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A POSTHUMOUS RIVALRY: ON BORELLI AND
VIVIANI'S RELATIONSHIP BETWEEN THE
ACCADEMIA DEL CIMENTO AND AN EIGHTEENTH-
CENTURY CONTROVERSY

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ABSTRACT

Between around 1656 and the late 1660s, Giovanni Alfonso Borelli and Vincenzo Viviani, self-proclaimed last disciple of Galileo, collaborated on a host of mathematical, physico-mathematical, and experimental problems, notably within the Accademia del Cimento. Their relationship, tensed at times, has long been characterised as a heated rivalry—the two men would have hated and continuously tried to outdo each other. Turning back to the archival sources—their correspondence and their disciples' correspondences—this contribution gathers, for the first time, all recorded events when merely embryonic priority disputes may have stained Viviani and Borelli's collaboration. Although these correspondences indeed show mild quarrels at

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times, they also prove that nothing ever became public or went further than personal complaints to third parties. To understand how Borelli and Viviani have become rivals, this contribution instead dives into eighteenth-century controversies between second-generation epigones who were waging war, through interposed publications, over the primacy of Galileo's heritage. The posthumously constructed rivalry later became entrenched and circulated down the centuries to late nineteenth- and twentieth-century historians.

INTRODUCTION

Fourteen years younger than Giovanni Alfonso Borelli (1608–1679), Vincenzo Viviani (1622–1703) was appointed in 1639 at Galileo's service, with whom he worked on problems of Euclidean geometry and physico-mathematics and helped the old blind scholar with his daily paperwork. From then on, he never ceased to call himself the *ultimo discepolo*—or *ultimo scolare*—in letters and publications, paying constant tribute to his master.

When Galileo died in 1642, Viviani became an engineer for the *Capitani di Parte guelfa*, first at the service of a new master: the chief engineer Baccio del Bianco (1604–1656). In 1656, upon Bianco's death, he was appointed first engineer, which occupied his life: roaming the hills of Tuscany to check upon roads, bridges, and rivers, Viviani was notably in charge of the

rationalisation of the Val-d'Arno. These works kept him too busy for his liking as he complained in a 1697 *supplica* to a correspondent whom he begged to intervene in his favour to the prince.² Indeed, although Viviani had become first mathematician in 1666—mainly as the result of the creation of the Académie des sciences in Paris, which coveted some Tuscan scholars—he never could fully enjoy the time and space needed for his practice of geometry as he was a lot on horseback surveying the Duchy.³

In the late 1650s, Viviani first met Borelli in Florence as the Grand Duke was starting to organise an informal academy, followed by Prince Leopoldo's creation of the Accademia del Cimento, dedicated, in the wake of Galileo, to the experimentalist study of natural phenomena like the speed of sound or the effect of heat on materials. Since the 18th century, it has often been argued that the relationship between Viviani and Borelli was an extremely chaotic one. This supposed very heated rivalry began at the Cimento and continuously unfolded until Borelli died in 1679. This entrenched view is usually based on different accounts of various events when the two scholars met and collaborated on mathematics or physico-mathematics. Starting with the works around Antonio Favaro's archival campaign at the end of the 19th century, the rivalry narrative went

² DUMAS PRIMBAULT, forthcoming 2024.

³ DUMAS PRIMBAULT, 2020; DUMAS PRIMBAULT, forthcoming 2024.

down the centuries—so much so that when I once met a Borelli scholar at a conference, they reminded me of the feud and teased me about the fact that we were continuing the rivalry. More recently, though, Luciano Boschiero, after Paolo Galluzzi, argued that Borelli and Viviani had a relatively collegial relationship and collaborated on good terms.⁴

What exact encounters between Viviani and Borelli led to various tensions? Why is it that much has been written about their relationship while it may seem anecdotal? How was it mobilised by disciples, sons of disciples, and historians alike in the following centuries? Based on the historical works of Favaro, Tenca, Bonelli, Boschiero, Galluzzi, and others, I propose here to gather, for the first time, all the events found in the archive—mainly their correspondence, as well as letters sent to third parties—that attest to some tension in their interactions. Then, I endeavour to trace in the eighteenth century how the few traces of mainly priority disputes between Viviani and Borelli were twisted, exaggerated, and constructed by their disciples, and by the sons of their disciples, as a violent rivalry over who owned the primacy of the Galilean heritage. This construction after that was taken for granted and mobilised by historians in the late eighteenth century as a significant cause to explain other events in the two scholars' lives. Eventually, the rivalry became a minor bone of contention at the turn of the 21st century as historians of

⁴ BOSCHIERO, 2007; GALLUZZI, 1981.

the Accademia del Cimento mobilised it to argue for its precedence in the history of the organisation of experimental science.

THE CORRESPONDENCE BETWEEN VIVIANI AND BORELLI

In the course of their career, Viviani and Borelli crossed paths quite a lot and for very different reasons. But most of their encounters were concentrated between 1656 and 1667 while Borelli was occupying the chair of mathematics in Pisa and regularly came to Florence as he was also a founding member of the Cimento and, with Viviani, one of its most active. Mostly revolving around mathematics and experimentations, I gather here the five episodes that left traces in the archive and attest, indeed, to some tension between the two scholars, generated mainly by priority disputes.

Cosimo Galilei as a go-between

Although Viviani and Borelli met for the first time at the end of the year 1642 when Borelli was sent to northern Italy by the Senate of Messina, they did not start collaborating before October 1656 on the speed of sound, and beginning June 1657 with the creation of the Accademia del Cimento (see below).⁵ Yet, towards the end of the year 1656, they were already in frequent contact through Cosimo Galilei (1636–1672), Galileo's

⁵ BOSCHIERO, 2007, p. 64.

grandson, who acted as a go-between. Indeed, Cosimo Galilei, a son of Vincenzo Galilei (1606–1649), the third and last son of Galileo, was both Viviani’s protégé and confidant, as well as Borelli’s student in Pisa. Viviani had been very close to Vincenzo Galilei, especially after the death of Galileo and in the aftershock of his trials, when the both of them had to hide Galileo’s personal archive in fear of it being seized and destroyed. As a result of this strong bond, Vincenzo Viviani maintained frequent correspondence with his friend’s son and master’s grandson about daily life in Pisa, student occupations, and money issues.⁶

Letters sent by Cosimo Galilei to Viviani between 1656 and 1657 attest to the fact that he was close to his teacher Borelli—recently appointed by the Grand Duke to the chair of mathematics in Pisa—, who in return was urging his pupil to send his regards to Viviani in order to obtain an invitation to collaborate in Florence.⁷ Between the end of 1656 and the beginning of 1657, Cosimo, therefore, passed on Borelli’s regards to Viviani at least thrice. But while the letters keep reiterating these demands, Viviani did not mention Borelli by name in his letters to Cosimo, and the two scholars only formally met at the Accademia del Cimento.⁸

⁶ TORRINI, 1999, p. 144.

