

# FROM THE GARDEN OF MR. LINDO TO THE *PHILOSOPHICAL TRANSACTIONS*. SCIENTIFIC EXCHANGES AND KNOWLEDGE LEGITIMATION IN THE MID-18<sup>TH</sup> CENTURY ROYAL SOCIETY\*

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**Resumo:** Uma carta publicada nas *Philosophical Transactions* em 1763, com o relato das experiências realizadas por Moses Lindo, mercador inglês e especialista em plantas tintureiras residente em Charleston (Carolina do Sul), é o estudo de caso analisado neste capítulo, no âmbito da problemática dos processos de circulação e comunicação de conhecimento científico. A análise da evolução do ideário da Royal Society e dos critérios de selecção da informação transmitida e publicada pela mesma, bem como do percurso biográfico-profissional dos intervenientes neste processo, levará a conclusões sobre o valor da reputação do intermediário na validação dos conteúdos comunicados e a forma como Lindo procura na autoridade científica da organização um meio para solidificar a sua própria reputação científica.

**Palavras-chave:** Moses Lindo; Emanuel Mendes da Costa; Royal Society; Reputação.

**Abstract:** A letter published in the *Philosophical Transactions* in 1763, concerning an experiment performed by Moses Lindo, an English businessman and expert in dye-yielding plants who

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lived in Charleston (South Carolina), is the case-study that will be analysed in this chapter, regarding the processes of circulation and communication of scientific knowledge. The consideration of the evolution of the Royal Society's guidelines and its criteria for selecting information to be communicated and published, as well as the biographical and professional paths of the players involved in this dynamics, will lead to some conclusions on the worth of the go-between's credibility in the process of validating information and on the way how Lindo found in the Society's scientific authority a mean to strengthen his own scientific reputation.

**Keywords:** Moses Lindo; Emanuel Mendes da Costa; Royal Society; Reputation.

## INTRODUCTION

«In August 1757, I observed the mocking bird fond of a berry, which grows on a weed called Pouck»<sup>2</sup> – these are the first words of an account sent by Moses Lindo, a Charleston merchant, to the clerk and librarian of the Royal Society of London, Emanuel Mendes da Costa, in September of 1763. It would be read in a weekly meeting of the Royal Society two months later. The interest that it got justified its publication in the Society's periodical journal, the *Philosophical Transactions*, during that same year.

The role played by the Royal Society in the development of science in the Colonial North America was remarkable, guiding it in the direction of the new experimental science, providing books, instruments and even financial support, and mentoring colonial men of science. Moreover, the *Philosophical Transactions* became «an outlet for the publication of the fruits of colonials' scientific discoveries»<sup>3</sup>.

In this article, we will propose a re-evaluation of this question through another point of view: the perspective of the colonial man of science<sup>4</sup>, his aspirations in being recognized by a renowned scientific organization as the Royal Society and the tools and methods he used to achieve this target.

Indeed, the publication of Lindo's account in the *Philosophical Transactions* is an interesting case when approaching the problems of science's communication, reception and appropriation, bidirectional flow of knowledge (centre-periphery, but also periphery-centre) and networks through which information circulates<sup>5</sup>. The Royal Society of London is the recipient of a new discovery performed in a scientific periphery – Charleston – by an individual who is also peripheral to the organization. Despite being quite common for European scientific bodies to use local agents, even non-scientist ones, to seek information (specially natural history data) from the colonies, in this particular case, Lindo's experiments were not motivated by any kind of instruction or order from his London correspondent, but rather they were the result of his own initiative and entrepreneurial zeal. Therefore, this

<sup>2</sup> LINDO, 1763: 238.

<sup>3</sup> STEARNS, 1970: 675.

<sup>4</sup> We use the concept «man of science» to designate an individual who developed any kind of scientific work, not restricted to «professional scientists», which is an anachronistic category and unsuitable with the lack of specialization that characterised the practice of science in the 18<sup>th</sup> century. About this discussion, see SHAPIN, 2003 and FISSELL & COOTER, 2003.

<sup>5</sup> CHAMBERS & GILLESPIE, 2000; GAVROGLU *et al.*, 2008; RAJ, 2007; RAJ, 2013.

case-study also raises other questions related to scientific knowledge production and circulation in colonial spaces, namely the close relationship between scientific development and economic interests, as well as the importance of the channels used to disclose information<sup>6</sup>.

The starting point of our article will be the analysis of Lindo's account (problems, methods and results), as well as a brief description of his life path and the framework in which he wrote this text. From the author, we will move on to the correspondent – Emanuel Mendes da Costa, a historian, conchologist and mineralogist who was enjoying a good moment of recognition among his peers when he received Lindo's letter about his experiments with pokeweed. Our approach will follow how this account arrived at the Royal Society and the channels used by Lindo to reach a wide and reputable audience abroad. Comparing the contents and typology of this account with other articles temporarily published in the *Philosophical Transactions*, particularly those by other authors from North America, we will try to relate it to the mid-18<sup>th</sup> century Royal Society's agenda, as well as to the role played by this organisation in the disclosure of the science produced in colonial spaces. This comparison will also enable us to identify the singularities of Lindo's account: the particular features of its content and the specific background of its author. Finally, our focus will be on Lindo's motivations for disseminating his discovery among the fellows of the Royal Society. Why would a businessman settled in Charleston, South Carolina, be interested in publicizing his experiments and his scientific skills among a worldwide reputable Londoner scientific organization? What was he trying to achieve? And how did his personal agenda determine the timing and the way in which the news about the discovery of a potential new dye arrived in London?

