of his life. It closed with the triumph of *Il Saggiatore* (*The Assayer*, 1623), generally recognized by critics as Galileo’s literary, rather than scientific masterpiece.

2. Galileo, the literary man

Galileo Galilei’s interest in literature dates from his youth. In 1588, at the age of twenty-four, one year before obtaining a post as lecturer in mathematics at the Studio of Pisa, he was invited by the *Accademia Fiorentina* to give two lessons on *La figura, il sito e la grandezza dell’Inferno dantesco* (*The Configuration, the Site and the Dimensions of Dante’s Inferno*). During his stay in Pisa he also dedicated himself to reading and commenting on an edition of Petrarch’s *Canzoniere* (ca. 1336–1374) and *Trionfi* (ca. 1340–1374), and to the composition of the manuscript on Tasso’s poem, which will be treated below. In Pisa he started to write poems himself, some of which showed his aversion for authority and hierarchies, especially within the *Accademia*. Galileo’s brief poem enti-

tled *Contro il portar la toga* (*Against Wearing the Gown*, 1590) considers the academic garment as representative of other differentiations within society, differentiations that were unjustified as they were generally not based on real distinction (intelligence, culture, critical analysis, dedication), but on the principle of authority.

In 1639, a seventeen year old scientist named Vincenzo Viviani became Galileo's assistant. Galileo was then seventy-five years old. Viviani remained in Arcetri with Galileo until the master's death in 1642. He also became his first biographer, publishing, in 1654, *Racconto storico della vita del Sig.r Galileo Galilei* (*Historical Narration of Mr. Galileo Galilei's Life*). It is from Viviani's biography that we know of Galileo's literary formation and of his literary preferences and opinions. According to Viviani's biography, Galileo had a great gift for memorization:

Nature blessed him with a quite unusual memory and because his love of poetry was great, he knew by heart – among the Latin authors – a large part of Virgil, Ovid, Horace and Seneca and – among the Tuscans – he knew almost all Petrarch, all Berni's rhymes and a little less than the entire poem of Ludovico Ariosto, who was always his favourite author, celebrated above all the other poets, to an extent that he [Galileo] wrote particular observations about him and particular comparisons with Tasso [...]⁷

In this passage, Viviani in all probability refers to the aforementioned manuscript, known as *Considerazioni al Tasso di Galileo Galilei* (*Considerations on Tasso by Galileo Galilei*), a treatise that accidentally disappeared while Galileo was still alive.⁸ Before analyzing the language in Galileo's works, it is worth stepping into the past and making a brief digression on a debate that involved most of the literati of the XVI century. In its first decades, Cardinal

⁷ “Fu dotato dalla natura d'esquisita memoria; e gustando in estremo la poesia, aveva a mente, tra gl'autori latini, gran parte di Vergilio, d'Ovidio, Orazio e di Seneca, e tra i toscani quasi tutto 'l Petrarca, tutte le rime del Berni, e poco meno che tutto il poema di Lodovico Ariosto, che fu sempre il suo autor favorito e celebrato sopra gl'altri poeti, avendogli intorno fatte particolari osservazioni e paralleli col Tasso”, Vincenzo Viviani, *Racconto storico di Vincenzo Viviani*, *ibid*, Vol. XIX, p. 627 (accessed November 4, 2010).

⁸ See chapter 3 of this article.

Pietro Bembo, the influential Venetian scholar, poet and literary theorist, presented his theories in the codification of literary Italian in the treatise *Prose della volgar lingua* (Proses of the vernacular language, 1525). In the third book of this treatise, Bembo claims that contemporary Italian poetic language should be based on the literary language of Petrarch's *Canzoniere*, while contemporary Italian prose should take the language of Boccaccio's *Decameron* (1351) as an ideal model. Due to the solid intellectual authority of its author, *Prose della volgar lingua* was a striking success and made possible a deep reformation within literary Italian.

Ludovico Ariosto (1474–1533) lived in the first half of the sixteenth century, while Torquato Tasso (1544–1595) lived in the second half. Ariosto and Tasso were the two major poets to dominate the Italian literary scene in the sixteenth century. On one hand, Ariosto's poem, *Orlando furioso* (Mad Orlando, 1532), was considered the symbol of the afore-mentioned reformation, the perfect example of the Tuscanization and archaicism of that poetical language which adopted Petrarch as a model. Ariosto's narrative structure is labyrinthic; while his octave is linear and harmonic, the style is ironic and detached in describing the adventures of his characters. On the other hand, Tasso's poem *Gerusalemme liberata* (*Jerusalem Delivered*, 1580) tends to break the style of Petrarchism. *Gerusalemme liberata* has a linear narrative structure, but is characterized by a fractured octave, with frequent use of enjambements that bring out the dramatic tone of the narration. The style and the position of the narrator is never ironic; on the contrary, they are often emotively involved in the psychological complexity of characters' lives and actions.

In the late sixteenth century and during the seventeenth century, philosophers, scholars and literati sustained a rather heated debate in establishing who, between these two authors, ought to be considered superior. This kind of critical setting is obviously obsolete, as contemporary literary critical approaches are not based on the "rules" that a literary genre is supposed to follow a priori, but on the cultural, historical, and sociological aspects in which a work, as well as the author, develops.

Nevertheless, this sort of posthumous literary contest between the two great poets of the sixteenth century involved intellectuals and

scholars of the period. Galileo himself did not evade the debate. Due to Viviani, we can see how Galileo's concept of literary criticism seems to be more similar to modern intellectual concepts rather than coeval ones. According to Viviani, Galileo, when asked, "was averse to making comparisons, which he considered hateful"⁹, and, "if urged, he used to claim that Tasso was better but he preferred Ariosto, as the former used to say words and the latter said things."¹⁰ Viviani actually never had the opportunity to read Galileo's *Considerazioni al Tasso*¹¹, otherwise he would have realized that Galileo's refusal to accept the habitual "hateful" ways of measuring artistic value might have looked superficial. The method adopted by Galileo in *Considerazioni al Tasso* exactly matches the dualistic criterion typical of the period: praise of one of the two sacred cows of the sixteenth century punctually coincides with sniping at the other one.

Pietro Pasqualoni, in his introduction to the first edition of *Considerazioni al Tasso* (1793), underlines the literary expertise of the young Galileo¹², advising his readers to do the following: "[W]hen you hear the name of Galilei, do not just consider him as a supreme philosopher and a unique Mathematician, but look at him also as a profound philologist."¹³ Nevertheless, Pasqualoni concludes that Galileo both resents Tasso and aims to hurt his reputation: "[W]ith this work Galileo goes at Tasso with great acrimony, sometimes with violence, which is not fair at all"¹⁴. Pasqualoni proceeds to note that on many occasions Galileo com-

⁹ "sfuggiva [...] le comparazioni, come odiose", Vincenzo Viviani, *Racconto storico di Vincenzo Viviani*, from *Edizione digitale delle opere complete di Galileo Galilei*, Vol. XIX, p. 627, <http://pinakes.imss.fi.it:8080/pinakestext/home.jsf> (accessed November 5, 2010).

¹⁰ "necessitato a rispondere, diceva che gli pareva più bello il Tasso, ma che gli piaceva più l'Ariosto, soggiugnendo che quel diceva parole, e questi cose." *Ibid.*, p. 627.

¹¹ See chapter 3 of this article.

¹² See footnote 18.

¹³ "quando odono nominare il Galilei non lo considerino solamente come sommo Filosofo, e raro Mattematico, ma lo riguardino eziandio siccome un profondo Filologo." Pietro Pasqualoni, in *Considerazioni al Tasso di Galileo Galilei e Discorso di Giuseppe Iseo sopra il poema di M. Torquato Tasso*, Roma: Stamperia Paglierini, 1793, p. VI. The book is also accessible on line at http://books.google.it/books?id=O5wZAAAAYAAJ&printsec=front-cover&dq=considerazioni+al+tasso&source=bl&ots=ew5oMenBu8&sig=bKCCQoMT_XFVkndQ-oX1qveS-NRY&hl=it&ei=J3xfS8OMGNi4jAeop4XLDA&sa=X&oi=book_result&ct=result&resnum=5&ved=0CBAQ6AEwBA#v=onepage&q=&f=false (accessed November 6, 2010).