⁷ Notably, Biblioteca Nazionale Centrale di Firenze (thereafter BNCF), fondo Galileiano (thereafter Gal.) 161, doc. 42, f. 77rv; Ivi, doc. 43, f. 79r; Ivi, doc. 44, f. 81rv.

⁸ For a general overview of Viviani’s correspondence network, see DUMAS PRIMBAULT, forthcoming 2023.

Collaborating at the Accademia del Cimento

In June 1657, Prince Leopoldo de' Medici, together with nine of his courtiers, created the Accademia del Cimento, dedicated to the experimental investigation of natural phenomena. Most commentators agree that Vincenzo Viviani and Giovanni Alfonso Borelli were the two main leaders of the Cimento that ended in 1667 after the publication of their *Saggi di naturali esperienze* and the departure of Borelli from Tuscany to Messina.⁹ It is often argued that among the leading causes of the dissolution of the Academy, Borelli's departure was due to his acrimonious relationship with Viviani. If such a blunt statement lacks strong empirical evidence, as we will see, the Accademia del Cimento is nevertheless the place where the two savants started developing a working relationship.

As soon as October 1656, before the official creation of the Cimento, Grand Duke Ferdinando II gathered an informal academy in order to address his personal interest in the speed of sound on which he had already experimented himself. On October 10, 1656, Viviani and Borelli—who had already discussed such matters as Viviani explained to the Grand Duke—ran together the experiment that later gave birth to one of the *Saggi*.¹⁰

⁹ MIDDLETON, 1971; GALLUZZI, 1981; BERETTA, 2000; BOSCHIERO, 2007.

¹⁰ BOSCHIERO, 2007, pp. 52-53

According to most commentators, Borelli and Viviani maintained a genuine collaboration on a host of other topics, notably experiments on freezing, barometric measurements, and considerations on the existence of the void—siding against Cimento members tenants of Aristotelian *horror vacui*, as we will see. They agreed on most philosophical aspects; more particularly, they shared a mechanical and corpuscularian natural philosophy. More generally, they are presented by Boschiero as allies in confronting Aristotelian natural philosophers as they exchanged relatively close letters attacking, sometimes virulently, Carlo Rinaldini (1615–1698) and Alessandro Marsili (1601–1670).¹¹ On most of these matters, Viviani and Borelli worked quite collegially, as is palpable in the way they write to each other: no letter *between them two* ever shows clear signs of discontent or hatred—the only sources bearing traces of the supposed rivalry are letters sent by Viviani to other correspondents.

Indeed, the only incident that left convincing traces that the collaboration at the Cimento between Viviani and Borelli was not always so collegial is recorded in a letter from Viviani to his Aristotelian detractor Rinaldini. In 1657, while the Academy was inquiring about the effect of heat on metals, a rather lively dispute took place between Borelli and Viviani on the one hand

¹¹ Ibid.

and Rinaldini on the other.¹² In the course of November 1657, twice did Borelli write to Viviani, complaining about Peripateticians. More particularly, Rinaldini whom he criticised in rather searing terms.¹³ On November 17, Viviani sent a calm letter to Rinaldini trying to convince him that Borelli is correct: a heated metal ring does indeed dilate. When Viviani sent his two fellow academicians the geometrical proof of the dilation of a heated metal ring in December, Borelli replied in passing that he had already demonstrated that result in his own working papers, which angered Viviani.¹⁴ Surprisingly, the latter complained in a letter to Rinaldini, quoting Borelli's claim and commenting on it in such fashion:

An answer that has indeed astounded not only me, but every other person with whom I have shared such a demonstration, and [Borelli's] great desire to take possession of it which I had considered a trifle [...] But may the fraud fall upon the fraudulent [...] Your Excellency, however, keep this to yourself, because I do not intend to come to an open feud, as I do not know what I would have answered in hot blood...¹⁵

¹² BOSCHIERO, 2007, Ch. 6.

¹³ BNCF, Gal. 283, doc. 9, ff. 14r-15v; and *ivi*, doc. 13, ff. 22r-23v.

¹⁴ BNCF, Gal. 283, doc. 11, ff. 19r-20v.

¹⁵ “*Risposta invero che ha stomacato a me non solo, ma ciascun altro a cui io l’ho partecipato tal dimostrazione, e la grandissima volontà di appropriarsi questa che per altro io avevo stimato bagatella [...] Ma che la fraude vuol cader addosso al fraudolente [...] V. S. Eccma, tenga però in se, perché non intendo venire a rottura aperta, se bene a sangue caldo non so quello che io me gli abbia risposto...*” BNCF, Gal. 252, ff. 40-44.

Although it is undeniable that Viviani was profoundly shocked and appalled by Borelli's priority claim, it is essential to note that he only complained to someone else—more importantly, someone whom Borelli himself explicitly despised—and clearly stated that he wanted to avoid open confrontation and aimed to delay his response in order to answer calmly. Eventually, Viviani never held Borelli accountable for his claim.

Rather than a proof of their rivalry, this event needs to be understood in the context of the Accademia del Cimento. Rules stated that scholarly productions were the Academy's as a body, and publications, such as the accounts of the *Saggi*, were to be formatted as anonymous experimental reports.¹⁶ Privately, this sparked quite a few priority disputes—as most of Viviani's and Borelli's are—and led the academicians to claim experiments for themselves.¹⁷ Prince Leopoldo, as the Academy's father, was therefore regularly called upon to arbitrate such disputes, as we will see, and mainly behaved according to his own *gusto*, as was argued by Galluzzi, who depicted the prince as Saturn devouring his children.¹⁸

In spite of this, though, several letters sent by Borelli to Viviani early in 1658 attest to the fact that Viviani was dealing with Onofri, a Florentine printer, about the engravings in

¹⁶ E.g., MIDDLETON, 1971, p. 130 n. 92.

¹⁷ In the case of Viviani (BNCF, Gal. 269, f. 259rv), see MIDDLETON, 1971, p. 38 and notes in Ch. 4.

¹⁸ GALLUZZI, 1981, p. 797.

Borelli's *Euclides restitutus*.¹⁹ It would seem that for the “cold-blooded” Viviani, this anecdotal dispute was no motive for an open rivalry.

