

An indirect convergence between the Accademia del Cimento and the Montmor Academy: the “Saturn dispute”

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Introduction

The purpose of the present chapter is to examine an indirect (albeit significant) point of contact between the Florentine academy, later known as the Accademia del Cimento, and the so-called Montmor Academy: their role in the “Saturn dispute”. In particular, this essay intends to demonstrate how, despite fragmentary evidence and often interrupted exchanges, the issue of the planet’s strange appearances offers a unique standpoint from which to assess the interests and the ways in which the two societies operated, as well as the nature of their relations.

The two academies were active between 1657 and 1666-7, in Florence and Paris, respectively. The first occasional meetings at the house of Henri Louis Habert de Montmor (1600-1679) can be dated back to the period between 1654 and 1656.¹ However, it is only from 1657—when the academy approved its own statutes—that the beginning of the Parisian circle can be dated with certainty. The Cimento, on the other hand, never had official rules or statutes.² The dating of its meetings can be determined thanks to the diaries kept by its academicians, and also through the only publication produced by the Florentine academy: the *Saggi di naturali esperienze* (1667). This book—signed by the “accademici del Cimento” and by the “Saggiato segretario”, Lorenzo Magalotti—attested that an ‘academy’, sponsored by Prince Leopoldo de’ Medici (1617-1675), was ‘founded in the year 1657’.³

Even less information is available regarding the cessation of their activities. Having never official statutes, the Accademia del Cimento did not have an official closure either. By the time when the *Saggi* was published, the meetings had become sporadic, many of the academicians moved elsewhere, the prince was elected cardinal and thus the meetings simply ceased to take place. The circumstances that led to the disbandment of the Parisian group are equally unclear. In June 1664—following a long debate on the form that the group should

¹ Harcourt Brown, *Scientific organizations in seventeenth century France (1620-1680)* (New York 1967 (1934)), 69-71.

² See in particular: Paolo Galluzzi, ‘L’Accademia del Cimento: ‘Gusti’ del Principe, filosofia e ideologia dell’esperienza’, *Quaderni storici* 48 (1981), 788-844.

³ “[...] la nostra accademia istituita dell’anno 1657”, Lorenzo Magalotti, *Saggi di naturali esperienze* (1667) (Palermo 2001), 40. English transl. in W. E. Knowles Middleton, *The Experimenters: a study of the Accademia del Cimento* (Baltimore 1971), 92.

have taken in order to become more robust and better regulated—⁴ Christiaan Huygens informed Robert Moray that the Montmor Academy had “ceased to exist”. On its “remains” another group activity emerged, spearheaded by some of the members of the Montmor Academy.⁵ They met in the house of Melchisedech Thévenot (c.1620-1692), one of the most active members of the Montmor Academy, at least until the establishment of the *Académie Royale des Sciences* in 1666.

The history of the relations between the two academies—which prior to the foundation of the *Royal Society* and of the *Académie Royale des Sciences* were the two most renowned groups of scholars engaged exclusively in matters of natural philosophy—is difficult to piece together, given that the various attempts to establish epistolary exchange often encountered delays, if not outright indifference. Consequently, the dialogue between the two academies might be better described as a succession of monologues.

1. Fragmentary and difficult exchanges

a. Autumn 1658: Michelangelo Ricci, Melchisedech Thévenot and the first contact between the two academies

As is well known, the first tentative contact between the two academies was made by Melchisedech Thévenot,⁶ a French diplomat, bibliophile and man of letters, and a collector of travel literature. His language skills earned him the position of ambassador in Genoa in 1647 and later in Rome, where he had already resided between 1643 and 1645 and where he witnessed the conclave that elected Pope Alexander VII

⁴ See for instance: Christiaan Huygens to Lodewijk Huygens, 6 April 1663, Christiaan Huygens, *Œuvres complètes de Christiaan Huygens*, Tome IV. *Correspondance 1662-1663* (The Hague 1891), letter n. 1104, 323-4; and Christiaan Huygens to R. Moray, 12 Mars 1664, Christiaan Huygens, *Œuvres complètes de Christiaan Huygens*, Tome V. *Correspondance 1664-1665* (The Hague 1893), letter n. 1218, 39-42.

⁵ ‘A Paris il n’y avoit rien de nouveau en matiere de Sciences, sinon que l’Academie chez Monsieur de Montmor a pris fin pour jamais, mais il semble que du debris de celle cy il en pourroit renaistre quelque autre, car j’ay laissè quelques uns de ces Messieurs avec de tres bonnes intentions’, Christiaan Huygens to R. Moray, 12 June 1664, *Œuvres complètes de Christiaan Huygens*, V, letter n. 1234, 69-70.

⁶ On Thévenot see especially: Robert McKeon, ‘Une lettre de Melchisédech Thévenot sur les débuts de l’Académie Royale des Sciences’, *Revue d’histoire des sciences et de leur applications* 18 (1965), 1-6; Trevor McClaughlin, ‘Une Lettre de Melchisédech Thévenot’, *Revue d’histoire des sciences* 27 (1974), 123–126; Id., ‘Sur les rapports entre la Compagnie de Thévenot et l’Académie royale des Sciences’, *Revue d’histoire des sciences* 28 (1975), 235–242; Jan Swammerdam, *The Letters of Jan Swammerdam to Melchisedec Thévenot*, ed. G. A. Lindeboom (Amsterdam 1975); Anthony J. Turner, ‘Melchisédech Thévenot, the bubble level, and the artificial horizon’, *Nuncius: annali di storia della scienza* 7 (1) (1992), 131–145. Nicholas Dew, *Orientalism in Louis XIV’s France* (Oxford 2009), ch. 2; as well as Thévenot’s sketch of himself in Melchisédech Thévenot, *Bibliotheca thevenotiana* (Paris 1694). On his relations with Tuscany, see the recent essay by Alfonso Mirto: Mirto, ‘Lettere di Melchisédec Thévenot ai fiorentini: Leopoldo de’ Medici, Cosimo III Granduca di Toscana e Vincenzo Viviani’, *Galilaiana* XII (2015), 145-191.

(1655).⁷ Although information on his life and activity is scarce, the letters reveal that during his first stay in Rome Thévenot had met with some of the scholars who, from 1657 onwards, gravitated in various capacities around the academy sponsored by Prince Leopoldo de' Medici. He was introduced to Michelangelo Ricci (1619-1682),⁸ corresponded with Vincenzo Viviani (1622-1703),⁹ and wrote to Carlo Roberto Dati (1619-1676).¹⁰

In 1658, having long before returned to Paris, Thévenot was also one of the men of letters that attended the regular meetings at the house of Henri Louis Habert de Montmor. In autumn 1658, perhaps inspired by the new statute written by Samuel Sorbière (1615-1670)¹¹ less than a year earlier, Thévenot wrote Michelangelo Ricci to express his desire to establish a form of “communication” between the Montmor group and the Florentine scholars. For one of the articles of the *Règlement* – mentioned in a letter that Sorbière addressed to Hobbes at the beginning of 1658¹² – required members to engage in scientific correspondence on behalf of the group.

Michelangelo Ricci, Thévenot's addressee, was not a member of the group that convened at the Grand Duke's residence and never participated in any of the activities carried out in Florence. In 1658 he was at the service of the papal court in Rome.¹³ Nevertheless, he

⁷ Details on Thévenot's two stays in Rome can be inferred primarily from his correspondence. The main source of information on the first stay are the letters preserved in the Galileo Collection at the Biblioteca Nazionale Centrale in Florence (hereafter BNCf); as for the second stay, see especially: *Lettres autographes de Melchisedech THÉVENOT au ministre sur les affaires de Rome. (1654-1655)*, Bibliothèque nationale de France, Ms. Français 10729.

⁸ See for example the letter dated 30 September 1644 in which Michelangelo Ricci informed Torricelli that he had delivered his *Opera geometrica* to Thévenot, among others: *Le opere dei discepoli di Galileo Galilei*, ed. by Galluzzi, P, Torrini, M., (hereafter DIS), I, 'Carteggio 1642-1648' (Firenze 1975), n. 116, 158.

⁹ The Galileo collection at the BNCf contains six letters between Viviani and Thévenot dating from the summer of 1643 to the summer of 1645, the last of which was written when Thévenot had already returned to Paris: DIS, I, 'Carteggio 1642-1648', n. 51, 54, 56, 88, 96, 106, pp. 62, 70, 72, 117-8, 127-8, 145-6. Furthermore, on 12 May 1646 Thévenot sent a letter to Viviani (now lost) via Ricci: M. Ricci to Viviani, DIS, I, 'Carteggio 1642-1648', n. 199, pp. 293-294.

¹⁰ Thévenot also enclosed a message for Dati (now lost) to a letter written for Viviani on 1 August 1643: DIS, I, 'Carteggio 1642-1648', n. 56, p. 72.

¹¹ On Sorbière and his role within the Montmor Academy see in particular Gregory M. Adkins, *The Idea of the Sciences in the French Enlightenment: A Reinterpretation* (Newark 2014), 9-28.

¹² Samuel Sorbière to Thomas Hobbes, 22 January /1 February 1658, in: Thomas Hobbes, *The Correspondence*, ed. by Noel Malcolm, vol. 1: 1622-1659 (Oxford 1994), vol. 1, 491; English translation p. 494. The letter is also published in: Samuel Sorbière, *Lettres et discours* (Paris 1660), 631-636.