## CRIMSON BERRIES IN A CHARLESTON'S GARDEN: MOSES LINDO AND HIS ACCOUNT

«An Account of a new Die from the Berries of a Weed in South Carolina: In a Letter from Mr. Moses Lindo, dated at Charles Town, September 2, 1763, to Mr. Emanuel Mendez da Costa...» is a good example of application of the scientific method, although its author was essentially a businessman with wide experience on indigo and other dye-yielding plants' trade, but also keen in Botany and other scientific matters.

A mockingbird eating the blooming crimson berries of a pokeweed<sup>7</sup> in the garden of his house rises a question in Lindo's mind: would it be possible to extract a dye from them? Observation and problem – the first two steps of the scientific method clearly appear in Lindo's account. The next step was to test it: he extracted and boiled a mixture of the berries' juice and Bristol water; then, he took two pieces of flannel, numbered 1 and 2, and boiled them in another pot with alum, a substance used to fix pigments. Then, Lindo dipped the first piece of fabric into the pot with the juice and left it there for 5 minutes. When he took it and put it in cold water, he noticed that there was a crimson dye fixed on the flannel superior to the juice of the berry. The other piece of fabric was also dipped in the same

<sup>6</sup> SCHIEBINGER & SWAN, 2005; COOK, 2008; DELBOURGO & DEW, 2008.

<sup>7</sup> Pokeweed or *Phytolacca americana* is an American perennial plant with dye-yielding and medicine properties, despite its considerable toxicity.

juice. Finishing the process, when Lindo was trying to clean his hands with limewater (commonly used as a solvent), he had a surprise: the stain had become yellow.

*This unexpected change urged me to throw a wine glass-full of lime water into the pot, where the piece of flannel N.º 2 was simmering; on which, all the juice, as well as the flannel, became of a bright yellow, by which I find alum fixed the crimson, and lime the yellow*<sup>8</sup>.

Lindo had already reached a conclusion. However, he needed to confirm it. Therefore, the experiment continued: he put some juice in two decanters and added some alum in only one of them; this mixture was laid during six weeks and, then, he found that the juice in the decanter without alum had turned black, while the other, with alum, had retained its colour.

The account of all these experiments and conclusions only occupies two pages of the volume 53 of the *Philosophical Transactions* (see reproduction below). The language is condensed, direct, pragmatic, without erudite references, quotations or superficial rambling considerations. It is clearly the work of a businessman, who favoured practical knowledge over theory, but also of someone without the need of further explanations or justifications for his experiments, not even when his audience was composed by renowned English men of science.

When Lindo wrote this account he had already get a solid reputation as a dye broker not only in Charleston but also in London, the city where he was born in 1712 and where he lived during 44 years before he moved to North America. Information about his youth is sparse. However, in a letter he sent to his New York agents Sampson & Solomon Simson in 1769, related to his contribution for the foundation of a school at Warren, Rhode Island (a precursor of Brown college), he remembered the three years he spent at the Merchant Taylor's School:

*where I went every day for three years, as well as two of my brothers from nine to one o'clock. There was at the time above 800 boys, sons of the principal merchants & trading people in the city. I have lived to see two Lord Mayors, & seven aldermen, & many toping merchants my school-fellows. Which I assure you was no small service to me when I was a broker on the Royal Exchange*<sup>9</sup>.

Lindo was aware that the social connections he established since his youth were essential for boosting his business career. When he arrived in South Carolina in November of 1756 on board the vessel *Charming Nancy*, he needed to enlarge his social network and to rebuild his reputation in a new place<sup>10</sup>. Shortly after his arrival, Lindo stated his business intents through an announcement published in the *South Carolina Gazette*. His intention was: «To purchase indico of the growth and manufacture of this province, and to remit the same to his constituents in London, classed, sorted and packed in a manner proper for the foreign market»<sup>11</sup>. Therefore, Lindo settled in Charleston as an

<sup>8</sup> LINDO, 1763: 239.

<sup>9</sup> GOODMAN, 1947: 137-138.

<sup>10</sup> PHILLIPS, 1894: 52.

<sup>11</sup> ELZAS, 1903: 3.

agent of a London firm. When the contract expired, he dedicated himself to classify South Carolina indigo by sort to other traders on a commission basis. His reputation grew so remarkably among his peers that, in 1762, he was appointed Surveyor and Inspector General of Indigo, Drugs and Dyes for the South Carolina, with the task of inspecting the quality of the indigo traded to England. In an office on «Mr Beresford's wharf», he attended those who brought him indigo to be inspected everyday of the week from 8 am to 1 pm. This function lasted until August of 1772, when he resigned, though he still used the title of Inspector General of Indigo. Indeed, it was with this designation that his death was announced in the *South Carolina Gazette* on April 26, 1774<sup>12</sup>.

Therefore, when Lindo wrote his letter to Emanuel Mendes da Costa in 1763, he was taking his first steps as Surveyor and Inspector General of Indigo and it was imperative to consolidate his reputation as a dye's expert.

## HOW TO CHOOSE A GOOD CORRESPONDENT

The importance of weak ties (as the opposite of strong ties as kinship, friendship, membership, etc.) had been highlighted by social network theorists as a condition to spread scientific knowledge beyond closed circles, making it reach wider audiences, and a means to disclose observations, experiments and discoveries performed outside. Scientific correspondence networks, in which weak ties played an essential role, are a vehicle for a wide knowledge circulation. However, the question lies in how it is possible to place trust in something that was not personally witnessed and/or in someone that is not particularly close<sup>13</sup>.