¹⁴ "il Galilei anch'egli con molta acrimonia, e talora con beffe (in che non é da lodarsi) si scateni in quest'opera contro il Tasso", *ibid.*, p. VII.

mended Tasso, “in many circumstances”¹⁵. In fact, it is not true that he commends him ‘in many circumstances’; on the contrary, Galileo praises few verses of the poet and very seldom:

A detailed analysis of all the defects of this work would take too much time; in general, one can say that the style almost always is weak, forced and ill-conceived, so that, to be briefer, we will rather notice those parts (there are some) in which the author did something good [...]¹⁶

With polemic intent, he often compares those few verses to the numerous other ones that he frequently stigmatizes with the term ‘pedantic’ (It. *pedanteschi*).

But the aim of the present essay is not to discuss whether Galileo’s judgments and critical interpretations of Tasso’s poem are pertinent. This preamble intends to introduce an analysis of the particular stylistic and rhetoric procedure adopted by the Tuscan scientist in his *Considerazioni al Tasso*, a procedure which is, in important respects, similar to the one Galileo will adopt, more than ten years later, in *The Assayer*, one of his most successful and celebrated *scientific* works.

3. *Considerazioni al Tasso* and *The Assayer*

The excellence of Galileo’s prose places him among the best of Italian and European writers of the period. Yet this excellence does not appear in his literary works, but rather in his scientific ones. It is a given that *The Assayer* embodies one of the apogees of Galileo’s body of work. The scientist displays absolute mastery of the ‘medium’ in that work. On the one hand, he shows peculiar connotative and rhetorical creativity, for example in the irony with which he does

¹⁵ “in parecchi luoghi altamente il commenda”, *ibid.*, p. VII.

¹⁶ “Troppo lunga manifattura sarebbe il volere andar notando a cosa per cosa tutto quello, che in quest’opera è di mendoso, però in universale si dice lo stile esser quasi sempre languido, sforzato e male spressivo, si che per maggior brevità andremo più tosto notando quei luoghi dove l’Autore ha del buono, che pur pur ce ne sono alcuni”, Gaileo Galilei: *Considerazioni al Tasso*, from *Edizione digitale delle opere complete di Galileo Galilei*, Vol. IX, p. 66, <http://pinakes.imss.fi.it:8080/pinakestext/home.jsf> (accessed November 6, 2010).

not hesitate to emphasize the subjectivity of his judgements with the rhetorical aim of attracting readers to his own position, and to obtain from them a sort of ‘favourable vote’, to the detriment of Galileo’s opponents. On the other hand, the author reveals the denotative precision of his scientific language. One of the most relevant literary aspects of *The Assayer* is the perfectly harmonic alternation of these two typologies of language, an alternation which turns out to be a symbiotic mechanism within the structure of the book.

But what interests me here is how the structure of Galileo’s attack in *Considerazioni al Tasso* (i.e. a critical essay, generally considered among Galileo’s less important works) on *Jerusalem Delivered* is, in some respects, similar to the one he adopted in *The Assayer* against the theories of the Jesuit scientist and philosopher Orazio Grassi, who published under the pseudonym of Lothario Sarsi Sigensano. In two different genres – on the one hand literary criticism, on the other, scientific treatise – Galileo seems to present surprisingly similar linguistic and expressive criteria. In addition to the technical and objective analysis of two phenomena (a ‘poetico-linguistic’ one in *Considerazioni al Tasso* and a ‘philosophical-scientific’ one in *The Assayer*), Galileo tends to dialectically ‘persuade’ the reader by adopting syntactical and stylistic choices and specific rhetorical devices. Though chronological and substantial differences obviously separate the two works, these choices and devices present a common characteristic of crucial importance: while in the past they were mainly used in literary works, Galileo adapts them in an original manner to the genre of scientific treatises. In other words, the fundamental novelty in Galilean writing is that mimesis becomes an essential part of the ‘essay’.

Like authors of literary works of fiction, Galileo is here searching for balance between ‘standard’ and ‘deviation’, both on a morphological and on a semantic plane – that is to say Galileo is properly searching for his own style. In *The Assayer* Galileo’s stylistic research reaches a maturity he perhaps does not even achieve in his two latter masterpieces.¹⁷ Nevertheless, it is in *Considerazioni al Tasso* that the expressive principles of that research begin to develop. Before taking the language of the two works into consideration, it is worth dwelling

¹⁷ *Dialogue Concerning the Two Chief World Systems* (1632) and *Discourses and Mathematical Demonstrations Relating to Two New Sciences* (1638).

on the peculiar history of *Considerazioni al Tasso*.¹⁸ Astonishingly, Galileo lost this work, and Viviani, who is not able to explain how, declares that Galileo was rather disappointed at the loss:

In Pisa, a friend of Galileo's – I think it was probably Mr. Iacopo Mazzoni – asked him several times for this demanding work and finally Galileo gave it to him, but after that he never was able to retrieve it, and he sometimes talked about his sadness over the loss of that study, as he claimed he wrote it with complaisance and delight.¹⁹

The dimensions of the treatise and the dedication it demanded of its author makes one imagine that Galileo wrote this work not only for reasons of pure 'complaisance and delight'. The work remained unknown until the Abbott Pier Antonio Serassi (1721–1791) found a manuscript (known as Barberiniano XLV.2) in a Roman library and recognized in it an apograph of Galileo's *Considerazioni al Tasso*. Serassi transcribed the text and hid it, since he was a devoted admirer of Tasso and did not approve of Galileo's destructive criticism of *Jerusalem Delivered*. When Serassi died, Don Baldassarre Odescalchi, Duke of Ceri, obtained his documents, discovered the important work among them, and passed it to the Roman literati Pietro Pasqualoni, who finally published it (1793) with a brief introduction by himself.²⁰

¹⁸ According to Pietro Pasqualoni's introduction of *Considerazioni al Tasso* (see footnote 12), Galileo wrote *Considerazioni* in 1590, at the age of twenty-six, when he still lived in Pisa (see p. IV of this introduction). Pasqualoni does not adduce any historico-philological evidence to support his own opinion. Actually, there are no elements that testify the exact period of composition of *Considerazioni al Tasso*. According to Antonio Favaro (see footnote 1), the text could have been written in different moments in Galileo's life and the possibility that some passages of the work were written when Tasso (who died in 1595) was still alive cannot be ruled out. In all probability, *Considerazioni al Tasso* was written prior 1609. (See *Edizione digitale delle opere complete di Galileo Galilei*, Vol IX, p. 12–13).

¹⁹ "Questa fatica gli fu domandata più volte con grandissima istanza da amico suo, mentre era in Pisa, e credo fusse il Sig.r Iacopo Mazzoni, al quale finalmente la diede, ma poi non poté mai recuperarla, dolendosi alcuna volta con sentimento della perdita di tale studio, nel quale egli stesso diceva aver avuto qualche compiacenza et diletto." Vincenzio Viviani, *Racconto storico di Vincenzio Viviani*, from *Edizione digitale delle opere complete di Galileo Galilei*, Vol. XIX, p. 627, <http://pinakes.imss.fi.it:8080/pinakestext/home.jsf> (accessed November 5, 2010).

²⁰ Angelo Solerti, *Vita di Torquato Tasso*, Torino-Roma: Ermanno Loescher, 1895, Vol. I, pp. 451–452, <http://www.archive.org/stream/vitaditorquatot02solegoog#page/n525/mode/lup> (accessed November 5, 2010).

4. Rhetorical and stylistic devices in *Considerazioni al Tasso* and in *The Assayer*

Before observing the correspondences of particular aspects of the two works, it is worth noting how their structural setting is also similar: in *Considerazioni al Tasso* Galileo transcribes all those excerpts from *Jerusalem Delivered* he intends to critically analyse. In *The Assayer*, at the beginning of each chapter, he includes long excerpts of Sarsi's/Grassi's *Libra astronomica* (*Astronomic Scale*, 1619)²¹, in order to confute them.²²

The Assayer is an epistolary essay. Galileo dedicates his work to Virginio Cesarini, an Academic of Lynxes who also was the Chamberlain of Pope Urban VIII. The form and the vulgar tongue establishes a dialogic relationship with the addressee, brought out by the frequent use of allocutions: “And I wanted, Your Excellency, that before everyone else thou should be the reader of my reply”²³; or: “Nevertheless, I remained resolute in talking and writing to Your Excellency”²⁴.