¹³ On Michelangelo Ricci see especially Francesco Bustaffa's important doctoral thesis (to whom goes my gratitude for sharing a copy of his work): Francesco Bustaffa, *Michelangelo Ricci (1619-1682). Biografia di un cardinale innocenziano*, unpublished doctoral thesis in modern history, Scuola superiore di studi storici di S. Marino, a.a. 2010-11. See also Luigi Tenca's works: 'Michel Angelo Ricci', *Atti e memorie dell'accademia patavina di scienze, lettere ed arti. Classe di scienze matematiche e naturali* 68 (1955-1956), 142-158; 'Michel Angelo Ricci', *Torricelliana* 11 (1960), 5-13; 'Relazioni fra Vincenzio Viviani e

counted among his friends many of the scholars that convened in Florence (such as Giovanni Alfonso Borelli (1608-1679) or Vincenzo Viviani), and regularly corresponded with them as well as with the prince. He was therefore well acquainted with the group's activities, and probably discussed them with Thévenot. Borelli in particular appears to have been an important point of contact between Ricci and the Tuscan court¹⁴. It is therefore not surprising that the first approach between the two academies was mediated by Ricci and Borelli.

Borelli mentioned Thévenot's initiative in one of his letters to Leopoldo. As the correspondence between Ricci and Thévenot is not extant to date, the exchanges between Borelli and the prince are the only source available to trace back the requests made by the Frenchman and the ensuing response from Florence. This is probably one of the best-known¹⁵ exchanges between the two academies. Divided between the fear that the French could take advantage of the discoveries made by the Italians on the one hand, and the need to be updated on the work that was being carried out abroad on the other, Borelli sought advice from the prince.¹⁶ Ricci, in turn, was concerned with the damage that failure to respond to the letter would cause to the image of the academy and, by extension, of Italy.¹⁷ In any event, Thévenot did not receive an official response until 1660.

Michel Angelo Ricci', *Rendiconti dell'Istituto lombardo di scienze e lettere. Classe di scienze matematiche e naturali* 87 (1954), 212-228.

¹⁴ Formerly a student of Benedetto Castelli like Ricci, Borelli spent the summer of 1658 in Rome to work with Abraham Ecchellensis on the translation of Apollonius' *Conics*. As noted by Bustaffa, after Torricelli's death (1647) records of the relations between Ricci and Florence had weakened to the point of disappearing completely between October 1648 and 1658. As Bustaffa himself points out, the relations between the Jesuit and the Florentine milieus appear to have been rekindled around the time of Borelli's sojourn in Rome. See: Bustaffa, *Michelangelo Ricci*, 108-9.

¹⁵ Middleton, *The Experimenters*, 300-301. See also: Françoise Waquet, *Le modèle français et l'Italie savante : conscience de soi et perception de l'autre dans la République des lettres (1660-1750)* (Rome 1989), 407-12.

¹⁶ 'Ora io godo sommamente, che da quei Signori in Francia si vada con nuove Sperienze, e Speculazioni, promovendo la Natural Filosofia; ma ho anche qualche sospetto e gelosia, che dell'Invenzioni e Speculazioni dei nostri Maestri, e di quelle che abbiamo trovato Noi, se ne abbiano, secondo l'usanza vecchia, a far Autori e Ritrovatori gli Stranieri. Questo rispetto mi fa andar ritenuto, ad attaccar questo Commercio con quei Signori dell'Accademia Parigina, poichè non si può far di meno nello scrivere, di non comunicare loro qualche cosa; e l'istesso dubitare dà campo a quegli Ingegneri pellegrini di ritrovar le cose, tratto delle Ragioni, non delle Esperienze. Dall'altra parte parmi che sarebbe pur bene esser informati di quello, che si va operando, e speculando in quell'Accademia, sicché io mi trovo irresoluto; e però ricorro a V.A.S., perchè mi comandi come mi debbo portare in quest'affare'. See: Borelli to Leopoldo, 11 November 1658; published in: Giovanni Targioni Tozzetti, *Notizie degli aggrandimenti delle scienze fisiche accaduti in Toscana nel corso di anni LX. del secolo XVII* (Bologna 1780), t.1, 456; Angelo Fabroni, (ed.), *Lettere inedite di uomini illustri*, 2 vols. (Florence 1775), 115. English translation: Middleton, *The Experimenters*, 300.

¹⁷ '[I] Sig.r Michelagnelo Ricci mi replica questa settimana, e con moltissime raggioni vive, et efficaci procura mostrare quanto pregiudizio si faccia alla nostra accademia, et all'Italia tutta con il nostro tacere e non scrivere a quei Sig.ri dell'accademia di Francia vorrebbe egli insomma che si palesassero le conclusioni da noi ritrovate, e dimostrate facendo però, et occultando le raggioni, e le dimostrazioni: in questa maniera dice egli potremo esser sicuri che non ci possa esser tolto il primo luogo dell'inventione, preoccupata e palesata da noi'. BNCF, Ms. Gal. 275, c. 130r-131r.

b. *Spring 1659: the “form of government of the new Philosophical Academy in Paris”.*

In the spring of 1659 Borelli received from Ricci a lesser-known report, still unpublished, on the Montmor Academy. The manuscript, probably written by Thévenot,¹⁸ but of which only Magalotti’s Italian copy¹⁹ is extant, is mentioned by Middleton as an “undated and unidentified secretarial copy of part of a letter written to someone in Italy by someone in France”, which may have belonged to the correspondence between Ricci and Thévenot²⁰. The content corresponds perfectly with the comments sent by Borelli to Leopoldo²¹ on 19 April concerning a report discussing the ‘form of government of the new Philosophical Academy in Paris’²² received by Ricci and which, he added, was enclosed to the letter (now missing).

The report –discussing experiments carried out in Paris and focusing on the group’s composition and its code of conduct–was apparently never answered, despite the assurances of the author of the letter of the group’s good faith regarding their correspondence with Italy:

In quanto poi alle difficoltà e sconcerti che veggo accennati nella lettera di V.S. Illustrissima e che arrivarono già in simili occorrenze, pare che la comunicazione havendo da passar per via di lettere con la Data e tempo di esse si possa assicurare la fede di tal commercio virtuoso; può ben cader tal mancamento in un particolare che ambisca il principato di una scienza ma difficilmente rendersi commune à tutta un’adunanza di più di quaranta persone, che tanti ordinariamente sono quei virtuosi che convengono in questa nostra Academia, e forse in maggior numero saranno quei di Firenze.²³

It is possible that this assurance –which would seem to indicate that Ricci had informed Thévenot of Borelli’s concerns– contributed to persuading the Florentines to draft a belated response.

English translation: Middleton, *The Experimenters*, 301. See also: Waquet, *Le modèle français et l’Italie savante*, 408-410.

¹⁸ The manuscript begins indeed with a reference to an earlier message concerning the Montmor Academy: ‘Quell’adunanza di Virtuosi, ò Academia della quale scrissi già a V.S. Illustrissima [...]’. BNCF, Ms. Gal. 293, c. 30r.

¹⁹ BNCF, Ms. Gal. 293, cc. 30r-v.

²⁰ Middleton, *The Experimenters*, 299.

²¹ G.A. Borelli to Leopoldo, 19 April 1659, BNCF, Ms. Gal. 275, cc. 146r-v.

²² ‘[...] la forma con la quale si governa la nuova accademia de Filosofi di Parigi’. BNCF, Gal. 275, cc. 146r-v.

²³ *Ibid.*, c. 30v.

c. *Summer 1660: an experiment involving fumes in a vacuum space and the promise of a speech that was never sent*

Shortly after activities resumed at Pitti Palace in early summer 1660,²⁴ Lorenzo Magalotti (1637-1712) –the new secretary of Leopoldo’s academy– wrote to Ricci about ‘a gem recently studied by this Academy’ with the purpose to inform ‘Mr Thévenot’²⁵ in France. This is the only experiment that was officially announced abroad before the publication of the *Saggi di Naturali Esperienze* (1667). The experiment in question took place on 12 June 1660, and was related to the smoke that was generated in the vacuum left by the mercury inside a Torricellian tube. The description of the experiment was accompanied by a detailed drawing, and the letter justified the delay with various ‘unexpected events’ –most notably the prince’s indisposition ‘on various occasions’.²⁶ The letter also noted that, besides providing further proof against the Peripatetic hypothesis of positive lightness, the descending fumes clearly demonstrated that the void left by the mercury inside the instrument was far from obvious.

The letter did not make any reference to the composition of the Florentine academy, or to the manner in which the meetings were organised. For their part, the French responded by merely expressing gratitude for the official commencement of a correspondence with the ‘Pisa academy’. Furthermore, despite the fact that the experiment was discussed at a special session held at the Montmor residence, the

²⁴ Thévenot’s letter arrived at the start of one of the longest periods of inactivity for the Accademia del Cimento: no session is recorded between September 1658 and May 1660. In addition to the risk that the French could take advantage of yet-unpublished discoveries (as indicated by Borelli’s letter), the fact that the French letters went unanswered could also be explained precisely because academic sessions had been suspended, and many of the Cimento academicians were not in Florence at the time. In a letter to Boulliau dated 24 April 1659, Leopoldo wrote: ‘la forza di varij accidenti è stata cagion che molti della mia Accademia sieno stati, e sien separati in diversi luoghi; onde per qualche tempo non si è applicato alle esperienze, et alli Studi incominciati’. BNCF, Gal. 282, 10r.