According to this categorization, we can classify the bond between Moses Lindo and the Royal Society as a «weak tie». Lindo was not a fellow of the Royal Society, nor was he a usual correspondent. Actually, the account on the dyeing properties of pokeweed berries was his only paper published in the *Philosophical Transactions*. However, when Lindo sent it to Costa, he did not need to add any evidence to prove its accuracy. He did not mention the sending of any additional material proof as, for example, a dyed piece of fabric or a sample of the plant. Nor any further annotation by other expertise or even by the interlocutor was added in order to corroborate the content. If the direct and well-founded way in which Lindo wrote his account contributed for its reliability, the lack of additional proofs was an evidence of confidence on its trustworthiness.

But where did such confidence lie? Before gaining the Society's trust, Lindo had to earn the credibility from his correspondent, Emanuel Mendes da Costa. In this double test of trust that his account successfully overcame, the (strong) tie between Costa and the Royal Society was decisive. Firstly, it is necessary to try to uncover Lindo's criteria for the choice of Costa as his correspondent. From another point of view, it also may be asked why the librarian of the Royal Society relied in a Charleston businessman's report to the point of being its spokesman before his peers.

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<sup>12</sup> ELZAS, 1903: 10-18.

<sup>13</sup> LUX & COOK, 1998.

The fact is that some affinities linked them. First of all, both shared the same social background – the Sephardic community of London. Son of Elias Lindo, a prominent merchant from London, Moses Lindo belonged to a Portuguese Jewish family who had arrived in England around 1670<sup>14</sup>. Emanuel Mendes da Costa's father, John Mendes da Costa (alias Abraham Mendes da Costa) was a Portuguese Jew from Rouen who settled in London around 1696. The patriarch of the family, Álvaro da Costa, was born in Portugal and moved to England in the 1660s<sup>15</sup>. Therefore, both the Costa and the Lindo families settled in London almost at the same time, after Oliver Cromwell's policies favouring the resettlement of Jewish merchants in England had led some Iberian New Christian families to establish themselves in the city, building the foundations of a community that would flourish over the following century<sup>16</sup>.

Emanuel Mendes da Costa was raised in one of the most remarkable and wealthy Jewish families of London, whose members were brokers, financiers and businessmen involved in diamond and coral trade. However, when he was a child, his father had lost part of his fortune. Financial problems were a constant feature of his life, only minimised thanks to the support of friends and patrons, some of them his relatives, as his uncle Anthony da Costa, a director of the Bank of England, or his cousin Joseph Salvador, one of the most prominent Jewish businessmen of London and a regular adviser of the English government on financial matters<sup>17</sup>. Costa also had dedicated himself to other business beyond fossils and minerals trade, with which he ended up making a living. Indeed, at the beginning of his career, he worked with his brother-in-law, Abraham del Prado, who had earned a Treasury contract to supply the British army in Dutch Brabant – he seized this opportunity to follow his real vocation, travelling and increasing his Natural History collection<sup>18</sup>.

Both Lindo and Costa attended the Portuguese and Spanish synagogue of London, the Bevis Marks, and they may have had acquaintances and friends in common. After all, the Portuguese Jewish community, despite its notable growth during the first half of the 18<sup>th</sup> century, remained a tightly knit group. Therefore, it is very likely that they knew each other during the time Lindo was living in London.

When Emanuel Mendes da Costa received Lindo's letter, he had already built a solid reputation among the British scientific circles trading shells, fossils and minerals. Costa's expertise on this field was confirmed by the publication of his first work in 1757, *A Natural History of Fossils*. Elected fellow of the Royal Society in 1746, he consolidated his position into the institution and, in February of 1763, he was appointed clerk, librarian and museum keeper of the Royal Society, a role of great responsibility and trust. His copious correspondence and his reputation as an expert on mineralogy and conchology enabled him to build a wide network with ties with some of the most remarkable men of science of his time. This social network overcame the Jewish environment, expressing a deep assimilation into the British Society and a solid integration within the Republic of Letters<sup>19</sup>.

<sup>14</sup> ROTH, 1971: 259-260; The National Archives (Kew) – *Public Record Office*, 11/619/258. Will of Elias Lindo, January 27, 1728.

<sup>15</sup> PERRY, 1981: 11-25.

<sup>16</sup> ENDELMAN, 2002: 15-40.

<sup>17</sup> ENDELMAN, 2002: 74-75.

<sup>18</sup> ROUSSEAU & HAYCOCK, 2000: 130-131.

<sup>19</sup> RUDERMAN, 2000: 204-214.

However, the image of the trustworthy clerk of the Royal Society who read before his peers the report of experiments performed by an inquisitive Charleston's broker deeply contrasts with that of a deceitful man who misappropriated funds that belonged to the institution and ended up dismissed from the fellowship and arrested for debts<sup>20</sup>. Although he was able to restore part of his reputation among some scientific circles, the same did not happen in relation to the Royal Society<sup>21</sup>. Actually, Lindo's account found Emanuel Mendes da Costa at his zenith, shortly before having fallen in disgrace<sup>22</sup>. Then, Costa's credibility inside and outside the Society was a crucial factor for the publication of Lindo's paper in the *Philosophical Transactions*. After all, the reputation of the correspondent was almost as important as that of the author<sup>23</sup>.

The way how Lindo's account came to the Royal Society was quite traditional: a letter addressed to a fellow, who would read it before his peers during one of the weekly meetings of the Society. After its reading, it was submitted to a selection process by a committee composed by the President, the Secretary, and a selected group of fellows, which decided on its publication in the *Philosophical Transactions*<sup>24</sup>. At that time, the president of the Royal Society was the astronomer George Parker, the Earl of Macclesfield. The first and second secretaries were Charles Morton (physician and librarian of the British Museum) and Thomas Birch (historian), respectively.