If the use of courtesy pronouns is not particularly remarkable in an epistolary work, Galileo nevertheless seems to draw on the dialogic relation in order to subtly take advantage of it and to use it as a full-blown cooptation. The addressee suddenly becomes a sort of

²¹ The complete title of this work, a treatise in Latin, is *Libra astronomica ac philosophica, qua Galilaei Galilaei opiniones de cometis a Mario Guiducio in Florentina Academia expositae, atque in lucem nuper editae, examinantur a Lothario Sarsio Sigensano*. (Astronomic and philosophic scale by which Galileo Galilei's opinions about comets, exposed by Mario Guiducci at The Academy of Florence, and recently published, will be examined by Lothario Sarsi Sigensano). In 1619 Orazio Grassi published this work under the pseudonym of Lothario Sarsi Sigensano. The treatise was such a public, open, and harsh accusation against Galileo and his theories that Galileo could not ignore it. *Il Saggiatore* is the reply to Lothario Sarsi's alias Orazio Grassi's work.

²² In this way the reader can follow all the issues of the debate without necessarily owning all the books related to the debate itself (i.e. the original text and Galileo's confutations), since he can take advantage of all the material concerning information, data, and items of discussion by just owning Galileo's book. This fact, more than the adoption of the vernacular – adoption suggested by personal propagandistic necessity – significantly testify Galilean openness to ‘culture accessibility’.

²³ “Ed ho voluto, Illustrissimo Signore, ch'ella sia prima d'ogni altro lo spettator di questa mia replica”, Galileo Galilei, *Il Saggiatore* (1623), Milano: Feltrinelli Editore, Universale Economica – I Classici, 2008 [first edition, 1965], p. 15.

²⁴ “Ho nondimeno mantenuta l'istessa risoluzione di parlar con V.S. Illustrissima ed a Lei scrivere”, *ibid.*, p. 16.

effective assistant and a supporter of Galileo's reasoning against Sarsi's argumentations: "And for Mr. Sarsi's comprehension, Your Excellency could, in case thou meet him, suggest him two given straight lines AB, CD [...] and tell him [...] then, so that we may understand, ask him to describe, [...] since I confess I am not able to do it."²⁵; "Now I'll go explaining some very little doubts that come to me when I look to Mr. Sarsi's procedure, doubts that Your Distinguished Sir can eventually show him, in order that he [Sarsi], by removing them could even more perfectly re-establish the order of everything."²⁶; "I ask Your Excellence to show him [Sarsi] once how it is possible, on a mid-summer day, to freeze wine by shaking it strongly"²⁷.

Moreover, Galileo refines his rhetorical process by using the first person plural in such a way as to establish a relationship of complicity with the addressee (and, by extension, with the reader): "Let us listen to him and then we will follow the theory we consider as the most appropriate."²⁸; "Therefore, if we consider this subject again, we will find it defective"²⁹; "But Your Excellency, let us listen to what finally Mr. Sarsi produces."³⁰

The systematic confutations of *Libra astronomica* are directly addressed to Cesarini, but Galileo very often interrupts this sort of ideal connection with his privileged interlocutor and directs his sarcasm straight at his opponent, Sarsi. The aim of this alternation and double addressing is to gradually cut the opponent off from the consideration of the reader: "Well, Mr. Sarsi, forgive me: [...] I am quite surprised when I see you bringing this aforementioned discourse with a doctrinal style, as if you have the intention of teach-

25 "E per intelligenza del Sarsi, V.S. Illustrissima potrà una volta, incontrandolo, proporgli due tali linee rette AB, CD [...] e dirgli [...] lo prieghi poi, che per nostro ammaestramento egli descriva [...] perché io confesso di non lo saper fare." Ibid, p. 59.

26 "Io [...] andrò promovendo alcuni dubbietti che mi nascono nel progresso del Sarsi, i quali V.S. Illustrissima, se così le piacerà, potrà con qualche occasione mostrare a lui, acciò, col togli via, possa tanto più perfettamente stabilire il tutto." Ibid, p. 94.

27 "Io prego V.S. Illustrissima a farli una volta veder di meza state ghiacciare il vino per via d'una veloce agitazione", ibid, p. 248.

28 "Sentiamolo, e poi prenderemo quel partito che ci parrà più opportuno." Ibid, p. 72.

29 "Per tanto, se noi torneremo a considerar meglio questo argomento, lo troveremo esser difettoso", ibid, p. 95.

30 "Ma sentiamo, Illustrissimo Signore, quello che in ultimo il Sarsi produce." Ibid, p. 177.

ing it to me”³¹; “Alas, Mr. Sarsi, what kind of absurdity do you write?”³²; “Stop it then, and keep quiet.”³³

If *Considerazioni al Tasso* cannot strictly be categorized as an epistolary work, since there is no specific addressee in it, nevertheless one can also observe in this work the ‘dialogue’ between Galileo and his public and between Galileo and his ‘opponent’. In fact, this dialogue is the leitmotif of the work itself. As in *The Assayer*, the rhetorical aim is the same, only in a grosser way: to humiliate the sitting duck, in this case a literary sitting duck, unable to defend itself or to counterattack.³⁴ Galileo vehemently attacks Tasso’s very poetical standards and abilities – as in *The Assayer* he would attack Sarsi’s/Grassi’s scientific ones, more than ten years later³⁵ – with a sarcasm that often turns to insult: “Come on, Mr. Tasso, this is not your job, you will end up smearing a lot of papers and you will make a mush for dogs.”³⁶; “Here we are again, Mr. Tasso, with your intricate somersaults.”³⁷; “Mr. Tasso, this is childish rubbish”³⁸; “Oh, my dear Mr. Tasso, do you not realize how many words you waste by saying things without substance, without intelligence, without anything at all?”³⁹

Furthermore, Galileo often directs his fierce derision towards the characters of *Jerusalem Delivered*: “Easy, easy, Lady Clorinda; you are a bit too much free with your hands; let him at least catch his breath, that poor guy, don’t start beating him again so soon.”⁴⁰;

31 “Ma, Signor Sarsi, perdonatemi: [...] io non poco mi meraviglio nel vedervi portar questo precedente discorso con maniera dottrinale, quasi che voi lo vogliate insegnare a me”, *ibid.*, p. 107.

32 “Oimé, Signor Sarsi, e quali essorbitanze scrivete voi?” *Ibid.*, p. 224.

33 “Cedete dunque, e tacete.” *Ibid.*, p. 290.

34 See footnote 18.

35 See footnote 18.

36 “Eh, Sig. Tasso, questo non è mestier da voi; impiastreterete di molte carte, e farete una panicia da cani.” Galileo Galilei, *Considerazioni al Tasso*, from *Edizione digitale delle opere complete di Galileo Galilei*, Vol IX, p. 67, <http://pinakes.imss.fi.it:8080/pinakestext/home.jsf> (accessed November 5, 2010).

37 “E pur torniamo alle capriole intrecciate, Signor Tasso.” *Ibid.*, p. 75.

38 “Queste, Sig. Tasso, sono porcheriole da bambini”, *ibid.*, p. 90.

39 “Oh, Sig. Tasso mio da bene, non v’accorgete voi quante parole andate buttando via in dir cose senza sugo, senza concetto, senza niente?” *Ibid.*, p. 129.

40 “Pian un poco, Madonna Clorinda; voi siate un poco troppa manesca; lasciatel al manco ripigliar fiato a quel povero garzone, e non lo cominciate a ripicchiare così subitamente.” *Ibid.*, p. 85.

