

NOEMI DI TOMMASO

THE ERUDITE PRACTITIONER:
FRANCESCO REDI'S COMMUNICATION
STRATEGIES

ESTRATTO

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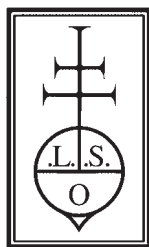
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NOEMI DI TOMMASO*

THE ERUDITE PRACTITIONER:
FRANCESCO REDI'S COMMUNICATION STRATEGIES**

ABSTRACT – The history of science has long questioned the role played by Francesco Redi (1626-1697) within the Accademia del Cimento. However, in the absence of proven list of members and of clear boundaries defining the perimeter of the Accademia more generally, it is considered more productive to speak of influence rather than membership. As is well known, Redi was at the centre of various cultural contexts in seventeenth century Tuscany, both scientific and literary, such as his well-known prominent roles in the Accademia della Crusca. Moreover, as some sources show, by the second half of the century, the narrative style he adopted for scientific experimentalism seemed to have become a model. Through the analysis of many unpublished sources, some of which I recently discovered, the aim of this study is to analyse the expressive, rhetorical, and communicative devices used by Redi in his scientific prose, which can also be traced in the prose of the *Saggi di naturali esperienze fatte nell'Accademia del Cimento* (1667). By examining the evolution of Redi's scientific prose and identifying common elements between his early works and the *Saggi*, this study aims to shed new light on the relationship between Redi and the famous Florentine Academy.

INTRODUCTION

[...] oltre al nostro dolce Idioma, la cui cognizione colla bella unione delle lingue volgari, e delle antiche erudite ancora mirabilmente raffinò, e ad alto punto condusse la naturale Scienza, la Notomia, la Medicina.¹

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¹ REDI, 1728-1742, p. 27.

In 1697, Antonio Maria Salvini (1653-1729) began his eulogy in honour of Francesco Redi with the following words: “the most graceful Tuscan Poet, the illustrious Academician of Crusca; the most judicious experimenter.”² The first qualification attributed to him was that of poet. Redi’s publication *Bacco in Toscana* earned him immediate notoriety. In addition, his numerous poetic compositions and his correspondence with illustrious poets of the time, such as Maria Selvaggia Borghini (1654-1731), demonstrate the degree of attention he paid to this field. Then, his membership in the Accademia della Crusca was mentioned and,³ finally, he was described as a “most judicious experimenter.” The attribute of ‘experimenter,’ in a period when the term had taken on increasingly specific connotations, was no coincidence.⁴

This study will attempt to show that the intersection between these three aspects has earned Redi a prominent position within the scope of reflections on the rhetorical and communicative strategies related to scientific investigation. This position probably determined his profound contribution to the formation of the Cimento’s prose and perhaps even to the choice of its Dantean motto, carefully adapted to the context of seventeenth-century Tuscan experimentalism.⁵

In the first part of this study, Redi’s relations with the Accademia della Crusca and the Accademia del Cimento will be analysed. The second part will investigate the rhetorical strategies Redi used in the publication of his two most important scientific texts: *Osservazioni intorno alle vipere* (1664) and *Esperienze intorno alla generazione degl’insetti* (1668). In the third part, the emphatic use of recursive expressions and the narrative device of ‘experimental reports’ as rhetorical tools for the communication of experimental science, will be analysed through a study of the *Esperienze*. Finally, an attempt will be made to relate these rhetorical devices to those used by Redi in his manuscript notes. By so doing, I will try to investigate whether the narrative technique he chose when publishing his works was also present in prose that was not intended for an audience.

Through an analysis of different types of sources – printed and manuscript – I will attempt to clarify the extent of the reciprocal influence between Redi’s scientific investigation and its communication, and the cul-

² REDI, 1728-1742, I, p. 127.

³ See PIATTOLI, 1952, pp. 116-119.

⁴ For a wider look at experimentalism, see TRIBBY, 1991; TRIBBY, 1995; BERETTA, 2000, WILDING, BERETTA, CLERICUZIO, PRINCIPE (eds.), 2009; GIANNINI, FEINGOLD (eds.), 2020.

⁵ See TRIBBY, 1995, p. 321.

tural atmosphere of the Accademia del Cimento. To do this, the terms, arguments, and expressions that reproduced the common thread of the principle of reiteration of scientific experiments typical of Redi's prose will be traced. Indeed, these rhetorical devices are believed to have influenced the narrative style of the *Saggi di naturali esperienze fatte nell'Accademia del Cimento* (1667).

BETWEEN THE ACCADEMIA DELLA CRUSCA AND THE ACCADEMIA DEL CIMENTO

During his studies at the University of Pisa, Redi soon encountered the Medici environment. In 1666, with a *motu proprio* issued by Grand Duke Ferdinand II, he was appointed physician to the Medici court and superintendent of the Fonderia di Sua Altezza.⁶ Redi's relationship with the court was decisive, guaranteeing him essential freedom in his investigations. Indeed, he could take advantage of the various grand ducal residences, such as Florence, Pisa and Livorno, and all the court's instruments and spaces. Furthermore, as evidenced in his *Libro dei ricordi*, preserved at the Biblioteca Comunale di Arezzo,⁷ the trust endowed by the context he worked in ensured he regularly obtained 'possession licences' directly from the Congregation of the Inquisition for the books in the *Index librorum prohibitorum*:

25 March 1658. I remember how on 13 March 1658 I received from the Sacred Congregation of the Inquisition in Rome the license to read and keep the aforementioned books for three years starting on 13 March.⁸

⁶ Redi recalled this episode in his *Libro dei ricordi*, BCA, ms. Redi 299, 90: "Ricordo come questo anno 1666 adi 28 il Granduca Ferdinando II di *motu suo proprio* mi dichiarò suo primo medico colla provvisione di seicento piastre l'anno e la Parte in campagna: il *motu proprio* è tra le scritture di casa: e di più mi diede la soprintendenza della Fonderia e Spezieria." Trad. eng.: "I remember how this year 1666 on the 28th the Grand Duke Ferdinand II's *motu proprio* declared me his first doctor with the provision of six hundred piastre a year and the place in the countryside: the *motu proprio* is among the house records: and moreover, he gave me the supervision of the Foundry and Spezieria." A copy of Ferdinand II's *motu proprio* with which Redi was appointed court physician and superintendent of the Foundry of His Highness (28 November 1666) is preserved in the ms. Redi 42, 40r. At 41r of the same manuscript is the copy of the *motu proprio* with which Redi was reconfirmed in the aforementioned roles by Cosimo III (15 June 1670).

⁷ BCA, ms. Redi 299, *Libro dei Ricordi di Francesco Redi di Gregorio Redi aretino*.

⁸ BCA, ms. Redi 299, 56v-57r: "Adi 25 marzo 1658. Ricordo come sotto il di 13 marzo 1658 ebbi di Roma dalla sacra Congregazione dell'Inquisizione la licenza di poter leggere e tener gli infrascritti libri per tre anni da cominciarsi il 13 marzo." It is interesting that almost all the books belonging to the *Index* that Redi managed to obtain through possession licences are not currently present in the Arezzo scholar's library, largely preserved in Arezzo's Archivio Petrarca and Biblioteca Comunale. On the subject more generally, see MARCUS, 2020.

What made Redi particularly famous was the role he played within the Accademia della Crusca, of which, under the aegis of Prince Leopoldo de' Medici (1617-1675), he became a full member in 1658 and, subsequently, archconsul in 1678. Redi remembered his initial admission to the academy in his *Libro dei ricordi* (Fig. 1):

I remember how I was admitted to the Accademia della Crusca by the Most Serene Lord Prince Leopold and by the Lords Academicians of the Crusca, and how I held a thanksgiving and other public function in the said Academy.⁹

Recent historiography has already explored his contribution to the third edition of the Crusca's *Vocabolario* (begun in 1648, but not published until 1691). This contribution represents an accurate indication of the degree of interest Redi showed in reflecting on scientific vocabulary.¹⁰ Seventeenth-century scientific nomenclature was still shrouded in profound semantic ambiguity. As Walter Bernardi has correctly emphasised, "Lacking any type of scientific nomenclature at the time and observing species that

no one or almost no one before him had studied in a scientific way, Redi often found himself in a quandary. Sometimes he borrowed names found in specialised literature (Theophrastus, Dioscorides and Bahuin for plants, Aldrovandi and Blasius for animals), or invented names himself, but often he appropriated popular names from the language of peasants, hunters, and fishermen."¹¹

It is important to remember that, up until then, reference texts for constructing an Italian lexicon had

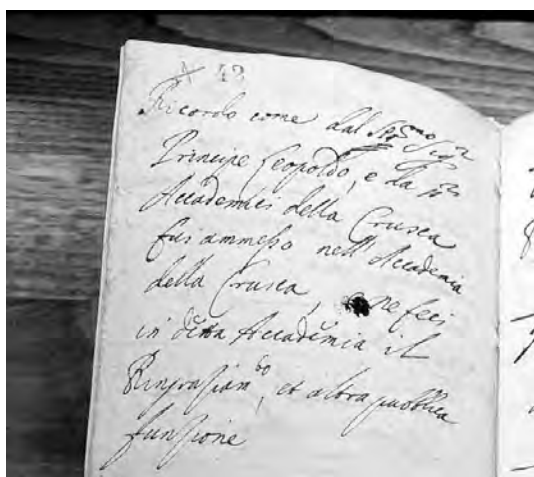


Fig. 1 – BCA, ms. Redi 299, 42.

⁹ BCA, ms. Redi 299, 42: "Ricordo come dal Serenissimo Signor Principe Leopoldo e da Signori Accademici della Crusca fui ammesso nell'Accademia della Crusca e ne feci in detta Accademia il ringraziamento et altra pubblica funzione."