The divinatio of Apollonius

Interestingly enough, the event most quoted by historians to argue for a rivalry between Viviani and Borelli is their work on the fifth book of Apollonius of Perga's *Conics*. This happened between 1656 and 1658, parallel to their work at the Accademia del Cimento but still under the aegis of Prince Leopoldo.

As early as 1640, the eighteen-year-old Vincenzo Viviani, only recently appointed at Galileo's service, began the mathematical reconstruction of the lost fifth book of Apollonius of Perga's *Conics*. An outstanding work in pure Euclidean tradition from the 2nd century B.C., Apollonius' *Conics* were a reference by then, but only part of them was extant. This kind of endeavour was widespread in the humanist Renaissance, understood by mathematicians as *restitutiones* or *redivivi*, i.e. genuine restorations or renovations—explicitly acknowledged as such—of lost ancient books, with no ambition to eventually obtain the original lost text.²⁰

¹⁹ BNCF, Gal. 254, doc. 36, ff. 67r-68v; and BNCF, Gal. 283, doc. 18, ff. 31r-32v.

²⁰ Viviani's rhetoric is slightly but significantly different as he presented his work as an exercise of *divinatio*, a transparent and immediate re-discovery of pure and ancient knowledge stemming from an old and perennial Euclidean tradition and fashioned himself as a *divinatore* in direct contact with the ancient *auctoritates* (see DUMAS PRIMBAULT, forthcoming 2024).

In the case of this fifth book, though, an Arabic translation existed in the Medici library, of which Viviani was ignorant. Although Galileo knew about it, and Abraham Ecchelensis (1605–1664) told Torricelli in 1645 that he wanted to translate it, nothing was done then. The translation was forgotten until Borelli rediscovered it in 1656 and endeavoured, with the help of Ecchelensis, to translate it.

When, the same year, 1656, Borelli was appointed to the University of Pisa, he informed Prince Leopoldo de' Medici of his intent to have the Arabic version translated into Latin. It is probable that Viviani complained directly to Borelli about this endeavour, or rather about not informing him early enough, as, in two letters from May and June 1657, Borelli apologised for his “secrecy [*confidenza*]” in dealing with an unmentioned matter.²¹ However, this did not stop Viviani from unearthing the notes he had started jotting 16 years before and, thus, went back to work.

The correspondence between Viviani and Borelli over the summer 1658, when the latter stayed in Rome with Ecchelensis to complete the translation, does not hint at any form of rivalry. On the contrary, their letters allowed the historians to document their respective works as they kept each other informed of their progress. Borelli even explicitly encouraged his fellow academician and ensured him of his goodwill:

²¹ BNCF, Gal. 254, doc. 30, ff. 56r-57v; and ivi, doc. 31, ff. 58r-58bisv.

I likewise concur with and approve the resolution of Your Excellency and all your friends to send your inventions on conics to print, and I will be able to testify among others that you have not heard of these latest books.²²

In July and then August, Borelli announced to the prince that the translation had to be postponed, possibly due to the many adaptations, errors, lack of diacritic signs he lamented about the preceding months, and the Roman summer heat that slowed them down.²³

Eventually, Prince Leopoldo received Borelli's translation in March 1659, which was published two years later. It was argued that the publication was delayed at the prince's request in favour of Viviani so that he could finish his work and dodge any accusation of plagiarism—a common courtesy at the time.²⁴ This said, there is no trace of such a decision, while Viviani's work was published in 1659, the same year Leopoldo received Borelli's translation. Possibly, Borelli and Ecchelensis's difficulties might explain the delay.

In the wake of this event, historians argued that Borelli and Viviani had become rivals competing for favours in the Medici

²² “*Io similmente concorro, et approvo la risoluzione di V.S. e di tutti i suoi amici di mandare ella alle stampe le sue invenzioni intorno a i conici, et io potrò testificare frà gli altri, ch'ella non hà havuto notizia di questi ultimi libri.*” BNCF, Gal. 254, f. 107r.

²³ BNCF, Gal. 275, ff. 95r–96r and 97rv; ivi, f. 98rv; ivi, ff. 100r–101r.

²⁴ BENVENUTO, 1991, p. 243.

court.²⁵ Yet again, no archival document allows us to support this statement. Instead, Boschiero rightly concludes:

Historians have long suggested that Viviani and Borelli were desperately trying to out-do each other on this issue. Instead, I contend that the correspondence between the two during this period in the late 1650s is suggestive of a mutually beneficial collaboration: it would reveal Borelli's discovery and translation and display the triumph of Viviani's ability to predict Apollonius' work.²⁶

On Saturn's rings

Turning back to the Accademia del Cimento, another small episode has scarcely been mentioned in the supposed rivalry between Viviani and Borelli. During the summer 1660, the members of the Academy endeavoured to study the appearance of Saturn.²⁷ Testing Huyghens' hypothesis that Saturn's peculiar and changing shape is due to its having rings, the Academicians devised experimental observations and Borelli drafted a *memorandum*. Although Viviani remained relatively quiet in this investigation, he sent in September 1660 a letter to Prince Leopoldo in which, explicitly concerned about Borelli taking precedence, he announced that he had something to tell the prince upon his return to Florence about Saturn's rings.²⁸ Again,

²⁵ Notably TARGIONI TOZZETTI, 1780; and BONELLI, 1972.

²⁶ BOSCHIERO, 2009, p. 97 n. 33.

²⁷ MIDDLETON, 1971, pp. 258-262; BOSCHIERO, 2007, Ch. 8.

²⁸ CAVERNI, 1891-1900, p. 1033.

Viviani was here trying to deal with a matter of priority and called upon the prince to act as a referee. There is no record of further dispute about this, and, early in February 1665, Viviani received a courteous letter from Borelli, closing with his usual salutation “I kiss your hands dearly [*io gli bacio caramente le mani*].” This letter is a response to a now lost letter from Viviani to Borelli in which the last disciple had sent him documents and news from Perugia, attesting to the fact that this priority dispute was once again no motive to terminate their collaboration and correspondence.

On ballistics tables

Finally, one last event, again scarcely mentioned, may have tainted the relationship between Viviani and Borelli. During Spring 1665, Viviani ran experiments on ballistics and sent his results to the Grand Duke. According to Tenca, Borelli declared that Viviani’s results were wrong and, after being proved wrong himself, claimed he had never seen such results.²⁹ Faced with such apparent bad faith, Viviani complains to Bruno Molara in the following terms:

I read the contrived and lying letter of the one who professes naivety, and acts as a philosopher, that is, as a lover of the truth, and with all that I have not heard any news of his twaddle, I was greatly scandalised

²⁹ TENCA, 1956.