“Tancredi [...], you silly ugly bean; I beg you, go and play with dolls.”⁴¹

Somehow, in the transposition of the caustic sarcasm, the characters in Tasso’s work could be considered as equivalent to the characters in the *Libra astronomica*, that is equivalent to the ancient authorities which Sarsi/Grassi defends (while Galileo ridicules them), according to the typical tradition of the Jesuit school:

If Sarsi wants me to give credit to Suida [the title of a Byzantine encyclopaedia, which probably dated back to tenth century and consisted of about 30000 entries] when it says that the Babylonians used to hard-boil eggs by quickly spinning them with their slings, well, I will; but I will also tell the reason, which is far different from the one attributed to this phenomenon [...] now, we are not lacking in eggs or slings, or strong men who are able to spin them, and yet the eggs do not get hard-boiled, on the contrary, if they were hot, they would soon get cold; in conclusion, since we are not from Babylon, the only cause of the hardening is not the air friction, but rather in their being Babylonians [...]⁴²

Sarsi invites me to listen carefully to Seneca’s theory and then he asks me whether it was possible to express oneself in a clearer and smarter way; I totally assent and I confirm that it was not possible to express oneself either in a smarter or in a more explicit way to tell a lie.⁴³

The tangle of the addressees, which is organized in order to ridicule the opponent, could not be complete, as aforementioned, without

⁴¹ “Tancredi [...], fagiolaccio scimunito; di grazia, va’ a giocar alle comarucchie.” Ibid, p. 86.

⁴² “Se il Sarsi vuole ch’io creda a Suida che i Babilonii cocesser l’uova col girarle velocemente nella fionda, io lo crederò; ma dirò bene, la cagione di tal effetto esser lontanissima da quella che gli viene attribuita [...] ora, a noi non mancano uova, né fionde, né uomini robusti che le girino, e pur non si cuocono, anzi, se fusser calde, si raffreddano più presto; e perché non ci manca altro che d’esser di Babilonia, dunque l’esser Babilonie è causa dell’indurirsi l’uova, e non l’attrizion dell’aria”, Galileo Galilei, *Il Saggiatore*, p. 247–248.

⁴³ “All’invito che mi fa il Sarsi ad ascoltare attentamente quello che dice Seneca, e ch’egli poi mi domanda se si poteva dir cosa più chiaramente e più sottilmente, io gli presto tutto il mio assenso, e confermo che non si poteva né più sottilmente né più apertamente dire una bugia.” Ibid, p. 248.

references to the readers themselves, that is the public in general. In *Considerazioni al Tasso*, the public is directly invoked to testify Tasso's literary subterfuges: "But please, go to the next verses and imagine Goffredo showing himself to the soldiers as a bride to her relatives"⁴⁴; "Hear, for your lives' sake, the harshness in these two verses"⁴⁵.

On the other hand, in the *The Assayer*, the public is called upon in an indirect way – Mr. Cesarini being the proper addressee – and sometimes it needs to be protected and supported as a 'victim' – just like Galileo himself was – against Sarsi's deceptive theories and procedures: "It seems to me that Sarsi tries to dupe the reader, as he feels unable to do anything else: but I will try to uncover his tricks."⁴⁶ Sometimes the readers display the same kind of 'intelligence' the author displays, so that they can not be misled by the grossness of the opponent: "My surprise is growing and growing inside me when I see how frequently Sarsi pretends he is not seeing things that are just in front of him. Maybe he hopes that his actions could have the effect of making other people really blind."⁴⁷; "Actually, Mr. Lothario, you really need a very simple minded and a not very enlightened reader."⁴⁸

These examples demonstrate how the structural categories of narrator and narratee, which usually apply to narrative, could be perfectly applicable to Galileo's two treatises. In fact, the previous examples testify how, in the two works in question, the category of narratee is even variable, so that these works could be analysed from different points of readerly perspective, that is to say from different epistemological dimensions (the latter being unusual, in

44 "Ma venite pure a quel che segue appresso e figuratevi il mostrarsi di Goffredo a' Soldati, come la sposa al parentado", Galileo Galilei, *Considerazioni al Tasso*, from *Edizione digitale delle opere complete di Galileo Galilei*, Vol IX, p. 67, <http://pinakes.imss.fi.it:8080/pinakestext/home.jsf> (accessed November 5, 2010).

45 "Sentite, per vita vostra, che durezza è in questi due versi", *ibid*, p. 73.

46 "Parmi che 'l Sarsi, sentendosi di non poter far altro, cerchi d'avviluppare il lettore: ma io cercherò di disfare i viluppi." Galileo Galilei, *Il Saggiatore*, p. 57.

47 "Séguita, anzi pur cresce, in me la meraviglia nata dal veder quanto frequentemente il Sarsi vada dissimulando di vedere le cose ch'egli ha dinanzi agli occhi, con speranza forse che la sua dissimulazione abbia negli altri a partorire non una simulata, ma una vera cecità." *Ibid*, p. 158.

48 "Veramente, Signor Lottario, voi siete molto bisognoso che nel lettore sia una gran semplicità ed una piccola avvertenza." *Ibid*, p. 167.

‘analytic’ treatises). In *Considerazioni al Tasso* the narratee is represented by Tasso himself, but it is also represented by the public of the readers Galileo explicitly addressees and even by that sort of ‘fictional narratee’ the characters of *Jerusalem Delivered* embody. In *The Assayer* the formal narratee is obviously Mr. Cesarini, but Galileo’s references to Sarsi/Grassi as narratee are also very frequent, as well as the direct aforementioned appeal to the narratee/public and the references to the authorities of the classic Latin and Greek world (to some extent ‘indirect narratees’) that Sarsi’s theories hark back to.

This multidimensional presence of the narratee is associated with the presence of a narrator who, by contrast, is never fictitious: Galileo. But the contrast to narrative works is just apparent. In fact Galileo properly activates his own dialogic performance, for he constructs himself and refers to himself also as an ‘actor’ who talks, makes others talk, interacts with his own characters, or narratees. In other words, the narrator Galileo puts his word ‘on stage’ by turning it into a rhetorical word. In order to do that, he employs different registers – just like narrative and theatre do – according to the setting and to the variable addressee (his opponents, characters in his opponents’ works, his public, or a generic implied reader). By starting with *Considerazioni*, what could be defined as Galileo’s stylistic-literary hallmark is developed through the exploitation of extremely heterogeneous linguistic material, but this hallmark focuses on a characteristic which also belongs to Galileo’s later works and is particularly evident in *The Assayer*: a constant interaction and alternation between components of high culture and refined writing on one hand, and popular and ‘living’ elements of oral expression on the other. Little by little critics have shaped the image of Galileo as a man of letters on this basis, that is, on the continuous switching between an educated and a popular code; hence they have sometimes represented him as an author strongly influenced by the Italian *scrittura aurea* (‘golden writing’) of the fifteenth century’s Renaissance yet immersed in the creative flair of a baroque aesthetic. As Andrea Battistini states in his seminal essay on *The Assayer*, Galileo was undoubtedly formed by the culture of the fifteenth century, while the influence of the baroque, with its demand for renewal, is undeniable. Other factors also mat-

ter, for instance those connected to the character of the scientist, to his exuberant, combative ‘tuscanity’, which never shrank from a dialectical fight.⁴⁹ Galileo discusses science (and, in the *Considerazioni al Tasso*, literature) by using the vernacular, but the real Galilean revolution consists in adopting genres (i.e. the dialogue and the epistle) which – in their peculiar characteristics – the Tuscan scientist modifies in a literary-artistic sense. With Galileo, if the concept of gnoseology is not slavish adherence to the principle of authority anymore, it is mostly due to the formal-dialectical transformation Galileo brought to ‘scientific’ language, that is to say to its mimetic evolution. At the top of the argument, the refined metaphor predominates by virtue of its own elegance, the one which leads Giacomo Leopardi, one of the most important Italian poets and philosophers of the nineteenth century, to write: “Concerning the association between precision and elegance, Galileo’s style is a splendid example among the Italian writers.”⁵⁰ In *The Assayer*, for instance, the ‘equestrian’ metaphor, which refers to the dialectic process, is celebrated:

I cannot help being surprised when Sarsi wants to persist in proving his case by bringing witnesses for what I can see every time by experience. If the discussion about a difficult question were just like carrying weights, so that several horses could carry more corn sacks than one horse could do, I should acknowledge that many discussions count more than one; but discussion is like running, not like carrying, and one single Berber horse will be able to run more than a hundred Friesian horses.⁵¹

⁴⁹ Andrea Battistini, *Galileo e i gesuiti. Miti letterari e retorica della scienza*, Milano: Vita e pensiero, 2000, pp. 132–133.