¹⁰ On this, see NOCENTINI, 1999, pp. 275-286. On this see VOLPI, 1915-1916, pp. 60-61; ALTIERI BIAGI, 1968.

¹¹ BERNARDI, 1999, pp. 24-25.

generally been taken (with the exception of the previous contributions by Galileo Galilei) from the most fundamental works of literature (including Dante Alighieri's *Divina Commedia* and many of Petrarch's works). With the third edition of the *Vocabolario* even scientific texts were accorded authoritative status in the semantic field. In addition, the third edition of the *Vocabolario* was the first in which a lot of personalities linked to the scientific milieu also participated.¹² It was the case with Francesco Redi, Alessandro Segni (1633-1697), first secretary of the Accademia del Cimento, and Prince Leopoldo de' Medici, founder of the Accademia del Cimento and sponsor of the Accademia della Crusca:

I remember how I was elected by the Most Serene Prince Leopold and the Lords Academicians of the Crusca as one of the Deputies for the correction of the Old Vocabolario of the Crusca and on the Board for the new edition [...]. The other deputies are: Signor Andrea Cavalcanti, Signor Carlo Dati, Signor Marucelli, Signor Valerio Chimentelli, Signor Michele Ermini, Signor Panciatichi, Signor Alessandro Segni.¹³

The collection of technical lexemes from arts and crafts was effectively an initial attempt to outline an Italian scientific lexicon, emancipated through its integration into the *Vocabolario*. In the Biblioteca Marucelliana of Florence, there is an important unpublished manuscript entitled *Studi per il vocabolario della Crusca*.¹⁴ In this autograph manuscript volume, Redi alphabetically listed a series of words to be integrated into the third edition of the *Vocabolario*. The terms were defined and, often, their etymology and their use in literature was explained. Numerous terms in this collection were related to the medical-scientific sphere, starting with the first annotated words pertaining to the medical definition of 'apoplexy' and 'apopleptic.'¹⁵ Redi's remarks on the terms 'ferretto' and the adjective 'fattizio' are worthy of attention in this regard (Fig. 2):

Ferretto. *Ricettario fiorentino*: how copper is burned in medications will be taught below. Burnt copper and similarly what is today commonly called Spanish wire.

¹² See BERTOLONI MELI, 2001, p. 93.

¹³ BCA, ms. Redi 299, 70-71: "Ricordo come dal Serenissimo Signor Principe Leopoldo e dai Signori Accademici della Crusca fui eletto per uno dei Deputati alla correzzione [sic] del Vecchio Vocabolario della Crusca e sopra la Giunta del nuovo per la nuova edizione [...]. Gli altri deputati sono: il Signor Andrea Cavalcanti, il Signor Carlo Dati, il Signor Marucelli, il Signor Valerio Chimentelli, il Signor Michele Ermini, il Signor Panciatichi, il Signor Alessandro Segni."

¹⁴ BMF, ms. Redi 38, *Studi per il vocabolario della crusca*.

¹⁵ Ivi, 1r.

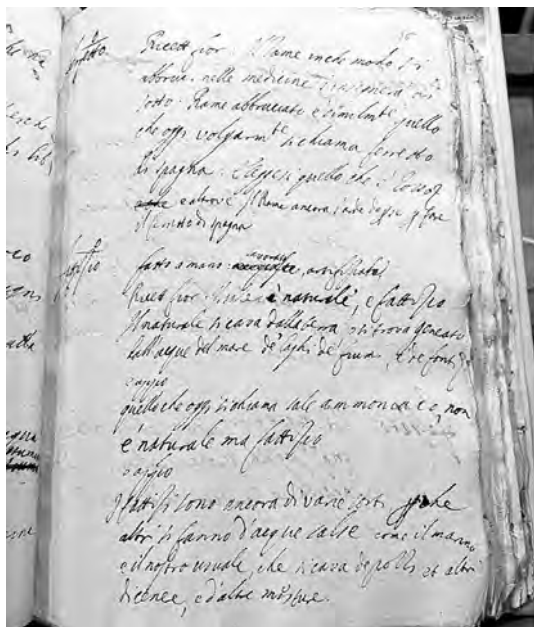


Fig. 2 – BMF, ms. Redi 38, 36r.

And you read what is red and elsewhere the copper still burns to make the Spanish iron.

Fattizio. Handmade: worked, artificial. *Ricettario fiorentino*. Salt is natural and factitious. The natural is extracted from the earth and is generated by sea water, lakes, rivers and springs. And then. What is called ammonium salt today is not natural, but factitious. And then. The artificial are also of various sorts because some are made from salty waters such as the marine and our usual one dug from wells and others from ash and other mixtures.¹⁶

Both words found their semantic justification not within a literary text but in the *Ricettario fiorentino*,¹⁷ the first pharmacopeia, published

in Florence in 1498. Redi owned a copy of this important text – currently preserved in the Archivio Petrarca in Arezzo, though unfortunately, it does not have any annotations or *marginalia*.¹⁸ It was still unusual to draw not on a literary text but on one of a scientific and practical nature to isolate

¹⁶ Ivi, 36r: “Ferretto. Ricettario fiorentino: il Rame in che modo si abbruci nelle medicine s’insegnerà di sotto. Rame abbruciato e similmente quello che oggi volgarmente si chiama ferretto di Spagna. E leggesi quello che è rosso e altrove il Rame ancora s’arde da per sé per fare il ferretto di Spagna. Fattizio. Fatto a mano: lavorato, artifiziato. Ricettario fiorentino. Il sale è naturale, e fattizio. Il naturale si cava dalla terra e si trova generato dall’acqua del mare de’ laghi de’ fiumi e de fonti. E appresso. Quello che oggi si chiama sale ammoniaco non è naturale ma fattizio. E appresso. I fattizi sono ancora di varie sorti perché altri si fanno di acque salse come il marino e il nostro usuale che si cava de pozzi et altri di cenere, e d’altre misture.”

¹⁷ For a brief look at Redi’s library, see MANGANI, MARINI, 2006.

¹⁸ AP, VI, a-6. The edition of the *Ricettario fiorentino* owned by Redi is from 1568. Although not annotated, it is a widely underlined example. The lexemes indicating the species of the three natural kingdoms are underlined, eg, *pyrite*, *calamo aromatico*, *lapis lazuli* etc. It is difficult to establish whether the copy was annotated by Redi himself or by the person who noted ownership at the end of the text, ie, Francesco Antonio Riccardetti of Arezzo.

a lexeme and introduce it into the vocabulary of the Italian language. It was an innovative exercise, significant for illustrating how reflections in this area were progressively changing.

As far as the adjective 'factitious' is concerned, we are faced with a particularly significant case since, as is well known, Redi had worked for a long time on the manufacture of artificial salts in the grand ducal Foundry and in 1663 had written a short treatise entitled *Osservazioni intorno a' Sali fat-tizi*.¹⁹ Including this term in the *Vocabolario* implied a profound reflection on scientific practice, which Redi himself had experienced, and to which he could implicitly refer in the definition of the adjective. Material praxis, therefore, became the substrate of reflecting on the scientific lexicon. As we shall see, material praxis was the basis of the entire communicative and rhetorical strategy of Redi's scientific production.

Lastly, there is a manuscript, preserved in Arezzo's municipal library, entitled: *Vocabolario di alcune voci aretine fatto per scherzo da Francesco Redi*.²⁰ In this manuscript, Redi isolated those terms whose origin from Arezzo was traceable. Again, in this case Redi referred to the famous Aretine poet Petrarch as well as to Andrea Cesalpino (1524/1525-1603), the Aretine student of Luca Ghini (1490-1556). Redi's attention to the reconstruction of a vocabulary from Arezzo is not particularly surprising; what is once again notable is the equal authority awarded on lexical matters to one of the most famous Italian poets and noted scholar of natural history. For Redi, in terms of the emancipation of the language, although from distinct areas, the two famous Aretine scholars did not assume different roles.

One of Redi's last substantial contributions, sometimes extolled and at other times marginalised by the historiography, was his contribution to the scientific environment of his time. His activity as a practical physician and his medical consultations constitute only a part of his substantial scientific legacy.²¹ Several manuscripts, preserved in various collections, contain accounts of scientific experiments of various kinds. From anatomy experiments on fishes (sometimes even self-illustrated),²² to the almost laboratory-like accounts of his experiments with the thermometer,²³ Redi

¹⁹ BMFL, ms. Laur. Rediano 199, 1r: *Memorie de' sali che si sono prima provati in poca quantità e poi dati con dose proporzionata cominciato alla villa Imperiale di comando di S.A.S. li 19 Maggio 1660.*

²⁰ BCA, ms. Redi 266. On this aspect, see NOCENTINI, 1999, pp. 275-286.

²¹ On the importance of medical consultations, see BERTOLONI MELI, 1999, pp. 73-86; DONI, 1999, pp. 211-224; CONFORTI, CARLINO, CLERICUZIO (eds.), 2013; BARRAUX, 2014, pp. 311-318.

²² On this aspect, see TONGIORGI TOMASI, 1999, pp. 211-224.