Like with other 18<sup>th</sup>-century journals, the short periodicity (monthly) of the *Philosophical Transactions* ensured it the property of disclosing fresher and more timely and original data than other kind of scientific publications<sup>25</sup>. Indeed, it is notable how short the time gap was between the reading and the publication of Lindo's account – less than two months. However, the quickness of this process was not completely extraordinary when one looks at other letters from foreign correspondents published in the *Philosophical Transactions*. David S. Lux and Harold J. Cook find a justification for this fact in the methodological affinities between communication of scientific knowledge and trade exchanges: «Quick assessment and forwarding of information may suggest some ways in which the participants in the new philosophy adopted methods of work as much like those involved in business as in scholarship», in other words, circulation via weak ties<sup>26</sup>. Moses Lindo, as a businessman, was familiar with the channels of circulation of commodities and capitals and used a similar strategy for the communication of his experiments and the choice of the interlocutor, an acquaintance with whom he shared a common social and religious background, but also someone who enjoyed of full recognition into the Royal Society.

<sup>20</sup> CANTOR, 2001: 590-593; ROUSSEAU & HAYCOCK, 2000: 149-153.

<sup>21</sup> HAYWARD, 2003.

<sup>22</sup> As a clerk of the Royal Society, Emanuel Mendes da Costa was responsible for collecting the members' fees. The Fellows could choose between giving a sum of 25 guineas when they were admitted in the Society or paying an admission fee of 5 guineas and sign a bond for payment of 1-2 guineas annually. Costa's fraud was that he took the perpetual fees of some Fellows and registered them as those who opted for paying the annual fee. Then, he continued to pay the Fellow's annual fees himself and invested the rest in order to benefit from the profits. When Costa's fraud was discovered, he had already diverted about £1400 (ROUSSEAU & HAYCOCK, 2000: 149-150). On the problem of scientific reputation raised by the case of Emanuel Mendes da Costa, see HAYWARD, 2003.

<sup>23</sup> COSTA, 2009: 25.

<sup>24</sup> FREEMON, 1985: 191.

<sup>25</sup> McCLELLAN III, 2003: 90-95.

<sup>26</sup> LUX & COOK, 1998: 201.

If the go-between's reputation may represent a warranty of trust on the account's content, its accuracy would not be the only criterion for its selection for the *Philosophical Transactions*. This raises another question: what was the interest of the Royal Society in Lindo's experiments with dye-yielding plants for such a successful and prompt reception?

## THE ROYAL SOCIETY FOR THE ENCOURAGEMENT OF ARTS AND MANUFACTURES

*Were Natural thus employed in applying the natural productions for procuring the necessaries, or adding to the comforts and ornaments, of human life, it would for the future free this science [natural history] from the vulgar opinion, that it is merely speculative, and incapable of being of the least utility in common life; a prejudice which gains more ground by the injudicious and unprofitable manner, now chiefly in vogue, in studying this branch of human knowledge; and which might be removed, if powerful trading companies would encourage the efforts of the naturalist, by enabling them to search the treasures of nature in the various countries subject to the British Crown, and connected with its subjects by trade and commerce<sup>27</sup>.*

This reflexion was provided by John Reinhold Forster, fellow of the Royal Society, in a letter for his peer William Watson concerning the roots of two plants (*Helleborus trifolius* and *Gallium tinctorium*) used by Indians in the neighbourhood of Hudson Bay to dye porcupine quills. Published in the *Philosophical Transactions* in 1772, this report ended up challenging the Hudson's Bay Company to order larger quantities of both roots to be examined and subjected to experiments in order to become «an useful article of commerce».

Forster's words expressed a concern on the direction followed by the 18<sup>th</sup>-century Royal Society, especially after Isaac Newton's death, that was at the time the subject of criticism among its detractors. If a commitment to natural philosophy and the encouragement of nature's observation and experimentation, in opposition to a more speculative knowledge, were the guidelines for the foundation of the Royal Society, in line with Francis Bacon's thought, the tendency over the 18<sup>th</sup> century was for a constant decreasing of the practical application of these principles into the organization. According to data collected by Richard Sorrenson, only 10% of the papers published in the *Philosophical Transactions* between 1720 and 1779 were on experimental natural philosophy. Nevertheless, this area still being more present in the periodical than other scientific fields such as mathematical natural philosophy or pure mathematics<sup>28</sup>.

Although public experiments were gradually losing their place during the weekly meetings of the Royal Society, the reading of letters sent by external correspondents tended to become more and more common, which was mirrored in the pages of the *Philosophical Transactions*. Indeed, an extensive correspondence fulfilled the function of spreading abroad the Society's methods and ideologies, namely its focus on natural philosophy and natural history, as well as of promoting cooperation among its fellows

<sup>27</sup> FORSTER, 1772: 58.

<sup>28</sup> SORRENSON, 1996: 37-39.

and other men of science all over the world<sup>29</sup>. So, the building of a worldwide network of correspondents made possible the foremost idea of the Royal Society as «the general banck and freeport of the World», according to the words of its major publicist, Thomas Sprat<sup>30</sup>.

Most of these letters written by foreign correspondents or English ones living abroad revealed a character more observational and descriptive than experimental. Even among the few that reported experiments performed far away, inclusively in extra-European territories, only a small part of them expressed a genuine concern with the practical application of their achievements. In fact, Forster's claim about the lack of interest with the pragmatic uses of natural history mirrored a situation, whose tendency was to increase along the 18<sup>th</sup> century. For example, there were fewer papers on industries or chemistry of production processes published in the *Philosophical Transactions* after 1750 than in the early century<sup>31</sup>.