⁵⁰ Giacomo Leopardi, *Zibaldone di pensieri*, Milano: Arnoldo Mondadori Editore, 1994 [first edition, 1937], p. 477. *Zibaldone di pensieri* is a sort of huge philosophical diary, which consists of 3619 pages. Leopardi began to work on it in 1817 and wrote the last page in 1832. It was published posthumously in seven volumes in 1898 with the original title of *Pensieri di varia filosofia e bella letteratura* (Various thoughts on philosophy and literature). In 1937 the work, enriched with notes and indexes by the literary critic Francesco Flora, was published with the name by which it is known today.

⁵¹ “Io non posso non ritornare a meravigliarmi, che pur il Sarsi voglia persistere a provarmi per via di testimonii quello chi’io posso ad ogn’ora veder per via d’esperienze. [...] Se il discorrere circa un problema difficile fusse come il portar pesi, dove molti cavalli porteran-

In another famous metaphor Galileo compares literature and science when attacking Jesuit scientists uncritical of Aristotelian theories:

Maybe [Mr. Sarsi] thinks that philosophy is a book and a fantasy of a single man, like Iliad and Orlando furioso, books where truthfulness is the least important issue. Mr. Sarsi, it is not like this. Philosophy is written in a huge book in which every moment is open in front of us (I mean the universe), but it cannot be understood if we do not learn its language and its alphabetic characters beforehand. It is written in mathematic language and its characters are triangles, circles and other geometric shapes and without knowing them it is not possible for human beings to understand a word of it. Being unaware of them is like wandering in a dark labyrinth.⁵²

In *Considerazioni al Tasso* the use of the ‘high’ metaphor is less frequent and less varied. Nevertheless, in this work it is possible to observe its efficacy, and elegance, for instance in the similes Galileo applies to Tasso’s style, with regard to literature and painting:

His narrative style is similar to an inlay rather than an oil painting, as the inlay is a patchwork made with wooden sticks of different colours and even if they are put together in the smoothest way, their edges still remain sharp and their different colours continue to contrast substantially, so that the pictures perforce turn out dry and plain, without any emphasis, while in oil painting, since the edges gradually shade from one colour into another, the painting becomes smooth, accomplished, with vigour and emphasis. Ariosto

no più sacca di grano che un caval solo, io acconsentirei che i molti discorsi facesser più che uno solo; ma il discorrere è come il correre, e non come il portare, ed un caval berbero solo correrà più che cento frisoni.” Galileo Galilei, *Il Saggiatore*, p. 247.

⁵² “e forse stima che la filosofia sia un libro e una fantasia d’un uomo, come l’Iliade e l’Orlando furioso, libri nei quali la meno importante cosa è che quel che vi sia scritto sia vero. Signor 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 si 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 altre figure geometriche, senza i quali mezzi è impossibile a intenderne umanamente parola; senza questi è un aggirarsi vanamente per un oscuro laberinto.” Ibid, p. 38.

can shade and soften [...] Tasso can only build his works in a fragmented, dry and rough way [...]⁵³

Draughtsmanship and colour in painting correspond to sentences and expressions in poetry. When these items are put into works with grace, they add up to a perfect imitation and representation, which are the core and the essential characteristic of these two forms of art. The more a painter or a poet will put his figures in front of our eyes by using these items, the more excellent he will be considered.⁵⁴

The organization of the linguistic apparatus, the extreme precision of the reasoning, and the difficulty of the subject require an adequate clarification and explanation through the use of ‘high’ metaphors and refined elegance, which, in fact, predominate in Galilean works. However, what characterizes and makes Galileo’s style unique – in terms opposite to the ‘elegance’ and organically related to it – are the idiomatic, popular, slangy expressions: the ‘lively’ and ‘talking’ components of the language. They are skilfully inserted into the generally refined text and instil real strength and novelty in Galilean ‘speech’. According to Cicero, “the supreme orator is the one whose words are able to instruct, amuse and arouse the soul of the listeners.”⁵⁵ By considering the literary drift of the ancient principles of rhetoric – originally connected to the *ars oratoria* (‘oratorical art’) –

⁵³ “la sua narrazione ne riesce più presto una pittura intarsiata, che colorita a olio: perchè, essendo le tarsie un accozzamento di legnetti di diversi colori, con i quali non possono già mai accoppiarsi e unirsi così dolcemente che non restino i lor confini taglienti e dalla diversità de’ colori crudamente distinti, rendono per necessità le lor figure secche, crude, senza tondezza e rilievo; dove che nel colorito a olio, sfumandosi dolcemente i confini, si passa senza crudezza dall’una all’altra tinta, onde la pittura riesce morbida, tonda, con forza e con rilievo. Sfuma e tondeggia l’Ariosto [...] rottamente, seccamente e crudamente conduce le sue opere il Tasso”, Galileo Galilei, *Considerazioni al Tasso*, from *Edizione digitale delle opere complete di Galileo Galilei*, Vol. IX, p. 63, <http://pinakes.imss.fi.it:8080/pinakestext/home.jsf> (accessed November 5, 2010).

⁵⁴ “Abbiamo in pittura il disegno e ’l colorito, alli quali molto acconciamente risponde in poesia la sentenza e la locuzione: le quali due parti, quando siano aggiunte col decoro, rendono la imitazione e rappresentazione perfetta, che è l’anima e la essenzial forma di queste due arti; e quello si dirà più eccellente pittore o poeta, il quale con questi due mezzi più vivamente ci porrà innanzi a gli occhi le sue figure.” Ibid, p. 76.

⁵⁵ “Optimus est enim orator qui dicendo animos audientium et docet et delectat et permovet.” Marcus Tullius Cicero (1949), *De Inventione, De Optimo Genere Oratorum, Topica*, with an English Translation by H.M. Hubbell, London: William Heinemann Ltd; Cambridge, Massachusset: Harvard University Press, p. 356.

the characteristics of the supreme orator perfectly match Galilean literary style. Cicero, whose work Galileo knew (the Latin author was part of the normal cycle of studies of every educated person in Galileo's time), states that the supreme orator is "in duty bound to instruct; giving pleasure is a free gift to the audience, to arouse it is indispensable."⁵⁶ One can say that, in Galileo, the 'high' elements of language (those which employ elegant metaphors) are particularly related to the function of instructing and giving pleasure to the reader, while the elements of orality (which will be considered below) are connected to the function of arousal. In fact, the use of a deeply informal linguistic register constitutes the very Galilean *pars destruens* that once and for all reduces his opponents to immature, childish individuals and is at the same time popular with the public. If elements of orality are well-known and evident in *The Assayer*, in the style of *Considerazioni al Tasso* – a style obviously rougher and undoubtedly less rich – we observe *in nuce* constituent parts of a structure in which the oratorical technique clearly plays a fundamental role. As mentioned above, the supposed puerility of the opponents is the best strategy to discredit them. In *Considerazioni al Tasso*, Tasso himself and his stanzas are caught in the trap of immaturity: "These are ways of wheedling that young people like very much"⁵⁷; "This is one of those jokes that children like"⁵⁸. In *The Assayer*, Sarsi is similarly derided: "Someone could infer a not very fair consequence for Sarsi. Either he considers his own conclusion ingenious [...] but if he thinks it is a special and grave idea, I cannot avoid judging him as a poor soul who needs to abide again by a teacher's authority."⁵⁹; "Childish thoughts and discourses indeed, which one moment support and the other oppose the same ideas, according to their puerile inconstancy."⁶⁰

⁵⁶ "Docere debitum est, delectare honorarium, permovere necessarium." Ibid, p. 356.

⁵⁷ "Questi son di quei scambietti che piacciono assai a' giovani", ibid, p. 74.

⁵⁸ "Questo è un di quelli scherzetti che piacciono a i fanciulli", ibid, p. 77.