²⁵ ‘Mi comanda il Serenissimo Principe Leopoldo mio Signore che io mandi copia a V.S. come fo con l’aggiunta d’una galanteria nuovamente osservata in quest’Accademia [...] si contenterà VS. di parteciparla in Francia al Sig. Tevenot’, Lorenzo Magalotti to Michelangelo Ricci, 4 July 1660, BNCF, Gal. 268, 67r-70r and Gal. 289, 1r-4r (these are two different copies of the same letter, parts of which are published in Fabroni, *Lettere inedite di uomini illustri*, II, 88-90).

²⁶ ‘Servirà in oltre il comunicarla per far credere a quei Signori vano il sospetto significatoci, che habbia l’A.S. revocato il pensiero del commercio letterario stabilito più mesi addietro, sentendo hora attribuirsi le cagioni del nostro indugio ad accidenti di mera casualità, fra i quali son forse stati i più considerabili alcune indisposizioni in vari tempi occorse all’A.S.; delle quali essendone andate copate per buona parte le sue non mai intermesse applicazioni a questi medesimi studi, e stata S.A. dalla violenza delle congiunture accennate consigliata di quando in quando ad un riposo più forzato, che volontario. Così l’essersi differito l’incominciamento del promesso commercio è stato più, che dalla propria elezione del Sig.r Principe, effetto della lentezza degli academici in sollecitare l’A.S. a nuove fatiche, sapendo ciascuno per prova con qual fervore poi l’intraprenda, anzi che per l’evidenza di tal verità solo in questo caso haremmo forse men’ che volentieri secondato anche l’espressi comandi con gl’atti per altri eternamente dovuti della nostra obbedienza’. Ibid.

Cimento²⁷ never received the ‘speech’ that Thévenot had promised in his letter of thanks to the prince.²⁸

d. *Spring 1661: Thévenot’s list*

In April 1661, Thévenot sent Leopoldo a list of 43 observations conducted in Paris in addition to a few experiments from England that were supposedly going to be carried out on the Canary Islands.²⁹ These involved primarily capillarity experiment: i.e. those phenomena whereby a fluid placed inside a very thin tube –the tube being either one of two communicating tubes, or immersed into a bigger container– reaches a considerably higher or lower level than usual. The experiments probably took place in Paris between November 1660 and February 1661.³⁰ This subject was pursued avidly by the Cimento academicians. From the very first sessions, they had engaged in the observation of the motion of various fluids inside syphons and tubes of different caliber.³¹

Having received Thévenot’s list, Leopoldo dispatched a hasty note of thanks; he did not offer any further comments besides apologising for not being presently able to return the courtesy, owing to the impending nuptials between the Grand Duke’s son, Cosimo III de’

²⁷ On 22 November 1660 Ricci was yet to receive the ‘writing’ promised by Thévenot: ‘La speranza che mi dava il Sig. Thévenot con l’ultime sue, di farmi avere quanto prima una scrittura di que’ Signori sopra l’esperienza che a loro inviai, così commandandomelo V. Altezza Serenissima; è stata cagione ch’i’abbia indugiato qualche ordinario a scrivere, volendo supplire nell’istesso tempo a due cose, per non portare V. Altezza duplicato incommodo con le mie lettere. Ma forse le novità devono colà tuttavia durare, et impediscono il radunar l’Accademia’. M. Ricci to Leopoldo de’ Medici, 22 November 1660, Fabroni, *Lettere inedite di uomini illustri* II, 106-8.

²⁸ ‘Hanno poi straordinariamente unita l’Accademia a fine di partecipare l’esperienza graziosissima, come la chiama il Sig. Thévenot, a quei Signori, li quali vogliono provar di nuovo l’esperienza, e quanto prima mandare all’Altezza Vostra Serenissima sopra di quella un Discorso’, M. Ricci to Leopoldo de’ Medici, 14 October 1661, Fabroni, *Lettere inedite di uomini illustri* II, 105-6.

²⁹ M. Thévenot to Leopoldo de’ Medici, 7 April 1661, BNCF, Gal. 270, cc. 139r-141v, 155r-156r. Published in: Mirto, ‘Lettere di Melchisédec Thévenot ai fiorentini’; and Targioni Tozzetti, *Notizie degli aggrandimenti delle scienze fisiche accaduti in Toscana nel corso di anni LX. del secolo XVII* (Bologna 1780), t.2, p.2, 716-721.

³⁰ Huygens’ diary entries suggest that in December 1660 Jacques Rohault (1618-1672) presented his experiments on the “water ascending small tubes” several times. Henri L. Brugmans, *Le séjour de Christian Huygens à Paris et ses relations avec les Milieux Scientifiques français. Suivi de son Journal de Voyage à Paris et Londres* (Paris 1935). The entry for 7 December notes that ‘Rohault lut les expériences de l’eau qui monte dans les petits tuyaux’ at Montmor’s residence, and again on 14 December Huygens wrote that ‘Rohault expliquoit des petits tuyaux’. On 21 December Huygens witnessed instead the ‘expériences des tubes et des petits tuyaux’ at Rohault’s own residence. After him, Balthasar de Monconys (1611-1665) –who had met with Torricelli during his stay in Florence in 1646– read a lecture on the same topic, the ‘Discorso sull’Ascensione dell’acqua sopra al suo livello in un tubo stretto’ which was commented by Rohault himself as well as Roberval, Adrien Auzout (1622-1691), Jean Pecquet (1622-1674) and Montmor. See: Balthasar de Monconys, *Journal des voyages de Monsieur de Monconys* (Lyon 1665-66), 3 vols., vol. 3, [109-114] 33-38.

³¹ See for example the experiments recorded in the diaries for 22 June, 27 July, 29 July, 7 August and 22 December 1657. BNCF, Ms. Gal. 260, cc. 5r, 28r, 43r, BNCF, Ms. Gal. 262, cc. 5r-v, 21r-22r, 24v, 49v-50r.

Medici, and Louis XIV's cousin, Marguerite Louise d'Orléans, which had brought all academic activities to a halt.³² A few days later Viviani also wrote to Thévenot, intimating that he 'greatly enjoyed' reading about the experiments 'of your illustrious academy', and about 'the other experiments from England that will be carried out on the island of Tenerife'.³³ No other reference to the Parisian observations can be found in the correspondence available to date.

Nor is it possible to determine whether Thévenot's list had been discussed at the Accademia. We do know, however, that once activities were resumed after the wedding of Cosimo III, capillarity continued to be frequently discussed in Florence. Yet the academicians shifted their focus into experiments in a vacuum, wishing to learn whether the same phenomena would occur with or without air. No mention of the Paris list appears in the academicians' diaries either, not even in the entry for 28 November 1661,³⁴ when the Cimento academicians observed—contrary to the position defended by the French—³⁵ that cold water does not, in fact, rise higher than hot water. And while the Florentines continued with this course of experiments after 1661, it doesn't appear from Thévenot's list that the Parisian academy even consider the topic. We may conclude, therefore that, having been prompted to return to the topic, the Cimento academicians did not take into serious consideration the observations received from Paris.

2. 1658-1661: the Saturn dispute

An indirect, albeit significant point of contact between the two groups can be found in their involvement in the 'Saturn dispute'. Between 1658 and 1660 the two academies were the main actors in the debate concerning the interpretation of the planet's 'strange appearances'—first observed as triple-bodied, then oval, then solitary, then triple-bodied again. Galileo's descriptions of Saturn that began in 1610 produced a flurry of observations and hypotheses. Those involved included Gassendi (1592-1655), Boulliau (1605-1694), Hevelius (1611-1687), Riccioli (1598-1671), and Grimaldi (1618-1663); and a variety of drawings were published and widely disseminated around the middle of the seventeenth century. The debate on the correct interpretation of the various guises under which Saturn made itself visible was ignited by Christiaan Huygens. In March 1656, the Dutch astronomer published the *De Saturni luna observatio nova*, where he

³² Leopoldo de' Medici to M. Thévenot, 21 April 1661, BNCF Ms. Gal. 282, c. 50r-v.

³³ V. Viviani to M. Thévenot, 6 May 1661, BNCF, Ms. Gal. 252 doc. 37, c. 70r-71v.

³⁴ 'Messo un Cannellino nell'acqua fredda, e notato l'altezza, alla quale per esso s'innalza l'acqua, votata per attrazione l'acqua fredda del vaso, e messavene ugual mole della calda, l'altezza di quella che si solleva si mantiene l'istessa'. BNCF, Ms. Gal. 260, c. 172r and Ms. Gal. 262, c. 123v.

³⁵ 'Pare che da molte osservazioni possa asserirsi, che l'Acqua Fredda si sollevi assai più della Calda'. Targioni Tozzetti, *Notizie degli aggrandimenti*, t.2/2, 719.

announced the discovery of Saturn's moon –which Huygens had already revealed to some colleagues during his stay in Paris several months earlier– further revealing a new theory to explain the planet's strange appearances. It was his intention to publish a full account shortly thereafter, but in the *De Saturni luna observatio nova* he reduced the hypothesis into an anagram, so as to ensure priority of the discovery.

Hevelius³⁶ and Roberval³⁷ immediately responded to the enigmatic announcement by sending Huygens their own theories, but the long-awaited *Systema Saturnium* was not published until the summer of 1659. In the meantime, the meaning of the anagram was revealed only to two close friends, Ismael Boulliau and Jean Chapelain: *Annulo cingitur, tenui, plano, nusquam coherente, ad eclipticam inclinato* (It is surrounded by a thin, flat, ring, nowhere touching, inclined to the ecliptic). And it was owing to the mediation of Chapelain and Boulliau that the issue of Saturn's appearances reached the two academies.