In contrast with this reality, there remained a discourse that appraised the practical concerns of the Royal Society, which was even cited to justify the relevance of certain experiments or discoveries reported. Actually, this kind of rhetoric was quite common among the 18<sup>th</sup>-century scientific circles<sup>32</sup>.

In March of 1763, a letter addressed to the fellow John Ellicot from a correspondent in America, Henry Horne, reporting his observations and enquiries on the properties and uses of the so-called Virginia sand iron, mentioned «the encouragement of arts and manufactures» as an inherent vocation of the Royal Society<sup>33</sup>. Six years later, when William Watson, physician and astronomer, read an account on ground nuts (peanuts) oil, transmitted by George Brownrigg of North Carolina, who alleged to have discovered this substance, he introduced it focusing on how «the application of natural productions to the benefit of mankind, has always been an object of our excellent institution [the Royal Society]; and endeavours to extend the utility of substances already very obscurely known, have always met from you a favourable reception»<sup>34</sup>.

This paradox was particularly evident when we consider the few papers concerning plants and animals used, or potentially used, by dyeing industries that were published in the *Philosophical Transactions*. Indeed, most of them were essentially descriptions of specimens – e.g. two accounts on Polish cochineals by Dr. Wolfe of Warsaw, published in the 1760s<sup>35</sup> – instead of reports of experiments performed with them. Even a letter from John Ellis on cochineal insects that breed on *cactus opuntia* in South Carolina and Georgia, which alleged the usefulness of his observations and experiences, «with a view to encourage the propagating and collecting them in our colonies», is more interested on the differences between female and male insects than on their practical application in the dyeing industry<sup>36</sup>.

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<sup>29</sup> RUSNOCK, 1999.

<sup>30</sup> SPRAT, 1667: 64.

<sup>31</sup> MILLER, 1999: 200.

<sup>32</sup> SHAPIN, 2003: 178-179.

<sup>33</sup> HORNE, 1763: 48-61.

<sup>34</sup> WATSON, 1769: 379.

<sup>35</sup> WOLFE, 1764; WOLFE, 1766.

<sup>36</sup> ELLIS, 1761.

A paper closer to the approach and intentions of Lindo's account is found in the *Philosophical Transactions*'s volume published in 1757. It is a letter written by Dr. Alexander Garden, from Charleston, and presented before the Royal Society by the fellow Henry Baker. The latter had ordered him to perform experiences with prickly pear<sup>37</sup> in order to test its effects in colouring urine. In a short letter, Garden reported how the prickly pear he gave to eat to two children made their urine appear of a «very lively red colour». Then, he also tested the effect of prickly pear intake in the breast milk of a slave – some hours after setting, the milk had «a reddish lustre». He added that he had observed a similar effect in the milk of cows fed in an indigo field, whose milk cream became blue. Observation, problem and testing – the scientific method was applied by Garden, as Lindo would do in his account. The reporting of these experiences had a practical purpose that was made clear at the end of the paper:

*Dr. Garden wrote, a year ago, that the prickly pear grows in great abundance about Carolina; and also that the cochineal insects are found upon it; but hitherto no attempts have been made to cure them as the Spaniards do. In hope, that some rich dye may be produced from the plant itself, Mr. Baker proposed some experiments to Dr. Garden, which he intends to prosecute this summer*<sup>38</sup>.

This report matches with the view of science at the service of the development of arts, manufactures and commerce. Indeed, most of the very few papers with this kind of concern published in the 18<sup>th</sup>-century *Philosophical Transactions* came from foreign correspondents and a great part of them related to North America.

In a data collection of the *Philosophical Transactions* articles published by North-American authors between 1753 and 1775, Frank Freemon calculated 23 men of science from North America who wrote 45 papers in the Royal Society's journal<sup>39</sup>. Like Lindo, most of them had not attended university (only 8 of 23 were graduates). Astronomy was the most popular subject matter, followed by electricity, natural phenomena (earthquakes, astronomic phenomena, etc.) and the description of living creatures. Actually, the scientific areas most commonly addressed by North American authors were not so different from the *Philosophical Transactions*' general panorama. Also, the papers revealed a weak degree of specialisation. Indeed, it was not unusual for authors to publish outside their area of expertise. A good example can be found in the North-American trader who, other than Lindo, also wrote to the 18<sup>th</sup>-century *Philosophical Transactions*: John Bartram, a seed-merchant from Pennsylvania, who had been appointed the King's botanist. Only one of the eight articles he signed alone or with other authors in the Society's journal was directly about Botany: an observation concerning the vegetation of a saltmarsh, published in 1744<sup>40</sup>. Beside this, he wrote about a wide

<sup>37</sup> Prickly pear or Indian fig was the fruit of *cactus opuntia*.

<sup>38</sup> BAKER, 1757: 297.

<sup>39</sup> FREEMON, 1985: 191-206.

The author uses the category «American» to designate individuals who were born in the British colonies of North America or had been living there for 10 years. But we should notice that Freemon includes Moses Lindo in this data collection although he had only been in America for seven years when his account was published in the *Philosophical Transactions*.

<sup>40</sup> BARTRAM, 1744: 157-159.

range of matters, from the behaviour of wasps, dragonflies and pheasants to the description of an aurora borealis.

Considering this framework, Moses Lindo was an exception: a trader who reported an experiment he made in line with his business activity, whose potential practical application was really evident. Moreover, among the group of North American *Philosophical Transactions*' authors analysed by Freemon, Lindo was the only Jew.