⁵⁹ "alcuno potrebbe dedurre forse una conseguenza non molto insigne pel Sarsi. Imperocchè o egli stima questa sua conclusione e dimostrazione per cosa ingegnosa [...] o vero per una cosuccia da essere anco ritrovata da' fanciulli [...] ma se ei l'ha per cosa sottile e di momento, io non saperei come non far giudizio ch'ei fusse povero affatto e bisognoso di ritornar sotto la disciplina del maestro." Galileo Galilei, *Il Saggiatore*, p. 172–173.

⁶⁰ "pensieri e discorsi appunto fanciulleschi, che or vogliono ed or rifiutano le medesime cose, secondo che la sua puerile incostanza loro detta." Ibid, p. 201.

The use of direct interrogative sentences aims to debunk the opponents and their intelligence. Rhetorical questions drastically reduce the reputation of Tasso: “Who, listening to such a poetical and figurative speaking, could not fall over laughing?”⁶¹; “How is it possible that this author, who after all can express himself in an elegant style, has such a tin ear that he cannot recognize these mawkish expressions?”⁶² The same rhetorical device exposes the falseness of Sarsi’s convictions: “But, my dear Mr. Lothario [...] what will you do with your syllogism? What will your conclusion be? Nothing.”⁶³; “Alas, am I not aware that time flies? Should I waste my time on these childish issues?”⁶⁴; “You then, Mr. Sarsi, are you accusing me of being a poor experimenter, while in the same experiment your mistakes are evidently as serious?”⁶⁵.

The characteristic of the interrogative sentence is theatrical in itself, but Galileo reinforces that theatricalism by using terms or expressions directly derived from spoken and performative language (and whose translation does not convey their incisiveness):

- Idiomatic and slang expressions:
 - In *Considerazioni al Tasso*: “By the way, remember that this is the second time you fill our ears with these very unspecific things; before the end of the party there will be more than two dozen of them.”⁶⁶; “He began to tap into the box of the ‘big’, in order to season so many soups made of ‘big’ bulls,

61 “chi non creperà di ridere sentendo questo parlar così poetico e figurato?” Galileo Galilei, *Considerazioni al Tasso*, from *Edizione digitale delle opere complete di Galileo Galilei*, Vol. IX, p. 83, <http://pinakes.imss.fi.it:8080/pinakestext/home.jsf> (accessed November 5, 2010).

62 “Come è possibile che questo autore, che pur dice delle cose buone, non abbia orecchio da conoscere queste putterie?” *Ibid.*, p. 88.

63 “Ma, Signor Lottario mio [...] che farete voi del vostro sillogismo? che ne concluderete? Niente.” Galileo Galilei, *Il Saggiatore*, p. 179.

64 “Aimé, e non m’accorgo del fuggir dell’ore? e vo logorando il mio tempo intorno a queste puerizie?” *Ibid.*, p. 225.

65 “Voi dunque, Signor Sarsi, mi tassate per cattivo sperimentatore, mentre nell’istesso maneggio errate quanto più gravemente errar si possa?” *Ibid.*, p. 298.

66 “o ricordatevi che questa è la seconda volta che ci avete intonate negli orecchi quelle vostre cose generalissime; perchè avanti che la festa finisca, s’ha da passar le due dozzine.” Galileo Galilei, *Considerazioni al Tasso*, from *Edizione digitale delle opere complete di Galileo Galilei*, Vol. IX, p. 67, <http://pinakes.imss.fi.it:8080/pinakestext/home.jsf> (accessed November 5, 2010).

‘big’ bodies, ‘big’ horses and many other ‘big’ things”⁶⁷; “Without showing one’s own business.”⁶⁸; “In this way you will splatter the eggs in their egg basket.”⁶⁹; “Great princes do not talk like this. These expressions rather suit the jacks of the silk weavers”⁷⁰.

- In *The Assayer*: “Not as a joke”⁷¹; “For you [Mr. Sarsi] I am just going to mention some details about various little things, just like this, little by little.”⁷²; “Chopping the air is a bigger waste of time than (as the saying goes) crushing water in a mortar.”⁷³; “I will wear you [Mr. Sarsi] down”⁷⁴; “These other subterfuges of yours [...] are, as they say, worthless things”⁷⁵.
- Interjections:
 - In *Considerazioni al Tasso*: “Eh, Mr. Tasso”⁷⁶; “Oh, good king, oh, good wizard!”⁷⁷
 - In *The Assayer*: “Ah, Mr. Lottario”⁷⁸; “Alas, Mr. Sarsi”⁷⁹.

67 “si comincia a metter mano alla scatola del grande, per condire, come si vedrà nel progresso, molte e molte minestre di gran capi, gran tauri, gran corpi, gran cavalli, e di molte altre gran cose”, *ibid.*, p. 79.

68 “senza andar col cimbalo in colombaja.” *Ibid.*, p. 80. The expression “andar col cimbalo in colombaja” – today obsolete – was quite coarse, as in the fifteenth–sixteenth century it literally meant ‘to show one’s ass’ (= to show one’s own business).

69 “e si sconcierai l’uova nel paneruzolo.” *Ibid.*, p. 101.

70 “Non si parla così tra i principi grandi. Questi son progressi convenienti a i fattori de’ setaio-li.” *Ibid.*, p. 110.

71 “fuor di burle”, Galileo Galilei, *Il Saggiatore*, p. 42.

72 “le anderò solamente toccando alcuni particolari sopra varie cosette così alla spezzata.” *Ibid.*, p. 221.

73 “e tritar l’aria sia maggior perdimento di tempo che quello di chi vuole (com’è in proverbio) pestar l’acqua nel mortaio.” *Ibid.*, p. 229.

74 “Io vi voglio pigliare alla stracca”, *ibid.*, p. 289.

75 “Questi altri vostri diverticoli [...] son, come si dice, pannicelli caldi”, *ibid.*, p. 283.

76 “Eh, Sig. Tasso”, Galileo Galilei, *Considerazioni al Tasso*, from *Edizione digitale delle opere complete di Galileo Galilei*, Vol. IX, p. 67, <http://pinakes.imss.fi.it:8080/pinakestext/home.jsf> (accessed November 5, 2010).

77 “Oh bel re, oh bel mago!” *Ibid.*, p. 97.

78 “Ah, Signor Lottario”, Galileo Galilei, *Il Saggiatore*, p. 188.

79 “Oimè, Signor Sarsi”, *ibid.*, p. 224.

In the two works it is possible to find other similar elements, with the frequent use of the exhortative *orsù* ('come on')⁸⁰.

- Dialectizations:
 - In *Considerazioni al Tasso*:
rigangherare ('to patch up'), *raccozare*⁸¹ ('to jumble up').
 - In *The Assayer*:
*abbarbagliar*⁸² ('to dazzle'), *ingarbare*⁸³ ('to adapt', 'to accommodate').

In his systematic intellectual annihilation of his opponents, Galileo not only emphasizes their immaturity, but he also mentions his own inability to understand their 'abstruse' literary techniques: "I sincerely confess that I can not grasp the meaning of these two verses, though I puzzled over them many times"⁸⁴; their philosophico-scientific procedures: "Then, so that we may understand, ask him to describe, [...] since I confess I am not able to do it."⁸⁵; even their language is stigmatized by Galileo: Tasso's stanzas are arrogant and obscure: "In order to understand them, it is necessary to stop reading them for half an hour, at the risk of losing the thread in the meantime. So, they are brain teasers [...] better to let children puzzle over them, as nobody cares if children take a whole month to solve them."⁸⁶

⁸⁰ In *Considerazioni al Tasso*, from *Edizione digitale delle opere complete di Galileo Galilei*, see for instance Vol. IX, p. 80 and p. 93, <http://pinakes.imss.fi.it:8080/pinakestext/home.jsf> (accessed November 5, 2010). In *Il Saggiatore*, see for instance p. 225 and p. 243.

⁸¹ Galileo Galilei, *Considerazioni al Tasso*, from *Edizione digitale delle opere complete di Galileo Galilei*, Vol. IX, p. 67, <http://pinakes.imss.fi.it:8080/pinakestext/home.jsf> (accessed November 5, 2010).

⁸² Galileo Galilei, *Il Saggiatore*, p. 44.

⁸³ *Ibid*, p. 60.