Huygens met Chapelain and Boulliau during his first stay in Paris in the summer of 1655.³⁸ On that occasion he had shared with many his discovery of Titan, Saturn's moon. Chapelain was particularly impressed by it, and his urgings were instrumental in persuading Huygens to publish the *De Saturni luna observatio nova*³⁹. After he received the text, Chapelain presented it in some Parisian circles and sent copies to influential acquaintances (including Montmor), later informing Huygens of the enthusiastic reception of his work.⁴⁰ Understandably, then, when Chapelain received in March 1658 Huygens's detailed explanation of his hypothesis concerning Saturn's strange

³⁶ On 22 June 1656 Hevelius sent Huygens his *Dissertatio de Nativa Saturni Facie*, in which he put forward a different explanation for the Saturn phases. See: J. Hevelius to C. Huygens, 22 June 1656, *Œuvres complètes de Christiaan Huygens* I, letter n. 302, 435. As early as in May 1656 Hevelius delivered to Christiaan Huygens' brother, Philips, an anagram that was later discovered to say simply that the Saturn phases took place over a period of about 15 years. In the same letter he also announced that he was preparing a new treatise on Saturn.

³⁷ Having read Huygens' treatise, Roberval put forward a hypothesis to explain the Saturn phases that was based on the vapour exhalations that would periodically pervade the planet's atmosphere. See: G.P. de Roberval to Christiaan Huygens, 6 July and 4 August 1656, *Œuvres complètes de Christiaan Huygens* I, letter n. 311 and n. 324, pp. 451-2 and 474-5.

³⁸ On Huygens' first stay in Paris see especially: Brugmans, *Le séjour de Christian Huygens*, in particular pp. 23-31. On the relations between Huygens and Chapelain see especially: Albert J. George, 'A seventeenth-century amateur of science: Jean Chapelain', *Annals of Science* 3:2 (1938), 217-236. On the relations between Huygens and Boulliau see especially Robert A. Hatch, 'Between Friends: Huygens and Boulliau', *De zeventiende eeuw: Cultuur in de Nederlanden in interdisciplinair perspectief* 12 (1996), 106-116.

³⁹ See in particular: Christiaan Huygens to J. Chapelain, [March 1656]; Christiaan Huygens to [Cl. Mylon], 15 March 1656; Christiaan Huygens to G.P. de Roberval, [March 1656]; Christiaan Huygens to J. Chapelain, 8 June 1656, *Œuvres complètes de Christiaan Huygens*, I, letters n. 270, 271, 276 and 299, pp. 390, 391, 395-6 and 430-1.

⁴⁰ See: J. Chapelain to Christiaan Huygens, 8 April 1656, *Œuvres complètes de Christiaan Huygens*, I, letter n. 278, pp. 397-9.

appearances,⁴¹ he was very eager to announce it at the sessions taking place at Montmor's house, which he assiduously frequented. Huygens was already informed the new academy, probably by Boulliau,⁴² and thanks to Chapelain he had already exchanged a few letters with Montmo –who expressed his strong desire to learn the details of Huygens' discoveries.

On 18 April 1658 Huygens granted Chapelain permission to present his hypothesis on Saturn's ring to the Parisian academy where, twenty days earlier, Roberval had read his own lecture on Saturn's system.⁴³ As is well known, nothing was left to chance in the organisation of the session. Chapelain and Montmor took every step to produce the greatest possible sensation, by inviting not only renowned Parisian savants, but doctors from the Sorbonne, state counsellors, and even knights of the Order of the Holy Spirit. The outcome exceeded expectations,⁴⁴ with the session representing one of the pinnacles in the activity of the Montmor Academy: the group achieved fame because it had been chosen by Huygens to announce his important discovery.

Within the academy, Huygens' theory of Saturn's 'ears' was seen as a response to Roberval's earlier lecture, in which the latter explained the different appearances of the planet by connecting them with the vapours generating from the hotter area, akin to sunspots. Chapelain, who at the time had already been made aware of Huygens' theory, had immediately expressed his misgivings, though the real response came from Huygens himself. Roberval, who had previously insinuated that Huygens had plagiarised his own theory, dropped all charges against him, while remaining doubtful of Huygens's hypothesis. His reservations were included in a letter that Chapelain hastily addressed to Huygens. It is not clear whether the responses of the Dutchman was read out verbatim or simply summarized in the Academy. Be that as it may, owing to Huygens's absence, Chapelain became the chief promoter and defender of the young Dutch astronomer in Paris.

Whereas Chapelain played a key role in introducing Huygens' Saturn hypothesis to the Parisian academy, Boulliau played an equally significant role in bringing the *Systema Saturnium* to the attention of the Accademia del Cimento. Following the Saturn debate at the Montmor

⁴¹ Christiaan Huygens to J. Chapelain, 28 March 1658, *Œuvres complètes de Christiaan Huygens* II, letter n. 477, 156-162.

⁴² A letter to Heinsius dating from February 1658 provides one of the first descriptions available to date of the Montmor Academy. See: Brown, *Scientific organizations*, 77-79.

⁴³ J. Chapelain to Christiaan Huygens, 12 April 1658, *Œuvres complètes de Christiaan Huygens* II, letter n. 480, 165-7.

⁴⁴ 'L'Assemblée estoit nombreuse et de plus de quarente Personnes, entre lesquelles il y auoit deux Cordons bleus le Marquis de Sourdis et Monsieur Du Plessis Guenegaud Secretaire d'Etat, plusieurs Abbés de conditions, plusieurs Maitres des Requestes, des Conseillers du Parlement des Officiers de la Chambre des Comptes, des Docteurs de Sorbonne, plusieurs Gentilzhommes qualifiés, des Medecins de reputation force Mathematiciens d'importance et quantité de Scauans lettres', J. Chapelain to Christiaan Huygens, 10 May 1658, *Œuvres complètes de Christiaan Huygens* II, letter n. 484, 174.

residence, and also at the insistence of Chapelain –whose support was indeed acknowledged in the final text– Huygens devoted himself to completing the work. During the final writing stages, the Dutch astronomer was charged with an even more aggravating accusation. As noted earlier, before revealing his hypothesis on Saturn, Roberval accused Huygens of having based his theory on the revelations that he himself had shared with the Dutch astronomer during the summer of 1655, when they were both in Paris. It was easy for Huygens to demonstrate that his ring had nothing to do with the vapours theorised by the Frenchman. The research on Saturn went hand in hand with important studies on the application of pendulums to clock. Chapelain and Montmor eagerly advertised these findings –which included interesting applications for the determination of longitudes. In 1658, after two years work, Huygens published his *Horologium*. The publication of this short treatise engendered disputes over priority, starting with Leopoldo de’ Medici himself, who accused Huygens of having plagiarised one of Galileo’s inventions.⁴⁵ The *Horologium* had reached the prince via Boulliau and it was to him that the prince conveyed his criticism. The two met for the first time in 1645 when Boulliau visited Florence with Nicholas Heinsius, and since then the two carried out regular correspondence.

It is therefore not an accident that, while Boulliau mediated between the two, that Huygens decided to dedicate the *Systema Saturnium* precisely to Leopoldo de’ Medici.⁴⁶ While it is not clear whether Boulliau came up with the idea, there is no doubt that he supported it.⁴⁷ The text reached the prince from Heinsius in August 1659 via Carlo Roberto Dati, who befriended Huygens ever since the latter visited Florence.⁴⁸ Huygens’ first Saturn publication reached Florence quite late. Although in July 1656 Vincenzo Viviani was informed of the *De Saturni luna observatio nova* by the mathematician Rasmus Bartholin,⁴⁹ the work itself did not reach Florence before July 1658. The news of a ‘new planet that revolves around Saturn in 16 days’ was welcomed with great interest by Borelli who, having received a copy of the text from Flanders, immediately sent it to Leopoldo ‘so

⁴⁵ On Huygens, the invention of the pendulum clock, and the ensuing debates see especially: Joella G. Yoder, *Unrolling Time: Christiaan Huygens and the Mathematization of Nature* (Cambridge 1988); Id., ‘Book on the pendulum clock’ in *Landmark Writings in Western Mathematics*, ed. Ivor Grattan-Guinness (Amsterdam 2005), 33–45. Cornelis D. Andriessse, *Huygens: The Man Behind the Principle* (Cambridge 2005).

⁴⁶ See the dedicatory letter: *Œuvres complètes de Christiaan Huygens* II, letter n. 635, 432-4.

⁴⁷ I. Boulliau to Christiaan Huygens, 4 July 1659, *Œuvres complètes de Christiaan Huygens* II, letter n. 633, 430.

⁴⁸ Nic. Heinsius to C. Dati, 14 August 1659, *Œuvres complètes de Christiaan Huygens* II, letter n. 652, 462-4.

⁴⁹ Rasmus Bartholin to V. Viviani, 26 July 1656, DIS II, letter n.715, 360.

that he might be able to see it with the exceptional telescopes of his Highness the Granduke'.⁵⁰

The publication of the much-awaited *Systema Saturnium* generated a new wave of critical reactions. The most critical was the *Brevis annotatio in Systema Saturnium*, co-written by Honoré Fabri and Eustachio Divini –though published with the latter's name only. The two rejected Huygens' theory and proposed a different explanation, according to which Saturn did not have any rings, but instead four satellites, two large and dark ones close to the planet and two, smaller and brighter, farther away. Published at the start of July 1660, the *Brevis annotatio* was also dedicated to Leopoldo, and furthermore it exhorted the prince to adjudicate which of the two theories was correct: 'facile, ni fallor, iudicabis utri potius habenda fides sit'.⁵¹

Leopoldo turned to the Accademia for assistance⁵² and, in so doing, he followed the suggestions that Boulliau had offered Huygens several months before. At the end of November 1659, Boulliau was finally converted to the theory of Saturn's ring, but at the same time he cautioned his friend that, in order to demonstrate the verity of the theory once and for all, it would be necessary to conduct 'some experiments'.⁵³ And while it doesn't appear that Huygens did so, the Cimento academicians built models for both hypotheses. Having accurately analysed distance, lighting and positioning, they proceeded to observe such models through various types of telescopes.