²³ BMF, ms. Redi 32.

showed extreme dedication to scientific research.²⁴ Despite this, his bond with the Accademia del Cimento has been, and remains, the subject of historiographical discussion.²⁵ Although some of the Aretine scholar's many letters suggest his involvement in the Cimento, Redi's name never appears in the diaries and papers tracing the academicians' activities.²⁶

In a published letter, dated 25 April 1659 and addressed to Michele Ermini (d. 1662), Redi openly declared that he participated in the Cimento's meetings: "It was my intention to come today to wish you a good trip, but it was not possible, because today the usual meeting of the Accademia del Cimento took place."²⁷ In a second letter, also already known and published, addressed on 9 May 1660 to Carlo Roberto Dati (1619-1676), Redi claimed that "in the Accademia del Cimento we work."²⁸

As we shall see, this is not the only case where Redi referred to the Accademia del Cimento using the third person impersonal or the first person plural. In an unpublished letter preserved in an epistolary manuscript collection at the Bibliothèque National de France, in January 1671 Geminiano Montanari (1533-1587) directly linked Redi with the Accademia del Cimento:

I do not know how to have anything but the most reverent feelings towards the Most Illustrious Accademia del Cimento, so that Your Illustrious Lordship should never doubt that in matters pertaining to it, where I do not think I can do you the honour of praising it, I would open my mouth or move my pen in another way.²⁹

This letter from the Modenese astronomer would confirm the hypothesis of Redi's engagement with the Accademia del Cimento, evidently also

²⁴ The manuscripts in the Biblioteca Marucelliana Redi 27, Redi 28, Redi 29, Redi 32, Redi 33 and Redi 34 are all manuscripts of experiments carried out and collected by Redi himself. These manuscripts represent an exhaustive summation of his research methods, interests and scientific goals.

²⁵ For an in-depth study of the Accademia del Cimento, see GIANNINI, FEINGOLD (eds.), 2020; BERTOLONI MELI, 2001.

²⁶ For a more general overview on the subject, see MIDDLETON, 1971, pp. 26-40; GALLUZZI, 1981; FINDLEN, 1993, pp. 36-40; TRIBBY, 1995, p. 321; BERNARDI, 1999, pp. 17-36; FINDLEN, 1996, pp. 195-196; BERETTA, 2000, pp. 131-151; BOSCHIERO, 2007, pp. 93-106.

²⁷ REDI, 1728-1742, IV, p. 22.

²⁸ Ivi, pp. 35-36. It is important to underline that for this letter and that to Ermini on p. 22, the manuscript versions have been lost, thus making it difficult to exclude manipulation and/or alteration.

²⁹ BNF, *Mélanges des pièces italiennes*, 116r: "Non so havere altro che sentimenti riverentissimi sempre verso l'Illustrissima Accademia del Cimento, onde Vostra Signoria Illustrissima non si dubiti mai che nelle cose attenenti a quella ove io non credessi poter farvi l'honore di lodarla, io sapessi aprir bocca, o muover penna in altra guisa."

known to his contemporaries. On 6 May 1682, many years after the end of the Cimento's activities, Redi, in a published letter to Giacomo del Lapo, again used the first person plural, suggesting his direct involvement in the Florentine Academy:

It seemed to me that I read in Borelli's book *De motu animalium* that he believed birds feed on those stones found in their ventricles, and that in addition to feeding on them, they also serve as grindstones for crushing, etc. It is a long time since we observed exactly this in the Accademia del Cimento.³⁰

Finally, in 1686, in a letter to Marquis Bartolomeo Vezzoni, Redi claimed to have been one of the founders of the Accademia: "as an experimental philosopher, I glory in having been one of the founders of the famous Tuscan Accademia del Cimento."³¹

Given the documentary traces, it cannot be ruled out that – although largely absent from the experimental agenda – Redi may have had a consultancy role in certain areas, not least that of writing the *Saggi*, a task formally entrusted to Lorenzo Magalotti (1637-1712). As we know, this was the only publication explicitly linked to the activities of the Accademia del Cimento. Nonetheless, in the absence of an actual 'membership list,' many scholars remain sceptical about accepting the notion, historiographically transmitted since Targioni Tozzetti's *Notizie degli aggrandimenti*, of Redi's participation in the Cimento's activities.³² While this is not the place to do so, a redefinition of the concept of participation in the Cimento, which is historically more nuanced than the historiographical framework suggests, would be required.³³

However, Redi's entire scientific production from the early 1660s revealed, through the methodological form expressed by his communicative devices, programmatic intentions and goals also expressed by the Accademia del Cimento. It is difficult to answer the age-old question of Redi's 'belonging' to the Cimento; it is therefore more productive to consider the

³⁰ REDI, 1728-1742, IV, p. 56: "Mi parve di leggere nel Borelli nel libro *De motu animalium*, che egli tenesse opinione, che gli uccelli si nutrissero di quelle pietre, le quali si trovano ne' loro ventricoli, ed oltre il nutrirsene, elle servissero ancora per macinette per trituzzare ec. Conforme è già gran tempo, che nell'Accademia del Cimento osservammo."

³¹ Ivi, p. 232.

³² See TARGIONI TOZZETTI, 1780; FEINGOLD, 2009, pp. 122-123.

³³ The diaries of the Accademia del Cimento, preserved at the BNCF, document experimental procedures similar to those described by Redi in his *Osservazioni* or, according to Tribby, at least the same type of activities. Experiments on snakebites are in BNCF, ms. Gal. 260, 190r-v and ms. Gal. 262, 83r-84r.

mutual influence between the physician of the grand ducal court and the Academy, especially regarding scientific communication.

GENRE AND RHETORICAL STRATEGIES OF FRANCESCO REDI'S PUBLISHED WORKS

In a famous letter written by Lorenzo Bellini (1643-1703) to Marcello Malpighi (1628-1694) on 7 March 1678, it is possible to glimpse the extent to which Redi's scientific prose represented the state-of-the-art in literary production during the second half of the seventeenth century:

[...] because today Redi is the arbiter of what little literature is here. He judges every trade, weighs every talent, determines every controversy, and woe betide anyone who takes a step outside of his direction, or tries to move forward and advance their interests without his approval.³⁴

If Redi was already perceived by his contemporaries, not without some impatience, as the judge responsible for evaluating scientific prose and more, this also meant that his prose had been taken as a model.

In 1664, during the central years of the Accademia del Cimento's activities, Redi published his *Osservazioni intorno alle vipere*³⁵ and then, in 1668, his *Esperienze intorno alla generazione degl'insetti*. In the second half of the seventeenth century, the 'osservazioni,' just like the 'esperienze,' from both of which Redi's works took their titles, had gradually become a literary and epistemic genre emerging within medical literary production.³⁶ Redi, a physician with refined training, had appropriated a predominantly 'medical' genre to proceed with a naturalistic experimental study. And as is known, aligning with a genre meant adopting not only its textual tools, but also its methodological objectives. The increasing importance of observations as epistemic genres was grafted onto an ever-increasing focus on praxis, associated with a less authoritative presentation of what was being conveyed. Thus, once again, the transversal integration of knowledge enabled Redi to develop the most effective strategy for communicating his scientific investigations.

³⁴ Published in GÓMEZ LOPEZ, 1999, pp. 137-138: "[...] perché in oggi il signor Redi è l'arbitro di quella poca letteratura che è qua. Egli giudica d'ogni mestiere, pesa ogni talento, determina ogni controversia, e guai a chi muovesse un passo fuori dalla sua direzione, o procurasse di portarsi avanti, e di promuovere i suoi interessi senza la di lui dipendenza."

³⁵ See POMATA, 2011; KNOEFEL, 1988.

³⁶ See POMATA, 2010.

For Redi the focus on genre was twofold. Both the *Osservazioni* and the *Esperienze* had been written in letter form.³⁷ The first was addressed to the then secretary of the Accademia del Cimento, Lorenzo Magalotti,³⁸ while the *Esperienze* were addressed to Carlo Roberto Dati (1619-1676), both important correspondents of Redi. Even the choice of the epistolary genre was a recognised stylistic strategy for putting an idea into circulation without conveying it with the solemnity typical of a treatise. In this way, the choice of literary and epistemic genres was able to suggest something about the informal tones in which Redi intended to present the scientific results of his research.³⁹ Furthermore, the idea of composing a scientific text in a literary form that was considered more palatable had its roots in Lucretius' *De rerum natura*, admired by the Medici court scientists.⁴⁰ In this regard, Giovanni Alfonso Borelli (1608-1679) reiterated to Alessandro Marchetti (1633-1714) on 27 July 1661 the importance of moderation and agreeableness in the prose of natural philosophy:

Every reason wants us to consider the present state of things, the taste that these Most Serene Princes have for running from sensational appearances that can excite malevolence and clamour, and in short, that true philosophy is spreading, yes, but in a pleasant and gentle manner.⁴¹

The *Osservazioni* had been published, as had the *Esperienze*, by Giuseppe Cocchini's Insegna della Stella imprint, as Redi recalled in his *Libro dei Ricordi*.⁴² And it was to Cocchini that the publication of the *Saggi* was entrusted only three years later.⁴³ In addition to Redi and the Cimento as an institution, some individual members of the Cimento had also turned to Cocchini as their publisher, as with Borelli's *Theoricae medicorum planetarum* (1666).⁴⁴ The campaign of publishing with Cocchini's presses had

³⁷ The *Esperienze* were contained in a letter addressed to Carlo Roberto Dati.

³⁸ A large part of the correspondence between Francesco Redi and Lorenzo Magalotti is currently preserved in BMF, ms. Redi 10, *Lettere di Francesco Redi a Lorenzo Magalotti*.

³⁹ See BARRECA, 2024.

⁴⁰ Cf. BERETTA, 2009, pp. 1-16.

⁴¹ See DERENZINI, 1959, p. 233: "Ogni ragione vuole che si consideri lo stato delle cose presenti, il gusto che hanno questi Serenissimi Principi di fuggir l'apparenze strepitose, e che possano eccitare malevoglienze, e clamori, et in somma che la vera filosofia si vada spargendo ben sì, ma con modi piacevoli e soavi."