[...] This is called wanting to overwhelm those who have the eyes of a lynx, or to make them become simpletons. [...] Oh good God, what impudence, what impertinence!³⁰

Although this event does not relate to a priority dispute but is instead an accusation of lying, Viviani, as he had done time and again, did not complain directly to Borelli, and there is no trace of any further development. Nonetheless, this seems to have halted their correspondence—already rather meagre after 1659.

The last extant letter between the two scholars dates from August 1676. In his usual courtly manner, Borelli confirms he received the few folios Viviani sent him of his *Diporto geometrico* but alleged he would have no time to read it correctly.³¹ Giovanni Alfonso Borelli died three and a half years later in December 1679.

LIKE MASTER, LIKE DISCIPLE

These few events that took place while Borelli was in Tuscany and as he collaborated with Viviani on diverse physical and mathematical matters both inside and outside the Accademia del Cimento do not attest to a continuous and active feud between the two scholars. Rather, it seems that they collaborated in a

³⁰ “*Lessi la lettera artificiosa e bugiarda di quel che professa l’ingenuità, e fa da filosofo, cioè da amatore della verità e con tutto che non mi siano giunte nuove le sue ritorbole, mi sono grandemente scandalizzato [...] Questo si chiama voler far travolgere chi ha occhi di lince, o far diventar calandrino. [...] Oh Dio buono, che sfacciataggine, che impertenza !*” Biblioteca Laurenziana, Cod. Ashb. 1811, c. 14.

³¹ BNCF, Gal. 256, doc. 52, ff. 95r-96v.

collegial fashion on most of the topics they addressed—including their parallel works on Apollonius’ *Conics*—and that only twice did Viviani startle at some claims made by Borelli that he deemed unwarranted. Furthermore, on each of these occasions, Viviani voiced his concerns only to third parties and waited to recover his calm before addressing the issue. Eventually, none of these events ever led to an open altercation between the two academicians. This also hints at the possibility that the relationship between Borelli and Viviani may have been mediated by other means—as it had been earlier through their go-between Cosimo Galileo. Here I will briefly go over two veiled controversies that happened between 1666 and 1670 through the publications of the two mathematicians’ disciples or protégés. These events, although they never led to an open quarrel either, put into perspective the relationship between Borelli and Viviani as more of a simmering but never actualised tension. Furthermore, as we will see in the following section, they are the primary elements on which their epigones will erect the supposed rivalry during the eighteenth century.

On the motion of muscles

The first of these two events concern the publication in Florence in 1667 of Nicolas Steno’s (1638–1686) *Elementorum Myologiae Specimen*. Steno, a Danish scholar versed in anatomy and geology, visited Europe to complete his education when he

set foot in Tuscany early in 1666.³² After a brief stay in Rome, he returned to Florence, where he conducted anatomical studies at the hospital S. Maria Nuova. Following up on his 1664 publication on muscles and glands, Steno completed in 1666 a treatise on myology, palaeontology, and embryology. Later published in Florence in 1667, this three-part treatise is dedicated to the Grand Duke Ferdinando II and, notably, used geometrical descriptions to understand the movement of muscles. This mathematical method is typical of the perspective of some members of the Accademia del Cimento, among which Borelli and Viviani. More specifically, Steno explicitly acknowledged in his publication the help he received from Viviani, who was presented as a close friend and as more than a spectator in his many experimental observations—indeed, they collaborated pretty closely on the mathematical structure of muscles.³³

What seems surprising retrospectively is that Borelli was nowhere mentioned in Steno's work. Indeed, at the time, Borelli was working on the motion of animals and, consequently, on a similar geometrical description of muscles. Although his own treatise was published posthumously in 1680, Borelli's work was already well advanced in 1666–1667. Furthermore, Borelli had been made responsible by the Grand Duke to provide Steno with fossils for his study of the Earth's history, and, on that occasion,

³² KARDEL and MAQUET, 2013, pp. 151-159; LÆRKE and ANDRAULT, 2018.

³³ BERTOLONI MELI, 2008, pp. 696-706.

the Dane asked Borelli for some geometrical advice.³⁴ On the whole, Borelli perceived the “*oltramontano*” Steno as a threat to his work and found his proximity to Viviani—who not only collaborated with him but, time and again, ensured the Duchy was satisfying his needs—rather suspicious.³⁵ In a letter to Malpighi in July 1666, Borelli complains about the situation:

Steno is here and will be here all summer and has told me that he wants to come up here to me and that he wants me to teach him something about geometry, etc. I will not allow him to use all possible courtesies, but I am not so sure that he believes in the idea of modesty and good manners as they preach it at the Palazzo, because those letters that he has printed give a clear indication of the greed to absorb all things and to worry about the attention of others, and I know that these *oltramontani* come here prepared and very willing to be on the alert.³⁶

No archival source exists to prove that Viviani indeed favoured Steno in order precisely to wrong Borelli. In fact, at a time when the Accademia del Cimento was somewhat scattered and on the verge of dissolution, Borelli was in Pisa. At the same time, Steno, in Florence, could collaborate with Viviani. It was argued

³⁴ DOMINICI, 2021.

³⁵ GALLUZZI, 1986.

³⁶ “*Lo Stenone è qui e si tratterà tutta l’estate e mi ha detto che vuol venire quassù da me e che vuol che io gli insegni qualche cosa di geometria ecc. Io non lascerò d’usarli tutte le cortesie possibili, ma non sono così credulo che lo stimi l’idea della modestia e dei boni costumi come a Palazzo lo predicano, perché quell’epistolette che egli ha stampato danno chiaramente indizio della avidità di assorbire tutte le cose e preoccupare gli aditi ad altri, e sò che questi oltramontani vengon qui da noi preparati e dispostissimi a star guardinghi.*” MALPIGHI, 1875, pp. 318-319.

that, although they worked on similar subjects, Borelli's and Steno's theories of muscles were somewhat different, which might account for the fact that they never quoted one another.³⁷ Conversely, according to recent research by Nuno Castel-Branco, Steno and Borelli shared more than meets the eye, and a careful reading of their respective works shows "scientific resonances" left hidden only by the differences in audiences their works were aimed at.³⁸

More importantly, Borelli's anger in that letter to Malpighi is not uncommon when it comes to "*oltramontani*," a rather racist slur commonly used to describe the perceived threat posed by foreign scholars from beyond the Alps.³⁹ In a previous letter to Malpighi, Borelli is outright insulting towards English anatomists with the same motives as he was towards Steno:

They are most superb and ambitious: they despise everyone, in Italy they say there is no one who knows anatomy, and when they learn it, and see things they never dreamed, as happened to me, they contradict it with great impudence, they vilify it; on the contrary, they exhibit nothing but those antiquities that are already mouldy, and they boast of having great and new inventions that keep silenced [...]. In short, Signor Marcello, these *oltramontani* who fill their mouths with our

³⁷ KARDEL, 1997.