Borrelli clarified the decision to test the two hypotheses experimentally in a report, which he wrote for the prince with the aim to have it sent to the authors:

Noi [...] secondo il costume dell'Accademia di Vostra Altissima Signoria ch'è d'investigare il uero, col mezzo di riproue sperimentali, l'abbiamo inuiolabilmente osseruato anche in questo affare, per quella parte però che può ridursi ad esperienza di cose tanto remote da nostri sensi, ed esaminando per ultimo nei congressi tenuti

⁵⁰ '[...] È venuto da Fiandra in stampa un foglio, nel quale si dà notizia di un nuovo pianeta, che circonda Saturno in 16 giorni, del quale ne mando a V.A. la copia, accioché possa farlo osservare con li telescopij squisiti del Ser.mo G. Duca, perché con telescopij più piccoli tal pianetino non è osservabile [...]'. A. Borelli to Leopoldo de' Medici, 27 July 1658, BNCf Ms. Gal. 275, c. 102r.

⁵¹ E. Divini, *Brevis annotatio in Systema Saturnium Christiani Eugenii* (Romae 1660), 55.

⁵² On the Cimento's experimental work concerning the Saturn system see especially the seminal work by Albert Van Helden. In particular: Van Helden, 'The Accademia del Cimento and Saturn's Ring', *Physis* 3 XV (1973), 237-259.

⁵³ 'Je scay que la nature a pû faire vn cercle autour de ce corps la, & que par la raison qui fait que la terre est suspendue in aère libero, vn anneau peut aussi y estre suspendu; neantmoins il vous faut encores quelques experiences pour demonstrier absolument ce que vous posèz'. I. Boulliau to Christiaan Huygens, 21 November 1659, *Œuvres complètes de Christiaan Huygens* II, letter n. 684, 510. On this point and on Boulliau's role in the Saturn dispute see also: Robert A. Hatch, 'The Republic of Letters: Boulliau, Leopoldo and the Accademia del Cimento' in *The Accademia del Cimento and its European Context*, ed. by Beretta, Clericuzio, Principe (Sagamore Beach 2009), 165-180.

dauanti all Altezza Vostra Serenissima disappassionatamente i concetti del Signor Vgenio, e quei degl' auuersarj che se gli oppongono vi sono cadute alcune riflessioni [...]. [...] Qui s'è scoperta l'incertezza di tal discorso con sensata esperienza, e finalmente quell'aspetto che in Saturno non poteua sperimentarsi, che tra'l termine d'otto ò noue anni, è riuscito a noi artificialmente di rappresentarlo.⁵⁴

In addition to the Accademia's general resolution to rely on experiments to study the natural world, the decision to test the two hypotheses by building a mechanical model was owing to a more immediate constraint: the study of all the various appearances that Saturn had shown up to that time would have required eight or nine years of astronomical observations.

This decision found a strong supporter in Michelangelo Ricci, who proved instrumental in managing the 'Saturn dispute' and in disseminating information on the various characters of this episode. On 20 September 1660, having received the first reports from Florence, Ricci wrote to the prince:

Io per me avendo conosciuto il sistema del P. Fabri essere un ingegnoso capriccio, e quello dell'Ugenio o vero, o che al vero molto s'avvicina, ma col bisogno di più accertate osservazioni per istabilirlo o istaurarlo, poche ore ho consumate nell'uno e nell'altro, differendo questo a miglior tempo, e quello tralasciandolo per attendere a più fruttuose speculazioni. La via dell'esperienze stimata da V.A.S. e con ragione, riesce di maggiore utile e diletto, tanti più a chi ha la perspicacia, l'intelligenza, e l'amore della verità, che in V.A.S. per raro esempio s'ammirano; perché direttamente porta alla verità che si cerca, e bene spesso a caso dell'altre sen'incontrano.⁵⁵

By studying these experiments, the Florence academicians came to the conclusion that Huygens' hypothesis best explained the phenomena at stake.

Interestingly, the dispute was handled in very different ways in the two academies. Whereas the Montmor group became the privileged seat where the announcement of such new astronomical news was made and discussed, the Cimento was the first scientific academy to act as an arbiter of a dispute –doing so by enlisting its members to carry out a concerted experimental effort. And although it is not known whether Florence had been informed of the discussions that took place at the Montmor residence, the Paris academicians were fully informed of the Cimento's involvement and of the conclusions there reached.

⁵⁴ [A. Borelli] to Leopoldo de' Medici, undated, *Œuvres complètes de Christiaan Huygens* III, letter n. 796, 152-8.

⁵⁵ M. Ricci to Leopoldo de' Medici, 20 September 1660, Fabroni, *Lettere inedite* II, 103-4.

News of the experiments in Florence reached Huygens in late August or early September 1660 –before he received Leopoldo’s response to the dedication of his work, a copy of which he had sent to Florence via Heinsius in August the previous year. In the meantime, Carlo Roberto Dati had informed him in May –as usual via Heinsius– on the publication of the *Brevis annotation*, on Fabri being its co-author, and of its being dedicated to Leopoldo.⁵⁶ The *Brevis Annotatio* reached Huygens one month after its publication via Pierre Guisony,⁵⁷ who was the first to inform him of Divini’s reactions in Rome.⁵⁸ Guisony also informed Huygens on the experiments carried out in Florence. On 27 August⁵⁹ he wrote that in order to resolve the dispute, the Cimento academicians had built a mechanical model that fully replicated the planet’s characteristics as he had described them in the *Systema Saturnium*. By observing the model with two different telescopes, and under different conditions, the academicians had concluded that ‘the objections raised by Fabri and Eustachio were false’.⁶⁰

Noteworthy is that not only was Guisony a key intermediary for Huygens during the dispute,⁶¹ but he also maintained important relations with the Montmor Academy. Born in Avignon (France), Guisony was a friend of Gassendi’s,⁶² and in May 1659 he visited England, where he attempted to establish contact with Hobbes. Guisony’s letter to Hobbes reveals his contacts with some of the most prominent members of the Paris academy, such as Sorbière and Du Prat, as well as his participation to a number of its sessions⁶³. In August

⁵⁶ C. Dati to N. Heinsius, 25 May 1660, 1 August 1660, *Œuvres complètes de Christiaan Huygens* III, letter n. 752, 83.

⁵⁷ P. Guisoni to Christiaan Huygens, 1 August 1660, *Œuvres complètes de Christiaan Huygens* III, letter n. 765, 101-4.

⁵⁸ P. Guisoni to Christiaan Huygens, 25 March 1660, *Œuvres complètes de Christiaan Huygens* III, letter n. 732, 45-9.

⁵⁹ P. Guisoni to Christiaan Huygens, 27 August 1660, *Œuvres complètes de Christiaan Huygens* III, letter n. 774, 116-8.

⁶⁰ ‘Ces Messieurs pour se conuaincre sensiblement, firent dresser à Florence vn cors artificiel de Saturne & vn cercle à l’entour aueq la proportion de leur diametres & autres circonstances que vous aués décrites; ils le mirent en suite la nuit au milieu de 4. flambeaux en quarré qui l’eclairioient & se mettans dans certaines distances & certains aspects l’obseruoient aueq 2. lunetes, l’une de fû Torricellj & ie ne sáy quelle autre: en sorte que aueq la moins bonne on voioit 3. còrs separés, & aueq la meilleure ils uoioient le cercle tout continué. Ils ne furent pas contans de cete ingenieuse experiance, mais le lendemain épreuerent le même en rase campagne dans un beaucoup plus grand éloignement; & la meme chose leur reüssissant comme la nuit, ils conclurent de la fausseté des obiections du Père Fabry & d’Eustachio’. Ibid.

⁶¹ On Guisony’s role and, more generally, on Huygens’ informants during the Saturn dispute see also: Antonella Del Prete, ‘Gli astronomi romani e i loro strumenti: Christiaan Huygens di fronte agli estimatori e detrattori romani delle osservazioni di Saturno (1655-1665)’ in *Rome et la science moderne: Entre Renaissance et Lumières*, ed by A. Romano (Rome 2009), 473-489.

⁶² See: P. Guisoni to Christiaan Huygens, 1 August 1660, *Œuvres complètes de Christiaan Huygens* III, letter n. 765, 101-4 and S.Sorbière, ‘De Vita et Moribus Petri Gassendi’, *Opera omnia de Gassendi* I (Lyon 1658), sig. i3v: ‘PETRVM GVISONIVM Cauallionensem, iuuenem in Philosophicis & Mathematicis versatissimum’.