Despite its allegedly openness to all «men of different religions, countries, and professions of life»<sup>41</sup>, religious diversity was not properly a feature of the Royal Society. Actually, it took more than sixty years until the Royal Society admitted its first Jewish fellow, Isaac de Sequeira Samuda. During the 18<sup>th</sup> century, other eight Jews reached the fellowship, among them Emanuel Mendes da Costa<sup>42</sup>. The number of *Philosophical Transactions*' articles written by Jewish authors is also low. In fact, Lindo was the only Jew amongst Costa's correspondents published in the journal.

The subject of his account was quite atypical among the several Costa's contributions as interlocutor of other men of science. However, the clerk of the Royal Society communicated reports not only related with his own scientific interests, but also concerning a quite assorted range of matters, as astronomy, medicine or natural phenomena. If, in the latter case, Costa used to confine his work to communicate the information exactly as it was provided by the correspondents (such as he did with Lindo's letter), when the subject was in line with his own field of expertise, he enhanced the reports with commentaries. We can find a good example in two reports written by the Reverend William Borlase that reached the *Philosophical Transactions* via Costa. «An enquiry into the original state and properties of spar, and sparry productous, particularly, the spars, or crystals found in the Cornish mines, called Cornish diamonds», published in 1749, was a result of the scientific correspondence exchanged between both, where Borlase asked Costa his opinion about a subject that he had already addressed in his own work<sup>43</sup>. Seventeen years later, two letters from Borlase to Costa concerning native tin found in Cornwall were also published in the *Philosophical Transactions*. At the end, Costa added some considerations, focusing on the doubts surrounding this subject and the need for experimental evidence about it. Then, he shared his experiments with two samples of native tin sent by Borlase. According to him, this procedure was absolutely required «before I presume to communicate it to this learned body; it being so extraordinary a discovery»<sup>44</sup>.

As we have seen before, Costa was not familiar with the kind of experiments reported by Moses Lindo at the point of providing them with additional commentaries or considerations. On the other hand, he would have had enough confidence in both its accuracy and its interest to the Royal Society. Now, we should turn the point of the question: why would Lindo be interested in sharing his exper-

<sup>41</sup> SPRAT, 1667: 63.

<sup>42</sup> VIEIRA, 2014: 135-149.

Besides Samuda and Costa, also the physicians Meyer Schomberg (1726) and Jacob de Castro Sarmiento (elected in 1729); the «Foreign Member» Jacob Rodriguez Pereira (1760), who developed a method of teaching deaf-mutes; and the businessmen Álvaro Suasso (1735), Anthony da Costa (1736), Joseph Salvador (1759) and Naphtali Franks (1764) (SALAMAN, 1947: 146-175).

<sup>43</sup> BORLASE, 1749: 250-277.

<sup>44</sup> BORLASE, 1766: 35-39.

iments on the dyeing properties of pokeweed berries with the fellows of the Royal Society? What would be his real agenda?

## THE RED AND THE BLUE. THE DYE'S BUSINESS AND THE PURSUIT OF REPUTATION

Considering his profile and purposes, Moses Lindo fitted into a typology of man of science that gradually emerged along the 18<sup>th</sup> century, which Steven Shapin named as a «civic expert»<sup>45</sup>. Indeed, Lindo put his technical knowledge and his expertise at the service of commerce, bearing in mind both his own business and the South Carolina's trading and industrial potentiality, namely in the field of dye-yielding plants. Even when he broadened his scientific interests, his practical sense did not fade away. For example, when he shared a recipe to cure a «grievous and common disease among the Negroes, called the Yaws» in the *South Carolina Gazette* on July 8, 1766, he stressed that the reason to make it public was «for the good of mankind, without the least view to my private advantage»<sup>46</sup>. As a landlord and slave owner, the discovery of a cure to a disease that dramatically affected his workforce was no stranger to his own economic interests.

Lindo cleverly knew how to use the local press for his personal targets. Specifically, the *South Carolina Gazette* became a privileged vehicle for him to announce his needs and achievements even before arriving in the New Continent. Three months before his arrival, in August of 1756, he was already paving his way. As a «correspondent in London», he sent to the *Gazette* an advertisement and directions for making limewater to subsidize indigo production, emphasising the quality of the South Carolina indigo, which was «equal to the best French»<sup>47</sup>.

Indigo had been cultivated and exported in South Carolina since the 1740s and its consumption in Europe progressively increased. The English Parliament's act in 1748 allowing a bounty of six pence per pound on indigo from the British Colonies considerably boosted its production. Then, South Carolina indigo started to be exported to Britain in large quantities and became the greatest source of revenue of the colony. However, it had strong competition from Spanish and French indigo, whose quality was broadly seen as superior<sup>48</sup>.

Acknowledging its great trade potential, Moses Lindo made indigo his major business, even long before his settlement in South Carolina. In an answer to all those who tried to undermine his reputation as an expert on ascertaining the quality of this commodity, published in the *Gazette* in February of 1762, he alleged his long experience: «My seal, well known in most markets in Europe for these 25 years, as always prime indico, which to this time of life I have not yet forfeited»<sup>49</sup>.

Nevertheless, in the late 1750s, Lindo was particularly committed to diversifying his business. His target was to discover specimens of plants from which it could be possible to extract new red dyes.

<sup>45</sup> SHAPIN, 2003: 178-182.

<sup>46</sup> ELZAS, 1903: 13-14.

<sup>47</sup> ELZAS, 1903: 2.

<sup>48</sup> FEESER, 2013: 17-18.

<sup>49</sup> ELZAS, 1903: 6.