³⁸ CASTEL-BRANCO, 2022, in this issue.

³⁹ DUMAS PRIMBAULT, forthcoming 2024.

facts, calling us duplicitous, artificial and fraudulent, are like whores, who call every other woman they meet a whore.⁴⁰

There is obviously more material here to build a case for Borelli's hatred towards foreign scholars than to attest to his rivalry with Viviani. Still, in a letter from the latter to Carlo Dati (1619–1676) dated January 1668, it is stated that Borelli directly accused Viviani of manipulating Steno to harm him, which Viviani denies:

He blamed me inappropriately, [claiming] that Signore Steno gave out the *Elementi geometrici dell'uso de'muscoli* at my instigation etc., which is completely false⁴¹

On solid resistance

In the same manner, Viviani alluded to another case of veiled controversy through protégés and disciples that occurred the other way around while Alessandro Marchetti (1633–1714) was working on his *De resistentia solidorum* later published in 1669. At stake here is the legacy of Galileo since the mechanical

⁴⁰ “Eglino sono superbissimi, et ambiziosissimi: a tutti disprezzano, in Italia dicono non esser niuno che sappia notomia, e quando se l'insegna, e mostra qualche cosa non mai sognata da loro come è successo a me con una gran sfacciataggine la contraddicono, vilipendono; per il contrario loro mostrano altro che quelle anticaglie già mufte, se ben si vantano di haver grandi, e nuove invenzioni che si conservano in petto [...]. In somma sig. Marcello quest'oltramontani che s'empiono la bocca de fatti nostri chiamandoci doppij, et artificiosi, e fraudolenti fanno come le puttane, ch'a tutte le femine ch'incontra l'ingiuriano bagascia.” MALPIGHI, 1875, p. 17; quoted by GUALANDI, 2009, p. 159 n. 194.

⁴¹ “spropositatamente egli si arrecò da me, che il Sig. Stenone, a miei stimoli desse fuori gli *Elementi geometrici dell'uso de'muscoli*, ec. cosa del tutto falsa” BNCF, Gal. 158, doc. 130, c. 205r.

resistance of solid bodies was one of the *Two New Sciences* advocated by the Tuscan mathematician in his last *discorsi*. Viviani, the self-fashioned last disciple of Galileo and who had inherited the working papers of his master, endeavoured to prolong and publish Galileo's works on the matter.⁴²

When Alessandro Marchetti, a former pupil of Borelli—he will eventually replace him as chair of mathematics in 1679—, then professor of natural philosophy in Pisa, addresses the issue of the resistance of solids and contemplates writing a book entitled *Galilaeus ampliatus*, the word is out in the Tuscan court that this endeavour results from a scheme by Borelli to surpass Viviani's ongoing work. In this same letter to Dati, Viviani seems to believe this hypothesis that some unknown courtier prompted him:

It has been the opinion of some, that Dottor Borelli, having some time ago realised, that among my other studies, I had this one [on the resistance of solids], as I have never refrained from saying, put D. M. [Alessandro Marchetti] to work on it, and lately knowing that I wanted to make use of it, urged him, or helped him, so that I was hampered.⁴³

⁴² RAPHAEL, 2017, Ch. 2.

⁴³ “È stata opinione di qualcuno, che il Dottor Borelli, avendo un tempo fa inteso, che tra gli altri miei studj, io aveva questo ancora come non mi sono mai astenuto di dirlo, mettsse su il suo D. M. a lavorare sopra di ciò, ed ultimamente sapendo, ch'io me ne volea valere, lo sollecitasse, ò ajutasse, perché io restassi prevenuto.” BNCF, Gal. 158, doc. 130, c. 204v-205r.

Once again, no extant document may support this word of mouth. Furthermore, reciprocal to Viviani and Steno's situation in Florence, it would seem all the more natural for Borelli and Marchetti both in Pisa to collaborate on such an important matter. We may note, though, that the relationship between Borelli and Viviani was sufficiently noxious for it to become a courtly matter and be the subject of rumours and anonymous whispering.

A POSTHUMOUS RIVALRY

In 1703, Vincenzo Viviani died in Florence after a long life as an engineer for the Tuscan court. As a foreign correspondent for the Académie des sciences in Paris, he was eulogised the same year by Fontenelle. The only mentions of Borelli concern the *divinatio* and do not even hint at a possible rivalry between the two men. As Pierre Bayle's source for his *Dictionnaire*, Fontenelle's eulogy remained the main version of Viviani's life in the francophone world for over half a century. Then, in 1760, the French could read in the *Journal étranger* that Viviani and Borelli had an "undying hatred [*haine immortelle*]" for each other.⁴⁴ The source is a book reviewed in the journal and published a year earlier by Giovan Battista Clemente Nelli, not so surprisingly, as we will see, the son of one of Viviani's pupils.

⁴⁴ ARNAUD, 1760, p. 171.

At the end of the century, this heated rivalry had become the official history in Montucla's *Histoire des mathématiques*.⁴⁵

Indeed, the chaotic relationship between Viviani and Borelli did not die with them. Instead, the eighteenth century set the stage for some of Borelli's and Viviani's later disciples to recount, for the first time, the story of a heinous and continuous rivalry between the two scholars. Embroidering the two previous reports related to Steno and Marchetti, some second-generation pupils of Viviani and Borelli went to great lengths to assert their respective masters' primacy regarding the Galilean heritage. Later in the nineteenth century, these twisted second-hand testimonies were the first sources used by historians to depict Borelli and Viviani's relationship as a long-lasting interpersonal rivalry.

Like master, like disciple, bis repetita

The first contribution to the construction of a rivalry resulted, early in the eighteenth century, from a heated controversy between Alessandro Marchetti, author of the treatise on the resistance of solids, and Guido Grandi (1671–1742). The latter, a Camaldolese monk, philosopher, and mathematician from Lombardy, had been working closely with Viviani—notably on his geometrical enigma sent to Europe's mathematicians in 1692—when he was appointed to the chair of philosophy in Pisa

⁴⁵ MONTUCLA, 1798, p. 92.

in 1700 and later became the Grand Duke Cosimo III's mathematician and theologian in 1707.⁴⁶ In 1703, Grandi published a book that was to begin introducing notions of infinitesimal calculus in Italy and started a controversy with Marchetti, who publicly criticised the work. Through several publications from both sides, all explicitly directed to each other—e.g., Marchetti's 1711 *Lettera nella quale si ribattono l'ingiuste accuse, date dal p. d. G. G. nella seconda edizione... della Quadratura*, or Grandi's 1712 *Dialoghi... circa la controversia eccitataagli contro dal sig. dottore Alessandro Marchetti*—the not-so-cordial debate shifted towards some forgotten events from the previous century. In 1712, Grandi published a *Risposta apologetica... alle opposizioni fattegli dal signor dottore A. Marchetti* in which, among *ad hominem* arguments and insults thrown at his rival, he tries to prove the priority of Viviani over Marchetti concerning their work on the resistance of solids. What's more, Grandi unearthed Viviani's 1668 letter to Dati in order to argue that, indeed Marchetti had carefully planned his publication to divert Viviani:

The printing of this book served admirably to put Viviani to sleep, and it was indeed a well-thought-out and much-needed diversion.⁴⁷

⁴⁶ SIMONUTTI, 1989.