⁶³ ‘MM. Sorbière and du Prat know how highly I esteem your illustrious name and those fine writings of yours by which all Europe is now instructed [...]. At M. de

1659 Chapelain wrote to Huygens (who had inquired about him) that, although he was not personally acquainted with Guisony, he had indeed lectured on vegetation at Montmor's.⁶⁴

Another Roman informant of Guisony was Michelangelo Ricci, who had informed him of the Florentine experiment on fumes in a vacuous space that was sent to Paris in the hope of establishing a fruitful exchange between the Cimento and the Montmor Academy⁶⁵. It is also very likely that Ricci was the "Gentilhomme de mes amis"⁶⁶ from whom Guisony had received details about the Saturn experiments long before Fabri and Divini, and who had made the Frenchman promise to keep such details secret until such time as the prince would have decided to make them public.

In October 1660,⁶⁷ minutes of the experiments, a letter from Leopoldo, and reports by Magalotti and Borelli were sent to Huygens via Heinsius. Huygens was about to leave for Paris, where he arrived on 28 October. During the days that followed he met with Chapelain and Montmor and, on 9 November, he attended, probably for the first time, a meeting at Montmor's residence, where Sorbière read a letter from Leopoldo to Boulliau on the 'making of a telescope'.⁶⁸ On that

Montmor's academy M. du Prat led us to hope that you would explain to us the phenomenon of the rising of water in the small siphon'. P. Guisony to Hobbes, 15 [25] May 1659, *The Correspondence of Thomas Hobbes* I, ed. by N. Malcolm (Oxford 1994), letter n. 136, 501-2, English transl. pp. 502-3.

⁶⁴ 'Ce Monsieur Guisoni dont vous me demandés d'estre informé n'est point particulièrement connu de moy. Je scay seulement qu'il est de Prouence, et que c'est vn Genie propre aux Speculations Physiques. Il sit vn jour ches Monsieur de Montmor vn Discours de la vegetation apres quelques autres, qui plut sort et qui parut fort sensé. Depuis n'estant point venu a l'Assemblée on l'y a trouué fort à dire. Cette experience que vous me dittes qu'il a faite en vostre presence fut faite et examinée dans la Compagnie, et il me souuient qu'ayant à mon Auis attribué cette ascension de l'eau dans le petit tube plus haut que dans le grand, a la plus grande impression de la colonne d'air sur le large que sur lestroit, cette pensée eut beaucoup de partisans encore que dailleurs elle fust contreditte'. J. Chapelain to Christiaan Huygens, 20 August 1659, *Œuvres complètes de Christiaan Huygens* II, letter n. 655, 467-470.

⁶⁵ The news had reached Ricci in order to be forwarded to Thévenot on 4 July 1660. On 1 August of the same year Guisony informed Huygens: 'Il Signor Ricci nobiluomo romano grande esperto in geometria e grande amico, mi ha detto da poco che il granduca è lieto che la sua accademia di Pisa comunichi con la nostra di Parigi e che a questo scopo le ha fatto inviare la seguente osservazione. Se con uno specchio d'acciaio si accende un corpo combustibile, abilmente sistemato nel luogo che nell'esperienza di Torricelli del sifone con il mercurio chiamiamo vuoto, il fumo anziché salire scende sul mercurio secondo la linea parabolica di Galilei. Questi Signori ne concludono contro gli aristotelici che non esiste leggerezza positiva: ciò non convince me che ci sia della pesantezza positive', P. Guisoni to Christiaan Huygens, 1 August 1660, *Œuvres complètes de Christiaan Huygens* III, letter n. 765, 101-4. Huygens was thus made aware of it before he heard from Thévenot himself a few months later, during his stay in Paris: 'Tevenot m'envoya l'observation de Florence de la fumée descendante dans le vuide', 5 December 1660: Brugmans, *Le séjour de Christian Huygens*, 135.

⁶⁶ P. Guisoni to Christiaan Huygens, 27 August 1660, *Œuvres complètes de Christiaan Huygens* III, letter n. 774, 116-8.

⁶⁷ C. R. Dati to N. Heinsius, 5 October 1660, *Œuvres complètes de Christiaan Huygens* III, Appendix I to letter n. 793, 149-150.

⁶⁸ Brugmans, *Le séjour de Christian Huygens*, 129. Although the letter from Leopoldo to Boulliau is no longer extant, a similar instrument is described by the prince in a letter

same day Huygens loaned ‘papers he had received from Florence’⁶⁹ to Cosimo Brunetti.

Huygens received the documents piecemeal.⁷⁰ It is therefore difficult to know what exactly he was able to show to Brunetti. However, by 19 November Huygens had all the documents,⁷¹ and on the 28th he informed Leopoldo that he had presented the ‘most erudite theories of His Highness’ Academicians’ at a session of the Montmor Academy –making explicit reference to the report written for the Accademia, as well as to reports by Borelli and Magalotti which, Huygens noted, met with widespread approval.⁷² On 16 and 28 December he loaned his *papiers de Florence* again, this time to Auzout and Thévenot.⁷³

Further confirmation that the Cimento experiments had been met with great success at Montmor came from Thévenot himself. On 18 April 1661 Michelangelo Ricci wrote:

Il Sig. Thévenot [...] mi parla di que’ Discorsi inviati al Sig. Ugenio da lor altri Accademici con la lode che meritano, mostrando che siano stati molto stimati et approvati. Ammirano ambidue e godono straordinariamente de’ progressi che si fanno in Italia, onore che le proviene da lor altri Sig.ri e dalla protezione del Sig. Principe, la cui generosità e virtù innalzano alle stelle [...].⁷⁴

Leopoldo thus publicly reclaimed his role as a European patron of science via the Accademia.

to Huygens dated 14 September 1660: Leopoldo de’ Medici to Christiaan Huygens, 14 September 1660, *Œuvres complètes de Christiaan Huygens* III, letter n. 781, 129-131.

⁶⁹ Brugmans, *Le séjour de Christian Huygens*, 128.

⁷⁰ ‘Quantum ex Dati verbis colligo, eodem tempore omnia isthuc perlata fuere, sed quaedam eorum ipse perlegere voluisti, atque hac ratione a reliquis separata venerunt’. Christiaan Huygens to N. Heinsius, 19 November 1660, *Œuvres complètes de Christiaan Huygens* III, letter n. 809, 182-3.

⁷¹ See: Christiaan Huygens to N. Heinsius, 19 November 1660, *Œuvres complètes de Christiaan Huygens* III, letter n. 809, 182-3. On 17 November Huygens marked on his diary: ‘M. van Beuningen m’envoya mes paquets de Florence [...]. Le Pr. Leop. m’exhorta a l’observation de quelque estoile fixe a travers les anses de, ce que Frenicle aussi venoit de me dire’. Brugmans, *Le séjour de Christian Huygens*, 132. Among the missing pieces of the Florence file was therefore Leopoldo’s letter: Leopoldo de’ Medici to Christiaan Huygens, 4 October 1660, *Œuvres complètes de Christiaan Huygens* III, letter n. 795, 151.

⁷² ‘In hac urbe etsi ne unum quidem inveniam qui Astronomiae seriam operam det (Bullialdo peregre ad visendum Hevelium profecto) sunt tamen aliqui qui intelligant, ac Systema etiam nostrum examinarint quibus abhinc diebus paucis apud Illustrissimum Monmorium, ut solent, congregatis, ostendi doctissimas Academicorum Tuae Celsitudinis Diatribas (nam praeter illam Academiae nomine scriptam alias quoque binas Clarissimus Datus mihi impertijt, subtilissimi Borelli et ingeniosissimi Magalotti,) summaque cum approbatione et laudibus exceptas vidi’. Christiaan Huygens to Leopoldo de’ Medici, 28 November 1660, *Œuvres complètes de Christiaan Huygens* III, letter n. 817, 195-8.

⁷³ Brugmans, *Le séjour de Christian Huygens*, 138 and 140.

⁷⁴ M. Ricci to [L. Magalotti?], 18 April 1661, BNCf, Ms. Gal. 283, 154r-v.

No indication of further Florentine discussions about the experiments sent to Huygens are known to exist. However, the Saturn dispute remained one of the main topics in the exchanges between the two academies in subsequent years. With the exception of information on new and forthcoming books –such as Borelli and Abraham Ecchellensis’s translation of Apollonius of Perga’s *Conics*⁷⁵ and Thévenot’s *Relations de divers voyages curieux*–⁷⁶ the correspondence between the two academies was dominated by astronomy-related news : about comets as well as information about Huygens’ work.

Thus, Huygens’ trip to Paris made it possible for the work of the Cimento’s academicians to be known to the Montmor academy; and conversely, the trip also created a new channel of communication between Huygens, Rome, and Florence. As early as October 1660 Guisony advised the Dutch astronomer to write to Michelangelo Ricci, whom the prince held in high esteem and whom he used for all his communications with Fabri.⁷⁷ What survives of the correspondence suggests that Huygens did not follow his friend’s advice before February 1661.⁷⁸ The opportunity arose in Paris on 2 February 1661, when Thévenot showed Huygens a letter (now lost) that the former had received from Ricci,⁷⁹ in which reference was made to the *Systema Saturnium* and to its author. The correspondence between Ricci and Thévenot had therefore acquired a further scope besides being the primary means of communication between the Cimento and the Montmor Academy: it had now become the preferred channel through which news on Huygens’ work crossed the Alps.⁸⁰ Via Thévenot the prince was informed in spring 1662, that new observations had led

⁷⁵ *Apollonij Pergaei Conicorum lib. 5. 6. 7. paraphraste Abalphato Asphahanensi nunc primum editi. Additus in calce Archimedis Assumptorum liber, ex codicibus Arabicis M.SS. serenissimi magni ducis Etruriae Abrahamus Ecchellensis maronita in alma urbe linguar. orient. professor Latinos reddidit. Io. Alfonsus Borellus ... curam in geometricis versioni contulit, & notas vberiores in uniuersum opus adiecit.*, Florentiae: ex typographia Iosephi Cocchini ad insigne Stellae, 1661. See for instance: G.F Marucelli to Leopoldo de’ Medici, 28 Ottobre 1661, BNCF, Ms. Gal. 276, c. 146r-147v; Leopoldo de’ Medici to M. Thévenot, 10 December 1661, BNCF, Gal. 282, c. 62r; Leopoldo de’ Medici to M. Thévenot, 11 September 1662, BNCF, Gal. 282, c. 57r; M. Thévenot to Leopoldo de’ Medici, undated, BNCF, Gal. 280, c. 116r-v.