In a letter published in the *South Carolina Gazette* on July 28, 1759, concerning trials on a new crimson dye called John's blood discovered in Port Royal (South Carolina), Lindo appealed to those who knew roots or weeds that could provide new red dyes to send him samples to be tried, under the promise of a proper reward:

*And as there are many roots and weed to be found in this province and Georgia, that will dye reds, I shall be obliged to all who will meet with such in their way, to send me a pound dried in the shade; that I may make trials of them. And if the discoverers be persons in middling circumstances, and what they produce to me be proven a dye, I will reward them with fifty pounds currency, and use my best endeavors to obtain for them further gratuities from the Dyers' Company in London*<sup>50</sup>.

It was in this framework that Lindo tested the dyeing properties of the pokeweed berries that grew in his garden in Charleston. This was between August and September of 1757. However, he only reported it by letter to Emanuel Mendes da Costa six years later. Something had changed in his professional life in the meantime.

Following the strengthening of his reputation as a dyes' expert and the recognition of his work for the boost of South Carolina indigo's valuation abroad, Lindo was appointed Surveyor and Inspector General of Indico, Drugs and Dyes in September of 1762. A group of «many gentlemen of rank and fortune, merchants, planters and others» gave their recommendation for this nomination with the following words:

*In order to bring our indico-produce into reputation at home as well as at foreign markets, it become necessary to have a proper person qualified to ascertain the value of our First Sort. We merchants, planters, principal traders and others, do, therefore, hereby certify under our hands, that Mr Moses Lindo, of Charles-Town, merchant, is the only person known to us, capable of rendering this province further service in that article [...]»<sup>51</sup>.*

This was a position that required enough skills and knowledge to enable him to ascertain the quality of indigo. If his expertise was already certified by his peers in South Carolina, it should be also recognised by those who would purchase the selected indigo or invest in this business. Namely, Lindo's skills needed to be acknowledged also in England, the greatest market for South Carolina's indigo.

The Royal Society would be a good vehicle for fulfilling this objective, as an organization that had built along the time a reputation for legitimating and validating scientific knowledge<sup>52</sup>. Therefore, a detailed and well-founded description of an experiment published in the *Philosophical Transactions* could be the ideal visiting card for someone who was pursuing recognition as an expert in dye-yielding plants.

<sup>50</sup> ELZAS, 1903: 4.

<sup>51</sup> ELZAS, 1903: 7.

<sup>52</sup> RUSNOCK, 1999: 156.

Moreover, the impact of a report published in the Royal Society's journal could be broader than the restricted circle of its fellows. As Palmira Fontes da Costa has noticed, *Philosophical Transactions* was «the public face of the Royal Society» and its audience was much wider than its members. According to her, in 1751-52, for instance, among 750 copies printed, only 300 were to fellows of the Royal Society, while the remaining 400 copies were sold by booksellers. Furthermore, *Philosophical Transactions*'s articles were often translated and sent to other people across the world or even published in other journals<sup>53</sup>.

Therefore, Lindo's account would find a wide and assorted audience. Even among the Royal Society's members, his discoveries on the dyeing properties of pokeweed berries were listened by diplomats, political authorities, aristocrats, businessmen, and many more. So, it is not excessive to suppose that Lindo could expect to find among this audience potential consumers or investors in South Carolina's dyes.

Having a report or account read and debated in the Royal Society's meetings meant something more than just an opportunity for scientific validation. It was also evidence of social recognition. The mid-18<sup>th</sup> century Royal Society was still, as it had been since its early times, an «assembly of gentlemen»<sup>54</sup>. By analysing the election certificates between 1735 and 1780, Richard Sorrenson demonstrated that 41% of the fellows were «gentlemen by virtue of their social position alone»<sup>55</sup>. Actually, the high social status of its members, as well as the hope of being part of this body of gentlemen and learned men, acted as great reasons for men of science all over the world wanting to exchange correspondence with the Royal Society's fellows<sup>56</sup>. Moses Lindo could also see it as an additional motivation when he decided to share his experiments with Emanuel Mendes da Costa.

However, we believe that what would ultimately drive him was something more pragmatic and immediate: the pursuit of validation and recognition of his skills as a dye's expert. Indeed, this was something that became essential for the success of his work, especially when competitors tried to cast doubt on his capacities. His concern is evident in a letter published in the *South Carolina Gazette* on March 26, 1763. In response to certain criticisms, he claimed his «superior knowledge and experience in all dyes and drugs to any in Europe or America»<sup>57</sup> – exactly the same that he proved with the two pages of pure scientific method applied to «arts and manufactures» published in the *Philosophical Transactions* some months later. Other target of Lindo's could be the advertisement not only of a new commodity (pokeweed dye) but also, by extension, of the economic potential of South Carolina's dyeing industry. And, as we have seen before in Dr. Alexander Garden's report, he was not the only one. Actually, efforts in order to make natural history profitable and to identify new resources that could drive to financial windfalls became a concern among who practiced science in North America before and after the Independence<sup>58</sup>.

<sup>53</sup> COSTA, 2009: 18-19.

<sup>54</sup> COSTA, 2002: 156.

<sup>55</sup> SORRENSON, 1996: 35-36.

<sup>56</sup> RUSNOCK, 1999: 166.

<sup>57</sup> ELZAS, 1903: 13.

<sup>58</sup> LEWIS, 2005: 66-80.

## CONCLUSION

The Royal Society was founded as a social space where experiments were performed and witnessed by a selected and reliable audience. Through the *Philosophical Transactions*, this experimental knowledge reached another level of publicity, beyond that of the restricted fellowship of the Royal Society. Using Steven Shapin and Simon Schaffer's terminology, it was a way of «virtual witnessing», as «a valid witnessing extended the public space of the laboratory»<sup>59</sup>. The strict selection of its fellows warranted this validation power.