⁴⁷ “*Servi mirabilmente la stampa di cotal Libro per addormentare il Viviani, e fu per verità una ben pensata diversione, e dal bisogno assai opportune.*” GRANDI, 1712b, p. 83.

Though not content with such an attack, Grandi produced a long historical chapter aimed at proving that Marchetti had, in fact plagiarised the unpublished book of the French engineer François Blondel (1618–1686).⁴⁸ The core argument shared by Marchetti and Blondel was that Galileo was mistaken in describing the shape of a beam of equal resistance as parabolic. Hence, not only does Grandi wage war against the putative heirs of Galileo—Viviani is the true one—but he also defends the master’s work—Galileo was right.

Forty years after the events and while Viviani had been dead for nine years, Grandi unearthed the suspicions of priority wars between Borelli and Viviani again, both through Marchetti and Steno, as well as he reminds his readers of their parallel work on Apollonius’ *Conics*, arguing in passing and using an unknown oral source that Borelli was angry afterwards.⁴⁹ Marchetti could not let that pass and, in a publication dated 1714, argued reciprocally that Viviani had actively manoeuvred to postpone the publication of his treatise *De resistentia solidorum*.

Back-and-forth, during about fifteen years, Grandi and Marchetti maintained an open feud through interposed publications, and a rather virulent at that as they accused each other of severe allegations over who were the proper heirs of Galileo. Marchetti’s death in 1714 did not stop Grandi from

⁴⁸ Ivi, Parte I Capitolo 3.

⁴⁹ Ivi, p. 61-62 and *passim*.

publishing yet another piece in his defence as in 1718, he added Viviani's work on the resistance of solids to the *Opere* of Galileo. And indeed, the feud was not over, bequeathed from generation to generation, as Francesco Marchetti, son of Alessandro, published in 1755 a biography of his father where he ardently took his defence in the controversy not only against Grandi but also against Viviani.⁵⁰

Like father, like son

In fact, Francesco Marchetti was first and foremost answering criticisms coming from Giovan Battista Clemente Nelli (1725–1793), himself the author of a biography of his father, Giovan Battista Nelli (1661–1725), not surprisingly a student of Viviani. Nelli father had been a Tuscan architect trained in mathematics by Viviani himself, then first mathematician for the Grand Duke. It is also worth noting that before arriving in Florence, he had been a philosophy student of Alessandro Marchetti in Pisa. He is known for having designed Viviani's ode to Galileo on the façade of his Palazzo dei Cartelloni, but more importantly for his many roles as *provveditore* for the *Magistrato di Parte guelfa*—the Tuscan engineering corps in charge of the road, bridges, and hydraulic works, and of which Viviani had been an engineer.⁵¹

⁵⁰ MARCHETTI, 1755.

⁵¹ DUMAS PRIMBAULT, 2020.

Almost twenty years after Nelli's death in 1725, his son endeavoured to publish posthumously his *Discorsi di architettura*. Thus, in 1753, Nelli son published his father's work, preceded by a *vita* of the architect. In this short biography, Nelli mentions Alessandro Marchetti by name, directly scolds him for being more of a poet than a mathematician, and recounts the story of the supposed feud between Borelli and Viviani related to the publication of the *De resistentia solidorum* in 1669:

Marchetti [...] was a better poet and versifier than philosopher and mathematician. And to tell the truth, the mediocre fame that this famous author acquired in mathematics, came from a hatred that Giovanni Alonso Borelli, Marchetti's master, had for Vincenzo Viviani, because Borelli, in order to harm Viviani's credit and to prevent his advances, composed the work *Resistentia Solidorum* for Marchetti, while Viviani was working on the same subject.⁵²

After targeting Marchetti *ad hominem*, Nelli thus, without a hint of proof, claims that not only had Borelli pressed his student to work on the resistance of solids for the sole purpose of forestalling Viviani, but moreover that Borelli had written the work for Marchetti himself. It is noteworthy that Nelli took for

⁵² “il Marchetti [...] miglior Poeta, e verseggiatore, che filosofo, e mattematico. E per vero dire la mediocre fama, che questo celebre Autore si acquisì nelle mattematiche, provenne da un odio che Giovanni Alonso Borelli maestro del Marchetti aveva con Vincenzo Viviani, imperciocche il Borelli per detrarre al credito del Viviani, e per impedire i suoi avanzamenti, compose al Marchetti l'opera de *Resistentia Solidorum*, mentre il Viviani andava lavorando nella medesima materia.” NELLI, 1753, p. 9.

granted Borelli's hatred for Viviani—it needed no proof even though Nelli was born twenty-two years after Viviani's death and forty-six after that of Borelli!—and that he straightforwardly presented as the direct cause of Borelli's putative behaviour— itself vastly exaggerated after Grandi's somewhat twisted version.

As between Grandi and Marchetti father, Nelli son and Marchetti son then exchanged a few blows through publications: Marchetti's publication of his father's *Vita e poesia* in 1755, followed by Nelli's 1759 *Saggio di storia letteraria Fiorentina del secolo XVII*, then again Marchetti's *Risposta apologetica* in 1762...

The details of the controversy are unimportant within the scope of this contribution. Suffice it to remark that Nelli's *Saggio di storia letteraria* later circulated and was reviewed by the *Journal étranger*, then served as a source for Montucla. In Italy as well, the stereotypical and exaggerated view of the supposed rivalry between Borelli and Viviani, based on ill-founded statements mobilised in mere legacy disputes by supposed Enlightenment men fighting over their fathers' honour, became history. When Giovanni Targioni Tozzetti (1712–1783), Florentine naturalist, endeavored to write a historical piece on the Cimento, he used Grandi's *Risposta apologetica* as his most important source.⁵³

⁵³ TARGIONI TOZZETTI, 1780.