⁷⁶ M. Thévenot, *Relations de divers voyages curieux* (Paris 1663). See for instance: M. Thévenot to Leopoldo de’ Medici, 7 May 1663, BNCF, Gal. 276, c. 191r-v; Leopoldo de’ Medici to M. Thévenot, 8 June 1663, BNCF, Gal. 282, c. 69r-v; Abraham Ecchellensis to V. Viviani, 17 November 1663, BNCF, Gal. 254, c. 261r-262v.

⁷⁷ ‘Si vos occupations vous le permettoient, ie crois qu’il seroit à propos que vous écriuissiez une petite lettre de compliment à Monsieur Michel Angelo Ricci gentilhomme de cete uille & le plus grand Geometre qu’il y aye; le Prince qui l’estime beaucoup s’est serui de luy icy dans tous les ecrits, qu’il à receus ou enuoies au Pere Fabry, & d’ailleurs il est fort uotre ami’. P. Guisony to Christiaan Huygens, 20 October 1660, *Œuvres complètes de Christiaan Huygens* III, letter n. 789, 141-4.

⁷⁸ See: *Œuvres complètes de Christiaan Huygens* III, letter n. 843, 248.

⁷⁹ Brugmans, *Le séjour de Christian Huygens*, 149.

⁸⁰ See for instance: *Œuvres complètes de Christiaan Huygens* III, letters n. 877, 899, pp. 302-3, 346-8; *Œuvres complètes de Christiaan Huygens* IV, letters n. 960, 1026, 1027, pp. 18-9, 160-1, 161-2.

Huygens to change the proportions of the ring surrounding Saturn.⁸¹ It is also possible that the Dutch astronomer himself wrote to Leopoldo around the same time to inform him directly of such changes, together with his criticism of Eustachio Divini's *Pro annotatione sua*.⁸² Yet, it was again via Thévenot that in December 1662 the patron of the Cimento solicited updates on Huygens' Saturn system.⁸³ And it was again via Thévenot that Florence was informed of Huygens' work on dioptrics and that Huygens attempted to find the treatise published in 1660 by Antonio Mancini.⁸⁴

3. Some final considerations

The Saturn dispute held a fairly marginal place within the Accademia del Cimento. It is not mentioned in the *Saggi di naturali esperienze* (1667), the only work published by the Accademia; and the experimental activity carried out in Florence on the topic came to an end when the reports were sent to the Netherlands and Rome. Nonetheless, the topic was undoubtedly close to Leopoldo's heart, as it was to several academicians. The prince's interest in astronomy, which emerges in his extensive correspondence with Ismael Boulliau, and Borelli's endorsement of the *De Saturni luna observatio nova*, attest to this.

As for the relations between the Cimento and the Montmor Academy, it should be noted that Saturn is the only topic about which neither academy chose to communicate with the other. Thévenot did not inform the Florentines about Chapelain's presentation of the Saturn hypothesis to the Paris assembly, while the Parisian academy learnt about the Cimento experiments only through Huygens' own communication.

⁸¹ 'Scrive da Parigi Monsieur Thevenot ch'il Sig. Ugenio per alcune osservazioni fatte di nuovo hà mutata la proporzione della fascia al corpo di Saturno'. M. Ricci to Leopoldo de' Medici, 14 April 1662, BNCF, Ms. Gal. 276, c. 164r. This information had been passed on by Huygens to Chapelain in a letter dated 14 July 1661 (*Œuvres complètes de Christiaan Huygens* III, letter n. 873, pp. 294-6); on 24 June Huygens wrote about it to Moray as well (*Œuvres complètes de Christiaan Huygens* III, letter n. 868, 283-4), who in turn read out the letter at a session of the *Royal Society* on 8 October of the same year. See: Thomas Birch, *History of the Royal Society of London* (London 1667), 49.

⁸² See: *Œuvres complètes de Christiaan Huygens* III, letter n. 1087, 286. The letter is not dated and does not mention the recipient. On the basis of a letter written by Huygens to his brother Lodewijk –in which he mentioned that he was planning to send Leopoldo his observations on Divini's latest treatise– the editors of Huygens' correspondence argue that the letter in question was addressed to Leopoldo. According to this theory the letter can only be later than 15 March 1662. See: *Ibid*, note 1.

⁸³ '[...] ne scriverò in Parigi al Sig. Tevenot, acciò che [...] faccia dar fuori al Sig. Ugenio l'altre notizie del suo sistema Saturnio'. M. Ricci to Leopoldo de' Medici, 24 December 1662, BNCF, Ms. Gal. 276, 181r.

⁸⁴ Antonio Mancini, *L'Occhiale all'occhio, Dioptrica pratica* (Bononiae 1660). See: M. Thévenot to Christiaan Huygens, 7 May 1661; Christiaan Huygens to M. Thévenot, 21 July 1661; Christiaan Huygens to M. Thévenot, [28 July 1661]; Christiaan Huygens to [M. Thévenot], [6 October 1661], *Œuvres complètes de Christiaan Huygens* III, letters n. 858, 877, 880, 905, pp. 268-9, 302-3, 306, 359-362.

It should also be pointed out that, by showing and presenting the Cimento reports to the Montmor academy, Huygens probably trespassed or at least pushed the limits imposed by the prince. Indeed, when Carlo Dati sent Huygens the results of the experiments, the reports came with the following warning:

Appresso auendo io ueduta la uolontà, e il desiderio del Signore Principe, non deuo celarlo a Vostra Signoria che questa scrittura dell'Accademia si mostri, e si legga liberamente a chi che sia non si repugna; ma per ora si desidera che non se ne faccia alcuna mentione pubblica [...].⁸⁵

By granting Huygens permission to show or read the reports freely, it is possible that Leopoldo was simply worried that they might be mentioned in print. But it is noteworthy that after the Cimento academicians had initiated their 'literary trade' with the Paris academy, they did not even contemplate sending Thévenot their work on Saturn. On 4 October 1660, Michelangelo Ricci –perhaps the most enthusiastic supporter of the correspondence with the Montmor Academy– informed Magalotti that he had received the Saturn reports from Florence in addition to a letter from Thévenot, who '*was ecstatic* at the news of the literary trade between the two academies'.⁸⁶ The Saturn experiments were carried out while the correspondence between the two groups was at its peak, and yet they were completely omitted in the letters until the Cimento reports were discussed at one of the Montmor sessions. Furthermore, the praise and appreciation expressed by Thévenot concerning the reports he heard in Paris were not followed by any further comments, nor were further details shared from Florence.

Even though Thévenot updated the prince on Huygens' activities, in practice the two academies never exchanged direct, substantive information on the dispute. And whilst we may assume a lack of mutual interests in the earlier and later exchanges –which could also explain why the attempts from either side to establish a dialogue failed– the interest and involvement of both groups in the Saturn dispute is manifest.

It is precisely the evidence of a shared and concomitant interest in the dispute that makes this episode in the relations between the two academies particularly worthy of notice. On the one hand, the almost simultaneous engagement of the two academies in the same problem

⁸⁵ C. Dati to N. Heinsius, 3 Octobre 1660, *Œuvres complètes de Christiaan Huygens* III, letter n. 794, 149.

⁸⁶ '[...] Scrivo con questa occasione al Sig. Principe Serenissimo, e gli mando un piego del Sig. Thévenot, il quale giubila per la nuova del commercio letterario delle due Accademie, che da tutti que' Signori di Francia era tanto desiderato, e mi promette un Discorso et una lettera diretta al Sig. Principe in ringraziamento dell'onor ricevuto, a nome di tutta l'Accademia [...]'. M. Ricci to L. Magalotti, 14 October 1660, BNCF, Ms. Gal. 283, 131r-132v.

offers a privileged standpoint from which to compare and contrast the methodologies, objectives, and preoccupations guiding the endeavors of the two academies. On the other hand, by ruling out the possibility of either assembly being disinterested in the subject, the withdrawal of information becomes a (more or less) conscious choice.

Regarding the first point, it has been shown that the Paris academy was primarily a site devoted to the exchange of information. Although written reports and letters were often the object of discussion, the primary format adopted was that of oral transmission. As for the Saturn dispute, no evidence survives to indicate that the group carried out observations of the planet. The Montmor salon was, and remained, a salon: a place where contrasting opinions were presented and discussed, but it was never configured as a laboratory. Rather than elaborating new scientific theories, the Paris academy was instead preoccupied with receiving, as early as possible, the most exciting news concerning the physical and celestial realms. Over time Huygens (and others) received several requests to send detailed accounts of their discoveries. Quite revealing in this regard is the account that Chapelain wrote to Huygen, identifying the dignitaries invited to attend the session in which his Saturn hypothesis was presented. Emphasis was placed not only on the attendance of renowned intellectuals, but also, and more importantly, on the presence of high-ranking figures within society more broadly. The Montmor academy was effectively an intellectual and social salon, one in which science was simply ‘communicated’.