⁴² BCA, Redi 299, 97.

⁴³ See MCLEAN, 2021, pp. 256-257.

⁴⁴ BERTOLONI MELI, 1998, pp. 382-402. Niels Steensen (1638-1686), who had long gravitated around the scientific context of the Medici court, had also published with Cocchini his *Ele-*

almost entirely been orchestrated by Prince Leopold who, as we shall see, put a great deal of effort into the *mise en circulation* of the aforementioned works. This aspect allows us to hypothesise that the shared editorial activity implied a cultural project coordinated by the Grand Duchy. The constellation of publications preceding and following the publication of the *Saggi* entrusted to Cocchini mirrored a broader cultural design, expressed in various forms still largely to be explored. Moreover, Cocchini seemed to be entrusted with texts that were intended to convey the image of a cultural context where the only objectives were unembellished experimentation and the neutral communication of its results.

In 1664, three years before the publication of the *Saggi*, Redi wrote in the dedicatory letter of his *Osservazioni*: “Every day I am more and more confirmed in my intention not to have faith in natural things that I do not see with my own eyes and I cannot confirm through *iterated and reiterated experience*.”⁴⁵ The strategy for communicating his experimentalism was summed up in these few lines and consisted of making no reference to anything other than a precise account of repeated observations and experiments. As Susana Gómez López has underlined,

The meticulous description of observations and experiments that characterises Redi’s work, his commitment to describing only what the senses perceive, basing his statements ‘in fact’ and not ‘in speculation,’ his anti-systematic and anti-speculative tone, seem to come from the same spirit that had animated Prince Leopold when he decided to gather a group of selected natural philosophers in his academy; that ‘Academy style’ consisting of ‘not disputing the causes of the experiences.’⁴⁶

In addition to Gómez López’s argument, one could infer a precedence of Redi’s prose choices over those of the Cimento, thus presupposing his significant influence on certain of the Accademia’s stylistic-rhetorical devices. Even from a strictly diachronic evaluation, it would seem more logical to speak of the precedence of Redi’s expressive techniques over those of the Cimento. What Barreca, dealing with the narrative devices of the *Saggi*, defines as Leopold’s ‘radical approach’⁴⁷ seemed to be the result of a

mentororum myologiae speciment, seu Musculi descriptio geometrica (1667) and *De solido intra solidum naturaliter contento dissertationis prodromus* (1669). Giuseppe Cocchini had also been chosen by Famiano Michelini (1664), Giacomo Salviati (1667), and by Carlo Roberto Dati for the publication of several of his works.

⁴⁵ REDI, 1664, p. 5 (my italics): “Ogni giorno più mi vado confermando nel mio proposito di non voler dar fede nelle cose naturali se non a quello che con gli occhi miei propri io vedo e se dall’*iterata e reiterata esperienza* non mi venga confermato.”

⁴⁶ GÓMEZ LÓPEZ, 1999, p. 131.

⁴⁷ See BARRECA, 2024, p. 541.

comparison with the beliefs expressed by the physician, both in his *Osservazioni* and later, more vehemently, in the *Esperienze*. Indeed, this 'radical approach' principally aimed at dissipating possible controversies through the elision of disputes, the anonymity of academics, and the exclusion of unsuccessful experiments.

At the end of the *Osservazioni*, Redi mentioned the work involved in the publication of the *Saggi*. Given that Magalotti had been working on the composition of the *Saggi* since at least 1662, the influence of Redi's prose, which was already emerging as the prose of post-Galilean Tuscan experimentalism, cannot be excluded. Redi, referring to the drafting of the *Saggi*, underlined in the last lines of the *Osservazioni* the centrality of Magalotti's caution in his investigations of natural philosophy:

[S]ignor Lorenzo, on the contrary, everyone knows how cautious and wise you are in not believing at first sight everything that is written in the books of the Philosophers, if you are not maturely persuaded by *geometric demonstrations*, the force of *powerful arguments*, or *repeated experience*; I hope, therefore, that the History that you have been ordered to compile from those natural experiences, which have been made with noble and glorious diversion for many years in the Philosophical Academy of the Court of Tuscany, will be applauded by all those who are truly lovers of the truth.⁴⁸

From these words emerged the expressive power of Redi's plain experimentalism, which, far from being aggressive, was intended to be cautious with respect to the cultural landscape of the time.⁴⁹ 'Geometrical demonstrations' 'powerful arguments' and 'replicated experiences' were considered the only possible ways of 'persuasion.' It bore a strong commonality with what Magalotti had written in the preface of the *Saggi*. This commonality probably was generated in a comparison whose outcome had been the appropriation of Redi's expressive and rhetorical stratagems by the Cimento. Magalotti had worked for a long time on drafting the preface to the *Saggi*, from the early 1660s, and yet, as shown in a letter to Paolo Falconieri (1634-1704) dated 30 March 1666, he struggled to relate to it:

⁴⁸ Ivi, p. 91 (my italics): "[S]ignor Lorenzo, e per lo contrario ognun sa, quanto voi saggiamente siete cauto, et avveduto in non credere alla bella prima tutto ciò che ne' libri de' Filosofi si trova scritto, se dove non s'arriva con le *geometriche dimostrazioni*, forza di *possenti argomenti*, o *replicate esperienze* maturamente non ve lo persuadono; ond'io spero, che l'Istoria, la quale v'è stato imposto di compilare di quelle naturali esperienze, che da tanti e tanti anni in qua fannosi con nobile, e glorioso passatempo nella Filosofica Accademia della Corte di Toscana, sia per ricevere ogni applauso da tutti coloro che da doverlo sono della verità amatori."

⁴⁹ Ivi, 1664, p. 63.

I don't know what to tell you about the book: I am ashamed, but it is my fault, or rather an unsurmountable aversion that I have conceived against it. It is a few weeks since I put my hand to the press, which has slept for sixteen months. To tell you the truth, I'm very dissatisfied with my draft, nor is it possible for me to resign myself about it.⁵⁰

It is possible that the prose of the *Saggi's* preface was more strongly influenced by the techniques of expressing empiricism used by Redi than by Prince Leopold, as traditionally thought. It cannot be excluded either that, in this specific context, the prince's preferences were influenced by those of Redi.⁵¹

Redi's rhetorical and communicative strategy unfolded in a binary way: both through the choice of textual genre and publisher, as we have seen, and through the use of recursive expressions and the use of experimental records, as we will see. The aim was certainly the objective, modulated and moderate framing of the expressed results. These results were also meant to implicitly clarify the impartiality of the scholar who had obtained them.

RECURSIVE EXPRESSIONS AND EXPERIMENTAL REPORTS IN THE *ESPERIENZE INTORNO ALLA GENERAZIONE DEGL'INSETTI* (1668)

In 1670, the Royal Society journal *Philosophical Transaction* reviewed Redi's *Esperienze*, only two years after its publication. The work was intended to refute the theory of spontaneous generation through the meticulous description of a sequence of protocol-based and controlled experiments, contextualised with references both to ancient and modern sources. Redi had experimented with the generation of certain types of insects on various rotting animal meats. In all the repeatedly conducted experiments, he used two jars: one hermetically sealed and the other not. Since, in all the experiments, maggots and insects were born only in the jar in contact with the air and never in the sealed one, Redi was able to conclude that their generation was to be found in the paternal seed deposited there by other

⁵⁰ Letter from Lorenzo Magalotti to Paolo Falconieri of 30 March 1666. MAGALOTTI, 1769, I, p. 159: "Del libro non so che dirti: mi vergogno, ma è mia colpa, anzi d'una avversione invincibile, che ho concepita contro di esso. Sono alcune poche settimane che ho rimesso mano alla stampa, che ha dormito sedici mesi. A dirtela, io malissimo sodisfatto del mio disteso, né è possibile ch'io ci accomodi l'animo."

⁵¹ See MADRIGNANI, 1961, pp. 476-500; MORAN, 1993, pp. 30-31; LICOPPE, 1994, pp. 204-244; MORAN, 1996, pp. 95-96; SCHICKORE, 2011, pp. 325-347; RAGLAND, 2017, pp. 503-528. SCHICKORE, 2017.

insects.⁵² It may be useful to focus on the first lines that the Royal Society journal dedicated to Redi's most famous publication:

I. *Esperienze intorno alla Generatione Degl'Insetti, fatte da Francesco Redi, Accademico della Crusca. In Firenze, a. 1668. In 4o.*

The Learned and Ingenious Author of this Book, lately come to the Publishers hands, though not yet (which is much disliked by the curious) into our Stationers Shops, doth with much industry undertake therein to evince that there is no such thing as *Æquivocal Generation*, but that every Animal is generated by the seed of another Animal (its parent) or, at least, from some Living and un-corrupted Plant, as out of Oak-Apples and several Protuberances and Excrescencies of Vegetables.⁵³

"Doth with much industry undertake therein to evince that there is no such thing as *Æquivocal Generation*." This was the fundamental core of Redi's theory, and the zeal for demonstration was his research method and his communication of it.