Late Nineteenth- and Early Twentieth-Century

Historiography

From then on, Viviani and Borelli's rivalry was so entrenched that it went down the centuries.⁵⁴ So much so that for Antonio Favaro (1847–1922), a mathematician and historian of science who did an extraordinary amount of work in gathering and classifying the Galilean archive, the feud between the two scholars became an explanatory resource for quite a few events in Viviani's life. For example, in his 1912 biography of Viviani, Favaro put the rivalry forth to explain a supposed conflict of interest regarding a position in Padova.

In Fall 1657, the chair of mathematics at the Studio di Padova—where Galileo was until 1610—became available. In a letter to a former Florentine courtier, then settled in Padua, Viviani showed his interest in the position. Nonetheless, the chair remained vacant for some time, and, in 1659, Viviani learned from Cosimo Galilei that the Paduan were dealing with Borelli, excluding any other competitor. While Borelli's financial demands were deemed too high, and he eventually refused, sources show that Viviani negotiated with Padua until 1663 before, in turn, refusing the position. Although there is no

⁵⁴ Nonetheless, it is worth nothing that Modestino del Gaizo's "Contributo allo studio della vita e delle opera di Giovanni Alfonso Borelli" (1890), given as a lecture at the Accademia Pontaniana in Naples, sticks to the letters exchanges by Viviani and Borelli and does not argue for a rivalry, but rather for frequent and fruitful collaboration, although sometimes tensed. Still, his opinion is that Borelli's departure in 1667 is due to these tensions.

written evidence, again, Favaro argued that Viviani spent so much time negotiating because he craved the position Borelli was coveting. While other, less compromising arguments could have been mobilised—Viviani’s current position in Florence, his general disillusion concerning the academic world, as we will see—here again, the rivalry constructed in the eighteenth century served as a taken-for-granted explanation.

Probably Luigi Tenca (1877–1960), mathematician, did the most damage to Viviani and Borelli’s relationship in a 1956 article dedicated explicitly to the issue and entitled “Le relazioni fra Giovanni Alfonso Borelli e Vincenzo Viviani.” Publishing his transcripts of a few letters exchanged between Viviani and Borelli and of these sent by Viviani to Rinaldini and Molara, Tenca argues for a rivalry. Without contextualising the relationship within the Cimento atmosphere, he based his claim, first on Viviani’s complaints to third parties—that never went further—, second on the observation that the letters are scarcer after the Apollonius episode, and third on a set of virtues and traits of character that he attributes to the two scholars. Sharing his admiration for Viviani, Tenca ventures that Borelli, in fact had problems with everyone else and gave his opinion as to how he should have behaved in certain circumstances:

Certainly, Borelli had a very difficult character, he admitted as a maxim that one cannot be a man and not be malicious, he too easily

expressed judgements to contradict the opinion of others, he always presumed himself superior to others, he did not, at times, have the due respect for truly worthy men.

Perhaps his state of mind was due to bitterness in his early youth; that is my impression.

But he had a quality that does him great credit. Above all, he loved his country, which he honoured with his brilliant works, and for his country he was able to sacrifice himself.⁵⁵

CONCLUSION: PRIORITY, PRIMACY, PRECEDENCE

For the first time gathered in this single contribution, all events of archival memory that fellow scholars and historians have mobilized cannot suffice to argue for a rivalry. First, Borelli and Viviani never directly confronted each other about the disputes they may have had. All traces of tension are personal complaints made, mainly by Viviani, to third parties—and in the case of the Cimento, to one, Rinaldini, who was intellectually disagreeing with both Borelli and Viviani. Second, these few events are but the tip of a deeper and more thorough collaboration that Borelli and Viviani maintained for more than ten years, both within the Cimento, as evident from the breadth of the *Saggi* and at its margin, as was the case for the *divinatio*.

⁵⁵ “Certo il Borelli ebbe un carattere molto difficile, ammetteva come massima che non si possa esser uomo e non esser maligno, esprimeva con troppa facilità giudizi pur di contraddire il parere altrui, si presumeva sempre superiore agli altri, non aveva, alle volte, il dovuto rispetto per uomini veramente degni. Forse il suo stato d’animo era dovuto ad amarezze della sua prima giovinezza; è una impressione mia. Me ebbe una qualità che gli fa molto onore. Amò soprattutto la Patria che onorò con le sue opere geniali e per la Patria seppe sacrificarsi.” TENCA, 1956, p. 120.

Finally, and more importantly, most of these embryonic disputes concern priority claims over specific physico-mathematical results. As they strongly shared a mechanical and corpuscularian natural philosophy coupled with the experimental stance of the Cimento, it is precisely the fruitfulness of their collaboration that may have ignited a few tensions. And the two scholars were not the only ones concerned with such disputes; instead, as Galluzzi argued, the general atmosphere of the Cimento was ruled by the “*gusto*” of a single and all-powerful patron, together with the necessity to write and publish the *Saggi* as the anonymous work of a single body—the Accademia—have fostered interpersonal quarrels and noxious debates.⁵⁶

Indeed, in December 1657, Borelli was complaining to Viviani about the time lost arguing with Peripateticians and how, through daily vain debates, this academy provoked him “nausea” and “impatience.”⁵⁷ In the same manner, Viviani, somewhat disillusioned by the general academic world, advised Cosimo Galileo in a letter dated October 1658 to avoid controversy, stay neutral, and trust no one if he ever wanted not to be “perpetually duped [*perpetualmente cogliona[to]*].”⁵⁸ And indeed, it seems Viviani followed his own advice. Although he seemed to anger quickly, he also strove to keep calm and avoid open confrontation by delaying his answers and addressing his

⁵⁶ GALLUZZI, 1981.

⁵⁷ BNCF, Gal. 283, c. 27rv, quoted by Ivi, p. 807.

⁵⁸ BNCF, Gal. 252, cc. 48r-51, quoted by Ivi, p. 823.

complaints to remote third parties—as he did again in 1697 with his *supplica*. Viviani’s general resentment for academia is therefore possibly less directly related to his relationship with Borelli than to his position in the Tuscan court: he only became a mathematician in 1666, and this was still a very symbolic title, as he was extremely busy with his task as an engineer until the end of his life.⁵⁹

Beyond hearsay, a case in point is how, in the eighteenth century, disciples and sons of disciples crystallised Viviani and Borelli’s relationship into a violent feud as it served their mutual arguments to assert their primacy over the Galilean heritage. Taking for granted a supposed rivalry, exaggerating it with accusations of plagiarism, and making it public through a vast range of diverse publications of a particular genre—derogatory *risposte* addressed to rivals by name and filled with *ad hominem* arguments—, Grandi, Marchetti father and son, and Nelli father and son reified a rivalry between Borelli and Viviani and made their publications the first sources for subsequent late eighteenth- and nineteenth-century historians.