⁸⁴ "Confesso ingenuamente, non saper cavar senso di questi due versi, ben che molte volte vi abbia fantasticato sopra", Galileo Galilei, *Considerazioni al Tasso*, from *Edizione digitale delle opere complete di Galileo Galilei*, Vol. IX, p. 65, <http://pinakes.imss.fi.it:8080/pinakestext/home.jsf> (accessed November 5, 2010).

⁸⁵ "lo prieghi poi, che per nostro ammaestramento egli [il Sarsi] descriva [...] perché io confesso di non lo saper fare." Galileo Galilei, *Il Saggiatore*, p. 59.

⁸⁶ "a ricombinarle insieme, bisogna interrompere la lettura per mez'ora, con rischio di scordarsi in tanto la continuazion del concetto. In somma sono arzigogoli [...] da lasciargli arzigogolare a' fanciulli, che se bene vi stanno intorno un mese per trovargli, non importa niente." Galileo Galilei, *Considerazioni al Tasso*, from *Edizione digitale delle opere complete di Galileo Galilei*, Vol. IX, p. 74, <http://pinakes.imss.fi.it:8080/pinakestext/home.jsf> (accessed November 5, 2010).

Sarsi's theories are regarded as conventional and doctrinaire: "He [Mr. Sarsi] should not think to bring his answers about limitations, distinctions, *per accidens*, *per se*, *mediate*, primary, secondary or other chitchats, otherwise, instead of upholding just one error, he will make a hundred more serious ones, I promise him [...]"⁸⁷

Among these caustic and grotesque elements used to discredit his opponents, Galileo also deploys metaphors connected to the symbolism of animals. Drawn from this symbolism, in *Considerazioni al Tasso* metaphors of animals are related to the realistic and popular register of Tuscan *burlesco* ('burlesque') and to the *facezia* ('joke') of the humanistic tradition, in which comic elements and vulgar, gross, immediately comprehensible jokes are very frequent: "A mush for dogs."⁸⁸; "Aladdin, that sheep"⁸⁹; "Heroes more cowards and more effeminate than a pack of dogs running after a bitch"⁹⁰; "In the last two verses are three concepts that have less to do with each other than the moon with crabs"⁹¹. On the other hand, in *The Assayer*, the animal figures Galileo chooses against his opponent have a more sophisticated relevance and, as Battistini underlines: "For the characteristics of their behaviour as well as for the meanings that Bestiaries attribute to them, they pertain to the canonical figures of satirical code [...]"⁹²

The simile that follows refers to the good and the bad philosophers and to the fact that starlings (the bad philosophers), besides being much more numerous and flying in large flocks, fly at lower altitudes than the eagles (the good philosophers): "Mr. Sarsi, I think they fly like eagles, not like starlings."⁹³

87 "Né si persuadea [il Sarsi] di poter venire con risposte di limitazioni, di distinzioni, di per accidens, di per se, di mediate, di primario, di secondario o d'altre chiacchiere, ch'io l'assicuro che in vece di sostenere un errore ne commetterà cento più gravi", Galileo Galilei, *Il Saggiatore*, p. 235.

88 "paniccia da cani." Galileo Galilei, *Considerazioni al Tasso*, from *Edizione digitale delle opere complete di Galileo Galilei*, Vol. IX, p. 67, <http://pinakes.imss.fi.it:8080/pinakestext/home.jsf> (accessed November 5, 2010).

89 "quella pecora d' Aladino", *ibid*, p. 78.

90 "eroi più vili e effeminati che un branco di cagnoli dietro alla cagna", *ibid*, p. 95.

91 "Ne gli ultimi due versi son tre concetti che non han che fare insieme più che la luna con i granchi", *ibid*, p. 122.

92 "per le caratteristiche del loro comportamento o per i significati attribuiti loro dai bestiari, appartengono alle figure canoniche del codice satirico." Andrea Battistini, *Galileo e i gesuiti*, p. 154.

93 "Io, Signor Sarsi, credo che volino come l'aquile, e non come gli storni." Galileo Galilei, *Il Saggiatore*, p. 48.

The reference to canonical figures is clear whenever Galileo presents the animal figure by using a demonstrative (i.e. “that snake”, “that ape”⁹⁴), which means that he takes the semantics of the metaphor for granted and commonly known. This reference occurs, for instance, when Galileo is ironic about the laboured efforts of Sarsi’s reasoning: “Mr. Sarsi, this behaviour is like that of the snake which was torn and crushed: since its only vital energy left was on the tip of its tail, it kept on shaking the tail, with the result that people could believe the snake was still healthy and strong.”⁹⁵ With the same ironical aim, Galileo emphasizes the necessity of the repetition in the experimental experience, in opposition to the procedure of Sarsi, who superficially trusts his own senses: “I confess [...] that I am like that ape which looks at the mirror and strongly believes that it is looking at another ape. And it runs four or six times behind the mirror before recognizing its own mistake, as the representation of that image is so much alive and real.”⁹⁶

As vulgar comedy (in *Considerazioni*) or canonical representation (in *The Assayer*), the animal metaphor is a “structural constant in the rhetoric of the parody”⁹⁷ and may therefore be considered to be another element of the mimetic representation that characterizes the Galilean text.

5. Conclusion

In spite of his global fame as a scientific revolutionary, Galileo’s work still has its critics. Most of these take the view that in his work the Tuscan scientist managed to hide a great number of sci-

⁹⁴ See footnotes 95–96.

⁹⁵ “Questo, Signor Sarsi, è [...] un far come quella serpe che, lacerata e pesta, non le sendo rimasti più spiriti fuor che nell’estremità della coda, quella va pur tuttavia divincolando, per dare a credere a’ viandanti d’essere ancor sana e gagliarda.” Galileo Galilei, *Il Saggiatore*, p. 102.

⁹⁶ “Io confesso [...] d’esser come quella scimia che crede fermamente veder nello specchio un’altra bertuccia, né prima conosce il suo errore, che quattro o sei volte non sia corsa dietro allo specchio per prenderla: tanto se le rappresenta quel simulacro vivo e vero.” *Ibid.*, p. 119.

⁹⁷ “una costante strutturale nella retorica della parodia”, Andrea Battistini, *Galileo e i gesuiti*, p. 154.

entific distortions. Among the most recent and significant examples, one can quote S. Timpanaro Senior, who sees in Galilean discourse the “ability to find ingenious and plausible argumentations even for false assertions”⁹⁸. An admirer of Galileo, Alexandre Koyré, nonetheless describes the *Dialogue Concerning the Two Chief World Systems* (1632) as “in fact, not a book about astronomy, not even about physics.”⁹⁹ Referring to the body of Galileo’s work (from *The Assayer* to the *Dialogue*), he notices in it a “mixture of ‘science’ and ‘philosophy’”¹⁰⁰, and accentuates the “impossibility, for any historian who has not given up all effort to understand them, of divorcing these two integral aspects of Galileo’s thought.”¹⁰¹ In Paul Feyerabend’s opinion, Galileo “exhibited a style, a sense of humour, an elasticity and elegance, and an awareness of the valuable weakness of human thinking, which has never been equalled in the history of science.”¹⁰² Nonetheless he states that, due to its distortions, “Galileo’s science rests on an *illustrated metaphysics*.”¹⁰³

In a significant passage of *The Assayer*, Galileo maintains that Sarsi pretends to know neither nature nor poetry, and ignores the fact that fantasy and fiction are so necessary to poetry that the latter could not exist without them; at the same time those ‘lies’ are so abhorred by nature that it is more difficult to find even one of them in nature than to find darkness in the light.¹⁰⁴ Galileo levels cutting remarks at Tasso for his pretensions of realism, or, better put, of verisimilitude. In the same way, Galileo satirically picks on Sarsi when he claims to know reality, not for having repeatedly and

98 “abilità di trovare, anche per le proposizioni false, ingegnosi ed apparenti discorsi di probabilità”, S. Timpanaro Senior, *Primato di Galileo*, in *Galilei, Opere*, vol. II, Milano: Rizzoli, 1936, p. 70, in Andrea Battistini, *Galileo e i gesuiti*, p. 128 (footnote 12).

99 Alexandre Koyré, *Galileo Studies*, Hassocks, Sussex: The Harvester Press Limited, 1978, p. 158. First published in France by Hermann & Cie, Editeurs as *Etudes Galiléennes*, 1978.