Before proceeding, it is important to focus on the support that Prince Leopold, founder and active member of the Cimento, had provided to the dissemination of the *Esperienze*.⁵⁴ The support offered to the *Esperienze* was similar to that offered to the circulation of Giovanni Alfonso Borelli's *Theoricae* two years earlier. Additionally, both works were published, as has already been mentioned, on Cocchini's presses.⁵⁵ From a long letter dated 19 April 1669 written by the mathematician Vittorio Siri (1608-1685) to Prince Leopold, the attention bestowed by the prince on the circulation of Redi's work is immediately evident:

Your Highness will easily be persuaded of the immensity of my appreciation and obligation for the favour given to me by the gift of Signor Redi's newborn book and I would like to give you infinite cordial thanks. Despite the fact that I found myself unusually busy, I read and devoured the whole thing and recited more than one experiment of it to the Lord Marshal of Gromont [...] Signor Carcavi and those of the Royal Academy, as well as a few other opponents, criticised perhaps that Signor Redi had been too insistent in giving examples of all the lice or at least of various animals, while two or three proofs and figures would have been suf-

⁵² See GOTTDENKER, 1979, p. 4; BERTOLONI MELI, 2009, pp. 122-123; SCHICKORE, 2010, pp. 567-617; DURIS, 2010, pp. 431-455; BERTOLONI MELI, 2010, pp. 405-429; ONELLI, 2017, pp. 42-57; BERTOLONI MELI, 2013.

⁵³ *Phil. Trans. R. Soc.* 5 (1670): 1175-1178, An account of three books. - I. *Esperienze intorno alla generatione degl'insetti, fatte da Francisco Redi, academico della Crusca. In Firenze, A. 1668. in 40. [...]*.

⁵⁴ On this, see TESTA, 2015.

⁵⁵ See BERTOLONI MELI, 1998, pp. 399-400.

ficient, but much more they criticised the style with so many verses and various oriental idioms without translation only for the sake of being noticed and for the exhortation of knowledge [...]. The book, therefore, will encounter many contradictors, but it will not fail to be greatly praised and approved by all as meritorious to the public improved by the disillusionment of so many questions that authority and antiquity have spread and carved in men with indelible certainty, particularly those concerning insects. Hence in the temple of immortality fame will erect a statue to Signor Redi.⁵⁶

From this letter it becomes clear that, while the results Redi obtained had immediately aroused interest and admiration in the scientific context, from a formal viewpoint the text had been harshly criticised. The scientific milieu of the time found the numerous literary references and the excess of examples redundant (and largely superfluous).⁵⁷ However, we believe that these two modes of emphatic expression were entirely deliberate on the part of the author. It is of fundamental importance to remember that the same had happened with the *Saggi*, whose prose style had been considered too full of narrative emphasis even by some of the members of the Cimento. Such narrative was easily traced in Redi's syncretistic prose.

Redi's references to the classics, retaining a sixteenth-century flavour, were the result of his hybrid training. His mental library, as we have seen in his contribution to the *Vocabolario*, did not observe the rigid disciplinary categorisations that were slowly beginning to emerge and be reflected in the expository style. For him, book culture was not an alternative vector of knowledge, but a heritage to be revisited through investigation. As we will see, these references, including those to the classical *auctoritates*, were

⁵⁶ In manuscript Redi 7 of the BMF, there are two other letters, one of which was written by Leopoldo himself and addressed to Egidio Menagio, which testify to the interest shown by the Prince in the circulation of the *Esperienze*, even in French territory. BNFC, Gal. 278, 251r-252r: "Resterà facilmente persuasa Vostra Altezza dell'immensità del mio gradimento et obbligazione per il favore fattomi del regalo del novello parto del Signor Redi con rendergliene infinite cordialissime grazie. Non ostante che mi trovassi fuor dell'ordinario occupato, il lessi e divorai tutto e ne recitai più d'una esperienza al Signor Maresciallo di Gromont [...] Il Signor Carcavi e quelli dell'Accademia Reale oltre a qualche altro oppositore criticarono forse che il Signor Redi era stato troppo insistito in apportare gli esempi di tutti i pidocchi o almeno di vari animali, bastando due o tre prove et figure, ma molto più criticarono lo stile con tanti versi e con vari idiomi orientali senza traduzione e per solo avviso e pompa di sapere [...]. Il libro, dunque, incontrerà molti contraddittori ma non lascerà di essere grandemente lodato e approvato da tutti come benemerito del pubblico migliorato col disinganno di tante questioni che l'autorità e l'antichità haveano diffuse e con certezza indelebile scolpite negli huomini, particolarmente quelle che concernono le pecchie. Onde nel tempio dell'immortalità la fama ergerà una statua al Signor Redi."

⁵⁷ There were particularly polemical responses to Redi's text; for an overview of the clashes that followed the publication of the *Esperienze*, see FAZZARI, 1999, pp. 97-127.

also present in his personal scientific notes, demonstrating the presence of a strong syncretism in his scientific practice.⁵⁸ Moreover, blending an innovative scientific message with a good dose of literary references could have been a way to align with the strategy of choosing literary and epistemic genre, thus concealing the polemical scope of the text and its consequent risk of being exposed to dispute. The formal criticism levelled at him by the scientific community was part of a growing trend towards cleansing scientific treatises of humanist and literary influence.

Secondly, it is possible to postulate that, from his earliest publications, Redi had made his terminological and structural choices to give the text a methodological approach mirroring that of experimental practice. The use of numerous experimental reports and the constant references to procedural repetitions were a way of reproducing, through narrative, the process of science in its making. In contrast to the scientific 'réseau' of the time, which saw literary quotations as a quirk of style and the explication of numerous experiments as an unnecessary effort, it is believed that such modes of expression were an attempt to accurately trace his scientific method.

It may be useful to begin the investigation into Redi's stratagems of science communication with a study of the use of the most recursive term in his work: the lexeme "experiment" and the expressions in which it was used. Even in the title, the term holds a central position and role, as was the case for the *Saggi*.

The word reappears immediately afterwards, on the flyleaf, in the translation of an Arabic proverb: "He who experiments increases knowledge; he who is credulous increases the error" – a useful proverb for clarifying the value of perceptible experience. Furthermore, it is notable that the term appears for the first time in the text on the third page, where Redi clarifies the methodological procedure he had used. Every philosophical evaluation had to be preceded by "accurate and continuous experiments:"

Therefore, although I have pursued the studies of philosophy with more fervour of soul than height of intellect, I have nevertheless always placed every possible effort and concern on ensuring that my corporeal eyes are well satisfied, first by means of accurate and continuous experiments, and then administering the material for philosophising to the mind's appraisal.⁵⁹

⁵⁸ See MANGANI, 1999, p. 248.

⁵⁹ REDI, 1668, pp. 3-4 (my italics): "Laonde ancorché io con più fervore di animo, che con altezza d'ingegno seguitati abbia gli studi della filosofia, niente di meno ho posta sempre ogni possibile pena ed ogni sollecitudine in far sì che gli occhi miei corporali in particolare si

In Redi's view, the methodological premise was also precautionary. If only 'repeated experiments' had heuristic value, even their narration had to circumvent theoretical interference. When Magalotti, at the beginning of the *Saggi*, framed the objective of the publication with the well-known expression "experimenting and narrating,"⁶⁰ it is possible he was influenced by this precautionary attitude expressed by Redi through the narrative expedient of the experimental reports. In fact, Redi took the following consideration as the starting point for his *Esperienze*:

Therefore, having newly made many experiments and many about the birth of those living beings that until today have been believed by all the philosophical schools to be born at random and by their own virtue, without paternal seed.⁶¹

A *status quaestionis* on spontaneous generation followed, through a diachronic overview of spontaneist theories. Redi went from the ancients to his most famous contemporaries: from Democritus and Epicurus to Fortunio Liceti (1577-1657), William Harvey (1578-1657), Pierre Gassendi (1592-1655), Athanasius Kircher (1602-1680) and many others including the sixteenth century naturalists Pietro Andrea Mattioli (1501-1577) and Ulisse Aldrovandi (1522-1605). He then countered these with an attitude that was anything but dogmatic:

I feel inclined to believe that all these maggots are generated from the paternal seed, and that meat, grasses and other putrefied or putrefiable things play no part, nor have any other use in the generation of insects than to provide a place or a proportionate nest in which maggots, eggs or other maggot seeds are brought and born from the animals at the time of their spawning.⁶²

In presenting his theory, Redi preserved the caution necessary in exposing certain theories before they were associated with any form of evidence.⁶³ In the above extract, the expression 'I feel inclined to believe'

soddisfacciano bene, prima *per mezzo di accurate e continuate esperienze*, e poi somministrino all'estimazione della mente materia di filosofare."

⁶⁰ *Saggi*, 1667.

⁶¹ REDI, 1668, pp. 3-4 (my italics): "perciò avendo ora di fresco fatte *molte esperienze e molte* intorno al nascimento di quei viventi che infino al dì d'oggi da tutte le squole [*sic*] sono stati creduti nascere a caso e per propria loro virtude, senza paterno seme."

⁶² Ivi, p. 15: "Io mi sento, dico, inclinato a credere, che tutti quei vermi si generino dal seme paterno; e che le carni, e l'erbe, e l'altre cose tutte putrefatte o putrefattibili non facciano altra parte, né abbiano altro ufizio nella generazione degl'insetti se non di apprestarne un luogo o un nido proporzionato in cui dagli animali nel tempo della figliatura sieno portati e partoriti i vermi o l'uova o l'altre semenze de' vermi."

⁶³ BONCIANI, 1999, p. 35.

reveals the insufficiency of a theory not significantly verified and demonstrated. However, in Redi's deliberate stylistic structure, historical analysis of the *status quaestionis* had to be followed by the experimental accounts.