One of the reasons why such an apparently anecdotal “rivalry” has been so actively constructed and then mobilised by commentators is that Viviani and Borelli were indeed the central two figures for the Accademia del Cimento, given their

⁵⁹ DUMAS PRIMBAULT, forthcoming 2024.

involvement in carrying out experiments and devising theories, both mathematical and philosophical, to support them. Any tension between the two scholars, however insignificant, therefore bears great explanatory power for the history of this institution, considered among the first to organise scientific inquiry around experimental principles.

In a book published in 2007 and entitled *Experiment and Natural Philosophy in Seventeenth-Century Tuscany: The History of the Accademia del Cimento*, Luciano Boschiero attempted to reverse the hierarchy between experimentalism and natural philosophy within the Accademia del Cimento. According to him, the academy's primary purpose was not to establish a-theoretical matters of fact through experimentation but rather to devise a theoretical framework for a renewed natural philosophy—notably based on corpuscularianism and mechanical philosophy.

This reappraisal of the more traditional experimentalist narrative led to the publication in 2010 of a lengthy review by Marco Beretta, Mordechai Feingold, and Paula Findlen.⁶⁰ Without entering this debate, let us briefly see how the rivalry between Borelli and Viviani was then mobilised. *Contra* Boschiero's thesis, Beretta argued that Viviani's adherence to atomism was weak and faded with Borelli's departure. The tension between the two scholars figures prominently among

⁶⁰ BERETTA *et al.*, 2010.

Beretta's arguments, and more specifically, the facts that Viviani would have hampered Alessandro Marchetti's publication—although there is only proof of hearsay—and that Viviani himself “manoeuvred to delay the publication of Borelli's work”—yet, as we have seen, the dates do not match.⁶¹ It is worth noting in passing that although Beretta did not mention this tension in his 2000 article on “At the Source of Western Science,” the supposed precedence of the Cimento in the “organization of experimentalism” can also be judged with regard to whether the relationship between Viviani and Borelli could have been caused by the Cimento atmosphere—which then puts a dent in the organisational argument as Galluzzi rightly argued—, or whether it was an anomaly which then may have led, if emphasised enough, to Borelli's departure and the dissolution of the academy.⁶²

While Findlen remained quite cautious about it, Feingold, in his turn, addressed the issue of the supposed rivalry. Taking the “personal rivalry” for granted and blaming “Borelli's temperament,” Feingold argued that only “Leopoldo's great managerial skill in conjunction with the novelty of the experimental enterprise” could hold the Accademia del Cimento together, despite intellectual debates between atomists and Peripateticians, as well as personal disputes on priority.⁶³ Again,

⁶¹ Ivi, p. 190.

⁶² GALLUZZI, 1981.

⁶³ BERETTA *et al.* 2010, p. 197.

Viviani and Borelli's relationship was mobilised to argue for the Cimento's historical precedence regarding experimentalism and its organisation.

In the author's response, Boschiero adopted a more nuanced position than he had about the sole episode of the *divinatio*:

Viviani and Borelli were pivotal to the Cimento's experimental and natural philosophical agenda and their relationship was important to the Cimento's fortunes. The tension between the two is well known as they came from vastly different backgrounds and contested the favouritism of their Medici patrons as they played upon differing claims to Galileo's successorship—Viviani was Galileo's last surviving student, while Borelli held Galileo's old position at the University of Pisa. Nevertheless, despite this rivalry, and even if Viviani later shifted in his views towards atomism, as Beretta argues, there is no evidence or reason to believe that they were constantly at loggerheads.⁶⁴

Beyond the purely erudite task that would aim at setting the record straight by distributing wrongdoings and prejudices, this very agonistic picture of science and its history is an excellent example of how much weight can a seemingly anecdotal question bear throughout centuries merely to settle matters of priority, primacy, and precedence.

⁶⁴ BERETTA *et al.* 2010, p. 207.

Viviani to Borelli

Date	Provenance	Destination	BNCF Gal.	doc.	c.
26 Mag. 1657	Padova	Pisa	157	23	33rv
24 Nov. 1657	?	?	283	12	21r
22 Dic. 1657	Firenze	Pisa	283	15	26r

Borelli to Viviani

Date	Provenance	Destination	BNCF Gal.	doc.	c.
1 Gen. 1643	Venezia	Firenze	257		233r
28 Mag. 1657	Pisa	Firenze	254	30	56r-57v
4 Giu. 1657	Pisa	Firenze	254	31	58r-58bisv
13 Nov. 1657	Pisa	Firenze	283	9	14r-15v
21 Nov. 1657	Pisa	Firenze	283	11	19r-20v
28 Nov. 1657	Pisa	Firenze	283	13	22r-23v
28 Dic. 1657	Pisa	Firenze	283	16	27r-28v
1 Gen. 1658	Pisa	Firenze	254	36	67r-68v
7 Gen. 1658	Pisa	Firenze	283	18	31r-32v
11 Gen. 1658	Pisa	Firenze	283	20	35r-36v
11 Feb. 1658	Pisa	Firenze	254	39	73r-74v
20 Feb. 1658	Pisa	Firenze	254	43	81r-82v
13 Mar. 1658	Pisa	Firenze	254	47	90r-91v
20 Mar. 1658	Pisa	Firenze	254	49	95r
17 Apr. 1658	Pisa	Firenze	254	53	103r-104v
29 Giu. 1658	Roma	Firenze	254	54	105r-106v
20 Lug. 1658	Roma	Firenze	254	55	107r
27 Lug. 1658	Roma	Firenze	254	56	108r-109v
17 Ago. 1658	Roma	Firenze	254	57	110r-111v
26 Ott. 1658	Casa	Firenze	254	59	114r-115v
2 Set. 1659	?	Firenze	254	69	135r-136v
11 Feb. 1665	Pisa	Firenze	254	141	272rv
9 Ago. 1676	Roma	Firenze	256	52	95r-96v
Undated: Woodward Library of the University of British Columbia, Vancouver (WL), Ms. Q113.B67, Borelli Op. Ined. Tom. III, c. 34r-36v.					

⁶⁵ I would like to express my gratitude to Federica Favino, who helped me consolidate this list.

The database of the metadata of all of Viviani's correspondence is available here in a .csv format: https://github.com/LHST-EPFL/Viviani_correspondence_network

I want to thank Francesco Barreca of the Museo Galileo in Florence for his help opening access to such data.

Some of these letters are either transcribed, summarized, or commented on in GAIZO, 1890; and TENCA, 1956.

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