Thomas Sprat, on the configuration of the Royal Society's fellowship, claimed that though its doors were open to men of all professions, countries and religions, «the farr greater number are Gentlemen, free and unconfined»<sup>60</sup>. According to him, the reliability of experimental knowledge was conditioned by this gentlemanly status of the greater part of its members. Their high social rank ensured impartiality and lack of self-interest. Why? One of the «two corruptions of Learning» identified by Sprat was when «knowledge still degenerates to consult present profit too soon», something that used to happen with those who were «married of Arts»<sup>61</sup>. A merchant, pursuing profit and requiring trade secrecy, would not be an ideal witness for the validation of scientific knowledge<sup>62</sup>. However, commerce was not completely foreign to the Royal Society. Several businessmen reached the fellowship and the way how the Society's correspondence network was built, and through which knowledge and technology was exchanged, resembled in many aspects the process of commodities and capitals' circulation on the cross-cultural trade – beyond close circles, through weak ties<sup>63</sup>. Furthermore, science and commerce shared common values as the need of reliable, up-to date and exacting information<sup>64</sup> or the importance of trust for the constitution of both scientific and trade networks.

The publication of Lindo's account in the *Philosophical Transactions* is an interesting case study for approaching this problem. After all, Moses Lindo was a merchant, and he was undoubtedly pursuing profit, as soon as possible. There was almost certainly a hidden agenda when he decided to share his experiments with the Royal Society. In short, Lindo was not the ideal «witness» conceived by Sprat. Actually, he was not a fellow of the Royal Society, only a correspondent. His interlocutor, Emanuel Mendes da Costa, was, however. And beyond a solid and widely recognised scientific career, Costa had interests in the business world – after all, he traded fossils, minerals and shells, which became his way to make a living. Therefore, Lindo's letter was exchanged between a businessman keen in science and a scientist who did business.

Lindo's trade experience was an important asset for the delineation of his communication strategy: the perfect timing; the «consumer friendliness» of his speech, in line with the methodological requirements of scientific experimentation as well as with the agenda (or propaganda) of the Royal

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<sup>59</sup> SHAPIN & SCHAFFER, 1985: 77, *passim*.

<sup>60</sup> SPRAT, 1667: 67.

<sup>61</sup> SPRAT, 1667: 67.

<sup>62</sup> SHAPIN, 1988: 396.

<sup>63</sup> LUX & COOK, 1998; RUSNOCK, 1999.

<sup>64</sup> COOK, 2008: 56.

Society; and, at last, his master stroke – the choice of an interlocutor with a high level of trustworthiness in the Royal Society but also someone with whom he shared a common social and religious background. We suppose that this was the essential move for the prompt reception and publication of his account in the *Philosophical Transactions*.

The reputation of his interlocutor warranted the reliability of Lindo's words before the Royal Society and enabled him to get what he most wanted when he wrote his letter to Costa: a wide recognition of his expertise on dye-yielding plants. After all, he was aware of the actual role of the Royal Society at the time. The «union of eyes and hands», in Sprat's words<sup>65</sup>, had become essentially a union of ears, a receptacle of worldwide knowledge, a «critical centre of collection», according to Andrea Rusnock words, adapting Bruno Latour's concept of «centre of calculation». In short, Lindo submitted his paper to the fellows's proof, in regard to their widely accepted capacity of legitimating knowledge. And this was the real power of the mid-18<sup>th</sup> century Royal Society.

## ANNEX

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**XXXVII.** *An Account of a new Die from the Berries of a Weed in South Carolina: In a Letter from Mr. Moses Lindo, dated at Charles Town, September 2, 1763, to Mr. Emanuel Mendez da Costa, Librarian of the Royal Society.*

Read Nov. 10, 1763. **I**N August 1757, I observed the mocking bird fond of a berry, which grows on a weed called Pouck, represented to me as of a poisonous quality; the juice of this berry being a blooming crimson. I was several times inclined to try, if I could extract a die from it; yet the very thoughts of its quality prevented me from proceeding, till observing these birds to void their excrement of the same colour as the berry, on the Chinese rails in my garden, convinced me it was not of the quality represented. I therefore made a tryal in the following manner.

1<sup>st</sup>. I ordered one of my negroes to gather me a pint of those berries, from which I extracted almost three quarters of a pint of juice, and boiled it with a pint of Bristol water, one quarter of an hour.

2<sup>dly</sup>. I then took two pieces of flannel and numbered them 1 and 2, boiled them in a separate tin pot with alum a quarter of an hour, and rinsed them in cold water.

3<sup>dly</sup>. I then dipped the piece of flannel N<sup>o</sup> 1. into the pot, where the juice was, and left it to simmer  
five

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five minutes, then took it out, and rinsed it in cold water; when, to my surprize, I found a superior crimson dye fixed on the flannel than the juice of the berry.

4<sup>thly</sup>. I then dipped the piece of flannel N<sup>o</sup> 2. in the same juice, and being desirous to clean my hands from the stain, which N<sup>o</sup> 1. had caused, I ordered some lime water to be brought me, such as we use to settle our indico, and found the colour of the stain change to a bright yellow. This unexpected change urged me to throw a wine glass-full of lime water into the pot, where the piece of flannel N<sup>o</sup> 2. was simmering; on which, all the juice, as well as the flannel, became of a bright yellow, by which I find alum fixed the crimson, and lime the yellow.

5<sup>thly</sup>. Having then put a quart of fresh juice in two pint decanters, in one of which I put a small quantity of powdered alum, I laid them up: about six weeks after, I then examined them, and found the juice in the decanter, which had no alum, was turned black, and the other retained its colour.

Fig. 1. Moses Lindo's account published in the *Philosophical Transactions* (vol. 53, 1763)

<sup>65</sup> SPRAT, 1667: 85.

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