The expressive emphasis increased through the accumulation of evidence from his experiments' positive outcomes. The first results of his series of experiments with closed flasks constituted a "stimulus to make new experiments."⁶⁴ There are a considerable number of expressions indicating a repetition of the same experiment, representing an accurate index of his will to clearly communicate his method of reiteration and comparative evaluation.⁶⁵ Reiteration was the most central aspect for the validity of an experiment. Only the *summation* of experiments could guarantee a certain reliability.⁶⁶ Redi considered it essential not to underestimate the role of variables in this context. All elements susceptible to modification and capable of affecting the outcome of an experiment were considered 'variable components:'

I was not, however, satisfied with these experiments alone; on the contrary, I made countless others at different times and in different vessels; and so as not to leave anything unattempted, I repeatedly ordered the vessels to be placed underground.⁶⁷

The only way to dispel any doubts and shield oneself from any opposition was to "try new experiments" that took into account the prism of possible variables.⁶⁸ It was precisely for this reason that Redi returned to repeat formulations, such as "I have made this experiment several times at various times and in different places,"⁶⁹ alluding to the importance of the variation of space and time in performing an experiment. Consequently, only at the end of the summary of repeated attempts was it possible for him to confirm his hypothesis (initially cautiously expressed) of the impossibility of a natural phenomenon like spontaneous generation. It is necessary to reach the core of the development of the *Esperienze* to see how Redi, confident in his experimental reports, set aside all caution and more forcefully stating: "Therefore, as I have reported, no animal that is dead can inverminate."⁷⁰

⁶⁴ REDI, 1668, p. 20.

⁶⁵ Ivi, p. 24: "and continuing to make similar experiments."

⁶⁶ SCHICKORE, 2010, pp. 567-617.

⁶⁷ REDI, 1668, p. 28: "Non fui però contento di quest'esperienze sole; anzi che infinite altre ne feci in diversi tempi e in diversi vasi; e per non tralasciar cosa alcuna intentata, infin sottoterra ordinai più d'una volta che fossero messi."

⁶⁸ Ivi, pp. 32-33.

⁶⁹ Ivi, p. 48.

⁷⁰ Ivi, pp. 35-36.

In Redi's eyes, scientific narration had to faithfully reproduce the gradual transition from hypothesis to demonstration. And if this transition occurred exclusively in material practice due to the accumulation of experiments, narration had to be its mirror image. In this way, with the results obtained, Redi could return to criticism of the theories that had preceded him:

Many were, and still are, imbued with this opinion, such as Pietro Crescenzi, Ulisse Aldrovandi, Fortunio Liceti, Girolamo Cardano, Tommaso Moufeto, Giovanni Ionstono, Francesco Osvaldo Grembs, Tommaso Bartolini, Francesco Folli, inventor of the instrument for reading the humidity and dryness of the air [...] And Father Athanasius Kircher himself believed in the artificial birth of maggots, indeed in the twelfth book of *Mundus Subterraneus* he taught that from the dung of oxen some maggots swarm like caterpillars, which in a short time, putting on their wings, change into bees [...] But if I kept it in a closed place where flies and gnats could not penetrate or lay their eggs on it, I never saw anything born there: and from here one can clearly see how Albertus Magnus affirmed without reason that flies are born from putrefied manure.⁷¹

This long excerpt sheds light, once again, on Redi's methodological practice, perfectly traced in the narrative: considering the reiteration of an experiment, never having observed a certain result makes a hypothesis unfounded. He could thus define the theory of one of the most famous scholars of natural history, Albertus Magnus, as one "without reason." Another case in which he refuted a theory due to the absence of experimental evidence of it was that of the generation of scorpions from other dead scorpions:

And because Father Athanasius Kircher *had determined* in the twelfth book of *Mundus Subterraneus* that *his experience showed* scorpions are reborn from the corpses of the scorpions placed in the sun and wetted with water in which basil has been macerated, *I once again risked making the second and third experiments* and, always disappointed, waited in vain for the desired birth of the scorpions, instead of which flies always appeared. And when *I tested it for the fourth time* in a well-secured chamber pot, I never saw any worms, flies or scorpions, *so I was increasingly*

⁷¹ Ivi, pp. 43-44: "Molti furono, e sono di tale opinione imbevuti, come sarebbe a dire Pietro Crescenzi, Ulisse Aldrovando, Fortunio Liceti, Girolamo Cardano, Tommaso Moufeto, Giovanni Ionstono, Francesco Osvaldo Grembs, Tommaso Bartolini, Francesco Folli inventore dello strumento da conoscer l'umido e'l secco dell'aria [...] E lo stesso Padre Atanasio Chircher, credè verissima quella nascita artificiosa delle pecchie, anzi nel libro duodecimo del Mondo Sotterraneo insegnò ancora, che dallo sterco de' buoi pullulano alcuni vermi a guisa di bruchi, i quali in breve tempo mettendo l'ali si cangiano in api [...] Ma se l'ho fatto conservare in luogo chiuso dove le mosche ed i moscherini non abbiano potuto penetrare, ne figliarvi sopra le loro uova; non vi ho mai veduto nascere cosa alcuna: e di qui si scorge evidentemente quanto senza ragione Frate Alberto Tedesco, cognominato Magno, affermasse che dal letame putrefatto nascer sogliano le mosche."

confirmed in my opinion that no animal of any kind is born from corpses if the seed is not carried on them.⁷²

Redi only commented on the invalidity of Kircher's observation after having replicated his experiment at least four times. Since on no occasion did the result coincide with that reported by the German Jesuit, Redi took the opportunity to emphasise that, on the contrary, these umpteen experiments had only proved that what he had already argued and experienced was true: no living species are generated on corpses that are not deposited there by other animals. In essence, even the narrative setting of his refutations reproduced the experimentation carried out to show the invalidity of the theory in question.

In this way, it was evident that Redi's expressive force was entirely directed towards the presentation and enhancement of true experimental methodological practice. And, on several points, it coincided perfectly with that expressed by the Accademia del Cimento. In the central part of the *Esperienze*, in fact, Redi expressed himself in these terms: "Again, *trying and trying again*, I had the experience."⁷³ Here, the Academy's motto and its principle of reiteration were evoked. It could not have been accidental to use its expressive power in a text published after more than ten years of the Cimento's flourishing activity and only a year after the *Saggi*'s publication.⁷⁴

Within a scientific context in which ever-increasing attention was paid to experimental practice, direct observation, and the empirical verification of natural facts, it was essential for Redi to repeat in an almost obsessive way how much he did not believe in anything that was not first confirmed directly by the senses and, only subsequently, re-elaborated by the intellect: "that in the past, dazzled by inexperience, I have sometimes believed those things of which I often feel ashamed when I remember myself."⁷⁵ And again,

⁷² Ivi, pp. 80-81 (my italics): "E perché il Padre Atanasio Chircher *avea determinato* nel libro duodecimo del Mondo sotterraneo che *per esperienza da lui provata* rinascono gli scorpioni da' cadaveri degli scorpioni stessi posti al sole ed innaffiati con acqua in cui sia stato macerato il basilico, mi arrischiavi *di nuovo a farne il secondo ed il terzo esperimento* e sempre deluso attesi invano la desiderata nascita degli scorpioni invece dei quali sempre mi comparvero mosche. E quando *la quarta volta ne feci la prova* in orinaletto da stillare ben serrato col suo antenitorio non vidi mai né bachi, né mosche, né scorpioni, *onde io sempre più mi andava confermando nella mia opinione* che da' cadaveri se non vi è portato sopra il seme non nasca mai animale di sorta alcuna."

⁷³ Ivi, p. 61 (my italics): "Ancora io *provando e riprovando* ne feci l'esperienza."

⁷⁴ See MANGANI, 1999, p. 33.

⁷⁵ REDI, 1668, p. 86 (my italics): "che ancor'io ne' tempi addietro abbacinato dall'inesperienza ho talvolta creduto di quelle cose delle quali soventemente ricordandomi *di me medesimo meco mi vergogno*."

a few pages before the conclusion of the text, he reiterated the substantial essence of his *modus operandi*: “and here it pleases me to remind you always restrict myself to what I have seen with my own eyes and that outside of this I never deny or affirm anything.”⁷⁶

Although maintaining a dialogue with philosophy and natural history, Redi openly declared that he wanted to embrace the experimental method, with the aim of avoiding falling back onto theoretical-dogmatic structures. The use of recursive expressions was a methodological choice linked to the “Medici strategy of opening the way – always prudently – to the new science,”⁷⁷ and to which the Accademia del Cimento probably aligned itself in the process of publishing the *Saggi*. Redi thus established himself as a prudent linguist, a careful communicator of science and an active promulgator of seventeenth-century Tuscan experimentalism.

METHODUS AND RECURRENCES IN REDI’S MANUSCRIPT SOURCES

The manuscript version of the *Esperienze*, in two volumes, is currently preserved in the Redi-Cestoni archive at the Biblioteca Marucelliana in Florence.⁷⁸ Largely handwritten by Redi, the preparatory manuscript of the

Esperienze serves as a privileged tool for introducing a comparison with the first edition of 1668. For example, the first occurrence of the term “experiment” contained in the methodological introduction to the first edition of 1668, is identically formulated in the manuscript. Moreover, it is also evidenced by the *manicula* (Fig. 3):

I have always taken every possible pain and care to ensure that my corporeal eyes are those

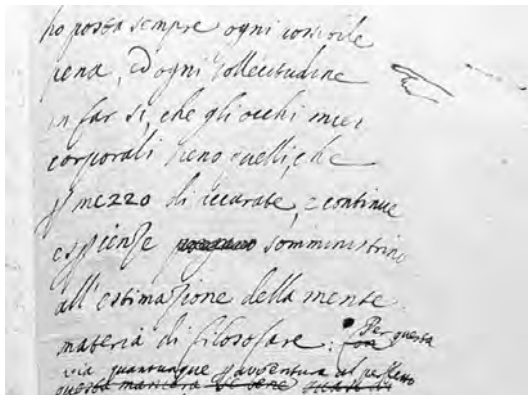


Fig. 3 – BMF, ms. Redi 33, 2r.