100 *Ibid*, p. 158.

101 *Ibid*, p. 158.

102 Paul Feyerabend, *Against Method*, London-New York: Verso, 1993 [first edition, 1975], p. 121.

103 *Ibid*, p. 121.

104 “[Sarsi finge] di non conoscere 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 abortite dalla natura, che non meno impossibil cosa è il ritrovarvene pur una, che il trovar tenebre nella luce.” Galileo Galilei, *Il Saggiatore*, p. 42.

unrelentingly explored and researched it, but for having analyzed it on the basis of immediate and personal perceptive experiences, without recognizing their relativity, and ultimately, their fallacy. In Galileo, a substantial, deep acknowledgement of human gnoseologic limits coexisted with the conviction that neither art nor science would be able to trespass those limits. But he neither stopped exploring nor admiring inventions, not only in science but also in the arts. Nevertheless, from the first decades of the sixteenth century, ‘knowledge’ and ‘comprehension’ began to take different directions in so far as specialization and autonomy of human disciplines became more and more strict.¹⁰⁵ One may legitimately say that the novelty and the modernity of Galileo’s style is a form of reaction against the intimate contradiction and the tension caused by the hiatus between knowledge and comprehension that formed an integral part of his personality from his years as a young student. Galileo expresses this hiatus in a very peculiar way: in works from *Considerazioni al Tasso* onwards the thread of logic – from beginning to end – is interwoven, in an argumentative tone, with irony. Indeed, the precise details of the research perhaps become more important than the final result or the general explanations and conclusions. Among the authors who succeeded Galileo, not many might be considered as his heirs.¹⁰⁶ In Italy, in general, the Galilean ‘lesson’ remains isolated for at least two centuries, overshadowed by the specialization of scientific and literary disciplines. Research (not only scientific research) becomes more and more technical and sectoral even in style, as the growth of deno-

¹⁰⁵ In this period scientific works were written not exclusively, but mostly in Latin, and this was a strong restriction per se. In the literary field, Aristotle’s *Poetics* was rediscovered and reinterpreted. The Italian Lodovico Castelvetro (ca. 1505–1571), with his *Poetica d’Aristotele vulgarizzata e sposta* (*The Poetics of Aristotle in the Vulgar Language*) had a fundamental influence on the development of a tight version of the three unities (time, place and action) in European drama. Castelvetro also wrote a commentary for the above-mentioned Bembo’s *Prose della volgar lingua*. In Italy, writings on poetics had started to be very specialist since the first years of the XVI century, but from Bembo’s *Prose* onwards, ‘poetics’ became an out-and-out autonomous discipline for experts only. ‘Universal’ thinkers, responsible for writing with the same mastery about science, literature, philosophy, religion, or cosmology, ‘intellectuals’ like Marsilio Ficino, Niccolò Cusano, Pico della Mirandola, Giordano Bruno and others, seem to have disappeared from the Italian cultural scene.

¹⁰⁶ Roberto Dati (1619–1675), Francesco Redi (1626–1698), and Lorenzo Magalotti (1637–1712) were all scientists and literati alike. They can be considered as the three major successors of Galileo, though their works never reach the sharpness and elegance of their master’s.

tative register marginalized the freshness and vehemence of prose in the Galilean vein.

During the sixteenth century, in several European countries, a new form of modern subjectivity – separate from the Baroque – takes shape, as well as a new literary genre, whose peculiar elements are a multilinguism that traverses different social classes (a sort of transversal multilinguism): masks, irony, parody, dialogic structure. This new genre is the novel, which has already given the world masterpieces such as *Gargantua and Pantagruel* and *Don Quixote*. Multilinguism, masks, irony, parody, dialogic structure are precisely the elements that characterize most of Galilean prose, but not even in this sense is the Galilean ‘school’ absorbed by Italian literature. The first great Italian novel, Alessandro Manzoni’s *I promessi sposi* (*The Betrothed*), would not be published before the first half of the nineteenth century,¹⁰⁷ while another work, Giacomo Leopardi’s *Operette morali* (*Small Moral Works*, 1824), which could be assimilated – for some characteristics – to Galileo’s works, was published in 1824. Galileo, the progenitor of so-called scientific prose, whose characteristic alternates rigorous demonstration with vivid language, is destined to represent a sort of isolated scientifico-literary ‘case’. Perhaps, if Galileo’s two major literary works (*Considerazioni al Tasso* and *Postille all’Ariosto*) had been published during his life, his reputation as a literary figure might have followed his fame as a scientist.

ÚTDRÁTTUR

Hliðstæður í málfari í umfjöllun um vísindi og bókmenntir í tveimur ritum Galíleos

The Assayer (*Il Saggiatore*, 1623) er eitt af höfuðritum Galíleos, en í því hrekur hann vísindakenningar sem eru settar fram í ritinu *Libra astronomica* eftir jesúitann og heimspekinginn Orazio Grassi. *Considerazioni al Tasso* er hins vegar eitt af smærri verkum

¹⁰⁷The first edition of this novel came out in 1827, but Manzoni continued to work on it until 1840, when the revised version – the one which is read and studied in all the Italian high-schools – was published.

Galíleos, ritað a.m.k. tólf árum fyrr en *The Assayer. Considerazioni al Tasso* er að stofni til ítarleg greining á sögulgjóðinu *Jerusalem Delivered* eftir ítalska skáldið Torquato Tasso (1544–1595). Handrit verksins glataðist þegar Galíleo var enn á lifi, en fannst fyrir tilviljun tveimur öldum eftir dauða hans og var gefið út í fyrsta sinn 1793.

Þótt verkin séu rituð á mismunandi tíma og í þeim sé beitt mismunandi stílbrögðum er uppbygging harðrar gagnrýni Galíleos í *Considerazioni al Tasso* á kvæðabálkinn *Gerusalemme liberata* í veigamiklum þáttum hliðstæð uppbyggingu á atlögu hans í *The Assayer* gegn kenningum Orazio Grassi. Í þessari grein er tekið til athugunar á hvern hátt bókmenntagagnrýni og vísindarit fela í sér óvanalega samstæð málsnið og tjáningarform.

Eitt helsta nýmæli í ritum Galíleos er að skáldlegar lýsingar verða veigamikill þáttur í bókmennta- og vísindaritum. Hér er leitast við að sýna fram á að auk tæknilegrar og hlutlægrar greiningar tveggja fyrirbæra (ljóðmál/textagreining í *Considerazioni al Tasso* og heimspekileg/vísindaleg í *The Assayer*) reynir Galíleo ekki aðeins að sannfæra lesandann með rökfræðilegri greiningu á viðfangsefninu heldur nýtir hann sér ákveðin stílbrögð mælskulistarinnar.

ABSTRACT

Similarities Between Scientific Language and the Language of Literary Criticism in Two of Galileo's Works

The Assayer (Il saggiatore, 1623) is considered one of Galileo's major works. He wrote it in order to confute the scientific theories expounded by the Jesuit scientist and philosopher Orazio Grassi in his *Libra astronomica*. *Considerazioni al Tasso*, on the other hand, is one of Galileo's minor works, written at least twelve years prior to *The Assayer*. *Considerazioni al Tasso* is a penetrating critical analysis of Torquato Tasso's *Jerusalem Delivered*. The manuscript, which was initially lost by Galileo, was subsequently found by chance about two centuries after his death and published for the first time in 1793.

Though chronological and substantial stylistic differences obvi-

ously separate the two works, the structure of Galileo's attack in *Considerazioni al Tasso* on *Jerusalem Delivered* is, in important respects, similar to the one he adopted in *The Assayer* against Orazio Grassi. This article will consider how these two different genres, the critical essay (*Considerazioni al Tasso*) and the scientific treatise (*The Assayer*), present surprisingly consanguineous linguistic and expressive criteria.

The fundamental novelty in Galilean writing is that mimesis becomes an essential part of the 'essay'. The aim of this article is to show how, in addition to the technical and objective analysis of two phenomena ('poetico-linguistic' in *Considerazioni al Tasso* and 'philosophico-scientific' in *The Assayer*), Galileo attempts to persuade the reader by enlisting dialectics alongside specific rhetorical devices.