The aims of the scholars that met at Leopoldo’s apartments in the Pitti Palace, in contrast, in, were quite different. Reluctant to communicate with the outside world, the Cimento academicians devoted themselves to intense collaborative experimental work. Even though the results of the experiments carried out on the basis of Huygens’ and Fabri’s hypotheses were never published, the primary scope of this investigation was to produce reliable results which, at least for a certain period of time, were to be disseminated in print. Leopoldo’s academy saw itself as a site for the production of knowledge, rather than a salon where to discuss the most recent scientific news.

As for the second point, having ascertained that both groups had an interest in this theme, it is difficult to explain why information was not exchanged; but it is possible to detect what effectively remained unsaid.

In Florence, after the experiments carried out in the summer of 1660, no further significant investigations were conducted. The matter was concluded when Magalotti and Borelli sent their reports to Rome and to The Hague; and despite initial expectations, these reports were never officially published. As the correspondence clearly shows, Saturn’s strange appearances were a particularly sensitive topic in light of the relations between the Grand Duchy and the Church. The regime that had so openly supported Galileo was now expected to be

particularly cautious with the Copernican implications of Huygens' hypothesis –especially as in the *Brevis annotatio Divini* (and Fabri) argued that one of the main points against the Dutch astronomer's theory was precisely the fact that all Christians were expected to conform to the theory of Earth's immobility. Within the work of the Accademia, this issue is underscored by Michelangelo Ricci, the most influential of the prince's advisors on this matter. In one of his letters to Leopoldo, Ricci wrote:

A friend of mine sent Divini's tract to Huygens; and I told him that Huygens must apply caution in his writing and not offend anybody, nor mention the Earth's motion, or any other topic that would offer cause to the Rome congregations to prohibit his writings; this would prevent the book from being sold, and would endanger the reputation of the cause itself. I am not sure whether Huygens has been warned, though he must do it, and argue his case by other means.⁸⁷

The letter is dated 13 September 1660. By then, the Cimento academicians had finished their experiments, thus offering their assistance in resolving a dispute that could have had serious consequences for their patron. In an attempt to rescue the cause into which the Cimento academicians got themselves entangled, Ricci – with Guisony's help– tried to convince Huygens to omit from his considerations any reference to Copernicus' hypotheses.⁸⁸

The fact remains that, at least until the reports were sent to Huygens, the Cimento's involvement with the Saturn dispute was shrouded in secrecy. Ricci imposed discretion on Guisony when he informed him of the experiments carried out in Florence; and a few weeks before the reports were sent to the Netherlands, Borelli indicated to Malpighi that the prince did not grant him permission to discuss the question beyond the academic sphere.⁸⁹

Whereas these preoccupations might be sufficient to justify the fact that the Cimento research on Saturn was never published, they do not satisfactorily account for the Cimento's decision not to share the results with Paris. In July 1660, Thévenot did receive of a letter in which Leopoldo presented the experiment looking at the descending fumes which served not only as proof against positive lightness, but also as a demonstration of the real nature of the vacuous space caused by the mercury inside the Torricellian tube. That matter of void was no less

⁸⁷ M. Ricci to Leopoldo de' Medici, 13 September 1660, Fabroni, *Lettere inedite* II, 97.

⁸⁸ '[...] si vous leur repondiés, prenés garde d'en venir aux iniures & de toucher à la religion, car ce seroit leur soûhait & à vos liures un obstacle d'être ueus en Italie, par ce qu'ils fairoient agir l'inquisition'. P. Guisony to Christiaan Huygens, 27 August 1660, *Œuvres complètes de Christiaan Huygens* III, letter n. 774, 116-8.

⁸⁹ '[...] Riverisca da parte mia il' Sigr. Mariani, ed il Sigr. Cassini; ed a questo dirà, che qui stiamo occupati intorno l'osservazioni di Saturno con tele[s]copij de i più lunghi forse, che siano visti, ed à me è toccato nell'Accademia di Sua Altezza di far' le relazioni, e censure delle due operette dedicate al' Serenissimo Principe dall'Eugenio, e da Eustachio intorno all'apparente forma di Saturno, delle quali cose ne parteciperò lor' Sigr., quando però Sua Altezza lo permetta'. A. Borelli to M. Malpighi, 18 September 1660. Marcello Malpighi, *The Correspondence of Marcello Malpighi* I, ed. by Howard B Adelman, 5 vols. (Ithaca-London 1975), letter n. 22, 43-4.

sensitive an issue, one that could indeed have suffered ecclesiastical censorship; it is hardly accidental that this experiment is only mentioned in a very descriptive manner in the *Saggi*, with no reference to what motivated it, or to its demonstrative function. What is certain is that this self-censorship mechanism, which influenced the Cimento's activity on numerous occasions, was one of the factors that led to the decision not to share the reports directly with Paris. Yet we have seen how, shortly before that, the Cimento academicians were perfectly comfortable to discuss the issue of the 'void' with Paris.

On the French side, news of the discussion of Huygens' hypothesis at the Montmor residence did not reach Florence before the spring of 1658. What is even more striking is the total lack of communications from Paris concerning the debates that followed around the Saturn dispute.

After Huygens had amended the ring's dimensions, Bernard Frénicle de Bessy (c. 1604-1674) had elaborated a hypothesis to explain Saturn's appearances. In August 1661 the Frenchman—a regular attendee of Montmor's sessions—almost simultaneously informed Huygens⁹⁰ and Kenelm Digby (1603-1655),⁹¹ one of the founders of the *Royal Society*, of his theory. Following a discussion of the theory in London,⁹² Christopher Wren's (1635-1723)⁹³ earlier theory was communicated to Frénicle and Huygens, which prompted a brief correspondence between the two.⁹⁴

Frénicle's communications had primarily the features of a private initiative, while the Montmor Academy was more a space for dissemination and debate than a centre for the actual production of knowledge. Thus, in contrast to what happened in Florence, the members' work was the product of individual activity, and was never claimed as the work of the academy as a whole. Nevertheless, the issue was discussed again during the sessions of the Paris group, and both Chapelain and Thévenot strove to persuade the Frenchman of the

⁹⁰ B. de Frénicle de Bessy to Christiaan Huygens, 26 August 1661, *Œuvres complètes de Christiaan Huygens* III, letter n. 901, 349-354. In the end Huygens received Frénicle's letter from Thévenot only after he had already been informed by Moray of the discussion of Frénicle's letter to Digby at a session of the *Royal Society*. See: R. Moray to Christiaan Huygens, 16 September 1661, *Œuvres complètes de Christiaan Huygens* III, letter n. 888, 321-2.

⁹¹ [B. Frénicle de Bessy] to [K. Digby], 31 August 1661, *Œuvres complètes de Christiaan Huygens* III, letter n. 894, 337-9.

⁹² See: Thomas Birch, *History of the Royal Society of London* (London, 1667), 43.

⁹³ Upon appointment of the *Royal Society*, Wren enclosed his theories and observations on Saturn in a letter to Sir Paul Neil. Contrary to Wren's requests, the letter was then forwarded to Huygens and Frénicle. See: Chr. Wren to P. Neil, 11 October 1661, letters n. 932, 933, 934, pp. 415-424. See also: Mordechai Feingold, 'Huygens and the Royal Society', *Œuvres complètes de Christiaan Huygens* XII (1996), 22-34; Albert Van Helden, "'Annulo Cingitur': The Solution of the Problem of Saturn", *Journal for the History of Astronomy* 5 (1974), 155-174, 166.

⁹⁴ See: B. de Frénicle de Bessy to Christiaan Huygens, 5 December 1661, *Œuvres complètes de Christiaan Huygens* III, letter n. 927, 401-4.

reliability of Huygens' conclusions⁹⁵. Even though Frénicle argued in his letter to Digby that his hypotheses were based on the observations carried out in Florence and presented in Paris the previous year,⁹⁶ no information about it was ever sent to Leopoldo or his academicians.

With regard to the communications between the two academies, the Saturn dispute therefore holds a special place. It has often been noted in the literature that the beginnings of various scientific academies are punctuated by a dynamics of competition. The fact that the two groups never had any direct exchanges when it came to an issue in which both had a clear interest, would seem to confirm this theory.

The relations between the two academies reached their peak with Saturn, although this convergence was not the result of an explicit choice. What made it possible was not the activity of the respective secretaries, or the official inception of an institutional exchange; the convergence was made possible by the network of correspondents that gravitated around the individual members and Leopoldo even before the creation of the two groups. It is therefore thanks to this *Republica litteraria*, as Leopoldo called it, composed of Boulliau, Huygens, Chapelain, Ricci and Guisony, that these young scientific academies were able, after many failed attempts, to share something of substance.

⁹⁵ See for instance: J. Chapelain to Christiaan Huygens, 17 February 1662, *Œuvres complètes de Christiaan Huygens IV*, letter n. 982, 61-3.

⁹⁶ 'Ayant veu l'annee passee les observations de florence, qui faisoient voir que l'anneau de $\frac{1}{2}$ passoit iusques sur le bord de son disque, ie creus qu'il nestoit pas possible que la cause de ces differents aspects, sous les quels il se montre, ne fut que dans le parallaxe, ainsi que pretend le Seigneur Huguenes de Zulichem dans Son Sistema Saturnium'. [B. Frénicle de Bessy] to [K. Digby], 31 August 1661, *Œuvres complètes de Christiaan Huygens III*, letter n. 894, 337-9.