⁷⁶ Ivi, p. 120: “E qui piacciavi di ricordarvi, ch’io mi restringo sempre a quel che ho veduto con gli occhi miei propri e che fuor di questo non nego mai e non affermo che che sia.”

⁷⁷ See GÓMEZ LÓPEZ, 1999, p. 135.

⁷⁸ BMF, mss. Redi 33 e 34.

that by means of accurate and continuous experiments provide for the mind's appreciation the matter for philosophising.⁷⁹

It was immediately evident how the inductive methodological premise of scientific practice, expressed in the narrative through the device of recursive formulations and lexical reiterations, was genuinely at the core of Redi's programmatic intentions. Furthermore, also the heart of his anti-spontaneist theory was expressed in the manuscript in a very similar way (Fig. 4):

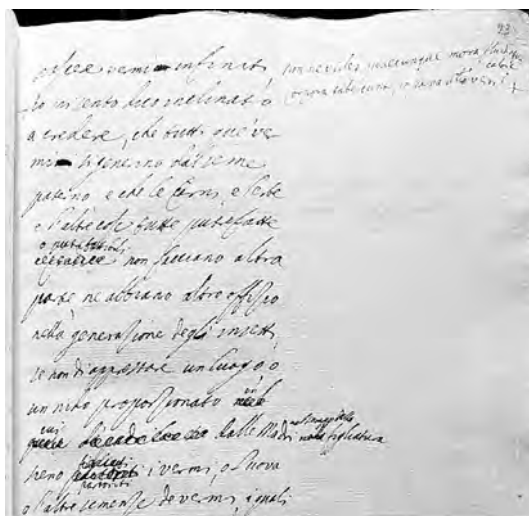


Fig. 4 – BMF, ms. Redi 33, 23r.

I feel inclined to believe that all those maggots are generated from the paternal seed and that flesh, grass and other things, all putrefied and putrefactive, have no other role in the generation of insects than to prepare a place or a proportionate nest in which the mothers, during the time of breeding, give birth to maggots or eggs or other maggot seeds.⁸⁰

These two manuscript volumes, in which the number of variations present with the first edition is negligible, constitute sources of great value because they are almost entirely autograph. This allows us to be certain about the author's intentions.

However, to correctly estimate the value of certain aspects of the *Osservazioni* and, above all, the *Esperienze*, it is useful to place them in relation to Redi's other scientific manuscripts. The manuscript between numbers

⁷⁹ BMF, ms. Redi 33, 2r: "Ho posta sempre ogni possibile pena, ed ogni sollecitudine in fa sì che gli occhi miei corporali sieno quelli che per mezzo di accurate e continue esperienze somministrino all'estimazione della mente materia di filosofare."

⁸⁰ BMF, ms. Redi 33, 23r: "Io mi sento dico inclinato a credere che tutti quei vermi si generino dal seme paterno e che le carni e l'erbe e l'altre cose tutte putrefatte e putrefattibili non facciano altra parte ne abbiano altro officio nella generazione degli insetti se non di apprestare un luogo o un nido proporzionato in cui dalle madri nel tempo della figliolatura sieno partoriti i vermi o l'uova o l'altre semenze de vermi."

26 and 34 of the Redi-Cestoni collection in the Biblioteca Marucelliana constitutes collections of scientific observations and experiments carried out by Redi. Comparing the prose he used in these manuscripts, which were not intended for the preparation of a publication, can help us to pinpoint any differences in his prose and, hopefully, allow us to understand the reasons for them. Unlike an edited work, any preparatory manuscript, letter, or medical consultation, this type of note has the advantage of not having a predetermined addressee, reader or audience.

The ms. Redi 27, *Studi ed esperienze chimiche. Acque, veleni, contravveleni, Sali ecc.*, largely autograph, is an excellent example of Redi's scientific prose. On 24 and 25 October 1670, just two years after the publication of the *Esperienze*, Redi collected his experiments on fluids in an expressive form that, once again and more clearly than anywhere else, reproduced literally the Cimento's principle of reiteration: *provando e riprovando*. Indeed, the first three expressions reported on 24 October, concerning the boiling of different waters, were introduced by the verb 'provare' (Fig. 5):

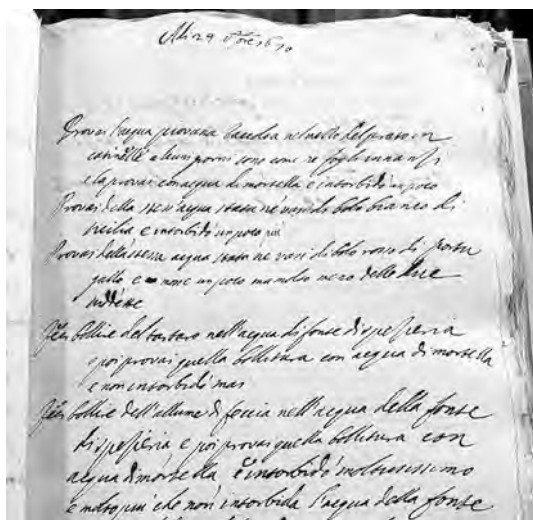


Fig. 5 – BMF, ms. Redi 27, 40r.

I tried rainwater collected in the middle of the meadow in small basins a few days ago as in the pages above and I tried it with myrtle water and it clouded it a little.

I tried the same water that was in the jars of Sicilian white bolus, and it became a little cloudier.

I tried the same water in jars of red Portuguese bolus, and it clouded a little but much less than the two aforementioned.⁸¹

On 25 October 1670, in the following folio, Redi reported the results of the replications of those first tests

⁸¹ BMF, ms. Redi 27, 40r: "Provai l'acqua piovana raccolta nel mezzo del prato in catinelle alcuni giorni sono come ne fogli innanzi e la provai con acqua di mortella e intorbido un poco. Provai della stessa acqua stata ne' vasi di bolo bianco di sicilia e intorbido un poco più. Provai della stessa acqua stata ne vasi di bolo rosso di portugallo e mosse un poco ma molto meno delle due suddette."

introduced by the verb 'riprovare' (Fig. 6):

1. I tried again the rainwater as in the previous page of the 24th and it became cloudy but only after a quarter of an hour.
2. I tried again the rainwater that had been in the Sicilian white bolus jar for 4 days and it clouded more than the aforementioned.
3. I tried again the rainwater that had been in the red Portuguese bolus for four days and it blurred very little and a little less than the aforementioned no. 1 rainwater.⁸²

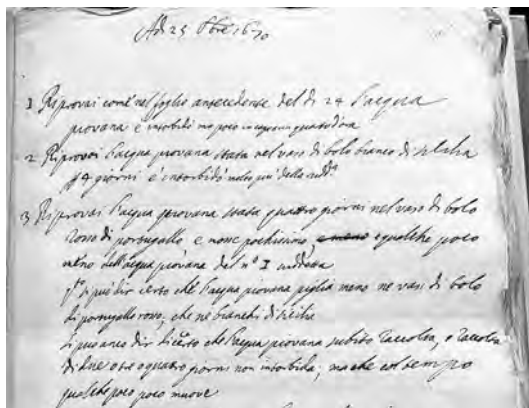


Fig. 6 – BMF, ms. Redi 27, 41r.

Just as in the *Esperienze*, even in this case Redi expounded the conclusions that could be drawn about the natural phenomena only following the three points introduced by the verb “riprovare.” It is therefore possible to conjecture that the Cimento’s Dantean motto “provando e riprovando” had been dearer to Redi than to any other member of the Academy. Redi had made Dante’s quotation a clear methodological prerequisite. The adaptation of the motto to the context of Tuscan experimentalism in the second half of the seventeenth century was also the perfect expression of the interpenetration of Redi’s knowledge and his ability to bring it into dialogue in a productive way.

The ms. Redi 29 in the Biblioteca Marucelliana, another collection of the author’s personal notes, is entitled *Esperienze di Francesco Redi intorno ai riscaldamenti, bollori e rinfrescamenti nati dalla mescolanza dei fluidi o di altre mescolate ad essi fluidi*.⁸³ In this manuscript, Redi numerically listed a series of experiences (over 700) made by immersing a thermometer in fluids un-

⁸² BMF, ms. Redi 27, 41r: “1. Riprovai come nel foglio antecedente del dì 24 l’acqua piovana e intorbida’ ma poco in capo a un quarto d’ora. 2. Riprovai l’acqua piovana stata nel vaso di bolo bianco di sicilia per 4 giorni e intorbida’ più della suddetta. 3. Riprovai l’acqua piovana stata quattro giorni nel vaso di bolo rosso di portogallo e mosse pochissimo e qualche poco meno dell’acqua piovana n° 1 suddetto.”

⁸³ See GIANNINI, 2024; BARRECA, 2024.

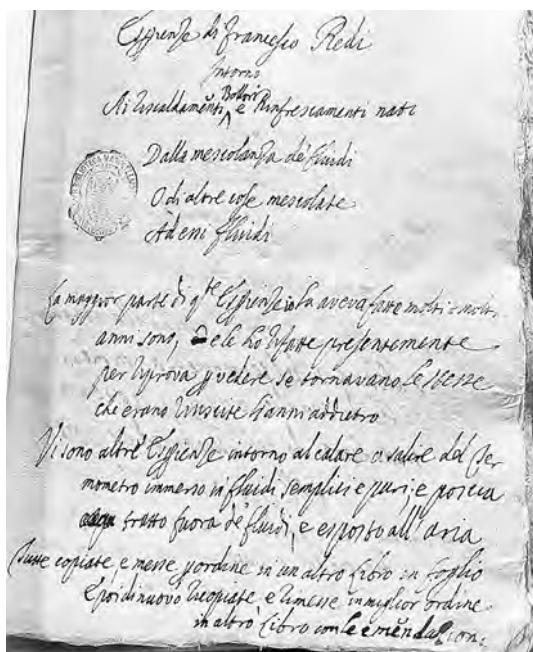


Fig. 7 – BMF, ms. Redi 29, 1r.

der various conditions and, crucially, at different times (Fig. 7):

Most of these experiments I had carried out many, many years ago, and I did them again now to see if they turned out the same as those that had been carried out years before. There are other experiments concerning the falling and rising of the thermometer immersed in simple and pure fluids; and then taken out of the fluids and exposed to the air.⁸⁴

Unfortunately, it is not easy to establish the time frame indicated by Redi stating he made the same experiments “many, many years ago.” The manuscript had presumably been written in

1688, as suggested by almost all the dated experiments. However, thanks to a note found on folio 352, it can be inferred that some of these experiments were conducted precisely in 1664, one of the key years of the Cimento’s activities. And, as is well known, the Accademia del Cimento devoted much effort to experimentation using the thermometer as an investigative tool.⁸⁵ What is of interest, however, is the laboratory approach that Redi also gave to his personal notes more than twenty years after the closure of the Florentine Accademia (Fig. 8).⁸⁶

The use of time indications, the meticulous description of the instruments used, as well as the precise description of contextual variables, illuminate his personal operating procedure. The writing of the various scientific

⁸⁴ BMF, ms. Redi 29, 1r: “La maggior parte di queste esperienze io le aveva fatte molti e molti anni sono e le ho rifatte presentemente per riprova per vedere se tornavano le stesse che erano riuscite li anni addietro. Vi sono altre esperienze intorno al calare e salire del termometro immerso in fluidi semplici e puri; e poscia tratto fuori de’ fluidi e esposto all’aria.”

⁸⁵ See GIANNINI, 2024, pp.; ROSSI, 2024.

⁸⁶ See BLAIR, 2010; ZANETTI, 2023.

texts, both manuscript and printed, was an effective tool offering the concrete possibility of replicating the experiments and obtaining the same results, thus also assuming the value of a handbook for experimental practice.

Redi applied the same approach in ms. Redi 32, *Osservazioni sui molluschi, crostacei, rettili, pesci*. Here the whole prism of cultural references used by Redi were conveyed together with the methodological aspects he used in the study of natural history.

As far as the sources were concerned, alongside the multiple references to Democritus, who was often defined as “wise and prudent,”⁸⁷ and to the other ancient *auctoritates*, the name of Ulisse Aldrovandi who dedicated himself extensively to ichthyological study, appeared several times:⁸⁸ “25 April 1663. I received from the Grand Duke Ferdinand II one of those fishes which are described by Aldrovandi under the name of *Vulpicula Marina*.”⁸⁹ However, while the presence of the most famous names in the history of naturalism is immediately evident, an important link with the world of craftsmanship is also present among Redi's papers:

Padron Peppo, Captain of the galley fleet, brought me two fish, which he said he had never seen in these seas. Grand Duke Ferdinand showed them to some of the older fishermen who all said they had never seen them.⁹⁰

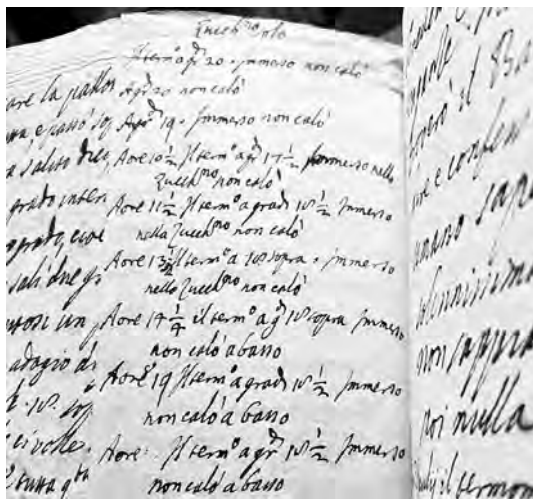


Fig. 8 – BMF, ms. Redi 29, 633v.

⁸⁷ BMF, ms. Redi 32, 186r.

⁸⁸ Ichthyology had undergone considerable development during the sixteenth century. Ulisse Aldrovandi, Ippolito Salviani and Guillaume Rondelet had contributed greatly to the development of this branch of study.

⁸⁹ BMF, ms. Redi 32, 153r.

⁹⁰ Ivi, 193r: “Padron Peppo, Capitano della felluca delle Galere mi portò due pesci, i quali diceva di non averne mai veduti in questi mari. Il Granduca Ferdinando gli fece vedere a detti pescatori de' più vecchi e ognuno disse che non ne avea più veduti.”

Redi and Ferdinand II also turned to fishermen in search of confirmation for the identification of ichthyological species. After all, as early as the end of the sixteenth century, the network from which empirical informations on species were obtained was gradually widening towards the world of technicians, craftsmen, fishermen and farmers.⁹¹ The fact that there was a comparison with texts from the natural history tradition in no way detracted from the evidence of a new practice in information retrieval and knowledge construction. Even in his previous studies on vipers, culminating in the *Osservazioni*, Redi referred more than once to the knowledge he had acquired through his dialogue with the 'viperoaro' Jacopo Sozzi.⁹²

Finally, in Redi's manuscript observations on fish, just as in the manuscript appendix volume of the *Esperienze*, he made use of a further methodological form used by the Accademia del Cimento and the seventeenth-century scientific network more generally: scientific iconography. After claiming that he and the Grand Duke had approached fishermen to identify a fish, Redi described its anatomy and, in the following folio, illustrated its internal viscera in an autograph sketch (Fig. 9).⁹³

The uncertain line, the ink and the urgency with which the anatomical parts of the fish were drawn would seem to confirm the hypothesis that Redi had sketched an iconographic representation with his own hand. Moreover, as evidenced by the *Libro dei ricordi* (qui nota con BCA, ms. Redi 299, f. 6), Redi had taken drawing lessons with pen by Remigio Can-

tagallina. It is interesting to note that Redi wrote about having resumed attending, indicating that he had already taken drawing courses in the past. This detail reveals how intentionally Redi had combined his scientific knowledge with his technical skills. In that historical period, in fact, drawing a scientific detail constituted a

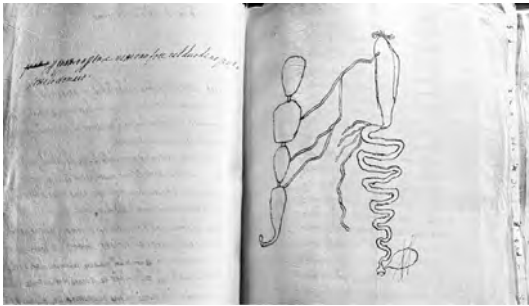


Fig. 9 – BMF, ms. Redi 32, 193v-194r.

⁹¹ See SMITH, 2004.

⁹² SCHICKORE, 2010, pp. 567-617.

⁹³ For the value of scientific illustration in this context, see TONGIORGI TOMASI, 1981, pp. 129-142; EGMOND, 2017; GIANNINI, 2023.

genuine epistemic act.⁹⁴ The need for a visual and material component in the circulation of scientific knowledge had become central, mainly among naturalists, by the second half of the sixteenth century.⁹⁵ It remained so during the seventeenth century, especially as the use of scientific instruments made observation more accurate and detailed. The collection of illustrated plates of insects at the end of the printed version of the *Esperienze* also reflected his experimental research method. The experiments described in the manuscripts, even when carried out with the use of scientific instruments, were often followed by illustrations of what was observed or described. And, as is well known, the use of a strong iconographic apparatus had also been central to the *Saggi*. Thus, the commonality of stylistic devices, expressive tools and methodological apparatuses with which both Redi and the Cimento had communicated their experimental investigations was realised.⁹⁶

CONCLUSION

Historiography has long debated the presence and role of Francesco Redi within the Accademia del Cimento. In this regard, the need for a re-definition of the concept of 'participation' in the Cimento, whose margins were characterised by a fluidity yet to be investigated, has already been stressed. As Galluzzi has underlined,⁹⁷ to speak of "membership" in the case of the Cimento is to think using categories that were alien to the institution. In fact, these are categories introduced subsequently, in a comparative perspective with the Royal Society and the Académie Royale des Science.

Beyond any actual belonging to the Cimento on paper, or participation in the experimental agenda, Redi's proximity to the experimental and expressive methods of the Cimento is indisputable. Thus, the example of Redi unequivocally clarifies the need to blur Cimento's boundaries, giving more space to evaluations of participation in the cultural atmosphere. Furthermore, as these preliminary notes on Redi show, approaching the reality of the Cimento with greater fluidity allows us to shed new light on the

⁹⁴ On the practice of the illustration of manuscripts by the scientists themselves, see KUSUKAWA, HENDERSON, MARR, FRANSEN, REINHART, WEIK, 2018; FRANSEN, REINHART, 2019; TONETTI, 2022, 357-375; NERI, 2011.

⁹⁵ Cf. OLMI, 1980-1981, pp. 99-120.

⁹⁶ GIANNINI, 2023.

⁹⁷ GALLUZZI, 1981.

origin, meaning and purpose of the rhetorical and stylistic choices adopted in the *Saggi*. The preface to the *Saggi* seems to refer to Redi's prose choices, especially regarding rhetorical devices such as the use of experimental reports and the neutralisation of the experimenting subject on the results obtained.

Redi's ability to cleanse the text from possible traces of philosophical polemics using rhetorical devices and experimental accounts was the *mise en oeuvre* of a communication strategy for experimental science. This functional stratagem was probably later adopted more generally by the entire panorama of Florentine scientific and experimental investigation in the second half of the seventeenth century.

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