CROSS-CULTURAL EXCHANGE AND THE CIRCULATION OF KNOWLEDGE IN THE FIRST GLOBAL AGE

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Título: **Cross-cultural Exchange and the Circulation of Knowledge in the First Global Age**

Editores: Amélia Polónia, Fabiano Bracht, Gisele C. Conceição e Monique Palma
Comissão científica: Ana Isabel Queirós, Cristina Joanaz, Cristiana Bastos, João Carlos Garcia, José Pardo-Tomás
Onésimo Almeida, Timothy Walker e Thomás Haddad
Design gráfico: Helena Lobo Design | www.hldesign.pt
Imagem da capa: POPPLE, Henry – *Atlas Map of the British Empire in America* (sheet 17). London: Willm. Henry Toms & R.W. Seale, 1733. Copyright of the David Rumsey Historical Map Collection (www.davidrumsey.com)
Revisão editorial: Marta Sofia Costa
Co-edição: CITCEM – Centro de Investigação Transdisciplinar Cultura, Espaço e Memória
Via Panorâmica, s/n | 4150-564 Porto | www.citcem.org | citcem@letras.up.pt
Edições Afrontamento, Lda. | Rua Costa Cabral, 859 | 4200-225 Porto
www.edicoesafrontamento.pt | geral@edicoesafrontamento.pt
N.º edição: 1913
ISBN: 978-972-36-1635-4 (Edições Afrontamento)
ISBN: 978-989-8351-88-3 (CITCEM)
Depósito legal: 437100/18
DOI: https://doi.org/10.21747/9789898351883Cross
Porto, novembro de 2018
Impressão e acabamento: Rainho & Neves Lda. | Santa Maria da Feira
geral@rainhoeneves.pt
Distribuição: Companhia das Artes – Livros e Distribuição, Lda.
comercial@companhiadasartes.pt

Trabalho cofinanciado pelo Fundo Europeu de Desenvolvimento Regional (FEDER) através do COMPETE 2020 – Programa Operacional Competitividade e Internacionalização (POCI) e por fundos nacionais através da FCT, no âmbito do projeto POCI-01-0145-FEDER-007460.

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INTRODUCTION

Cross-cultural Exchange and the Circulation of Knowledge in the First Global Age contributes to the understanding of mechanisms and processes of production and circulation of knowledge in the Early Modern Age. Seeing that the Early Modern colonial empires connected a wide variety of peoples and cultural complexes all over the world, this will also be a contribution to colonial history. The focus of the present collection is on the relation between the development of local knowledge production and its connection with wider contexts, at local and global levels. In this setting, knowledge production would, therefore, also be influenced by how knowledge circulated among the various producers, associated with local factors, processes of exchange, negotiation, and reconfiguration, often involving asymmetric power relations.

From that viewpoint, knowledge production would no longer be related only with the so-called scientific knowledge, as upheld by traditional works on the history of science, but would also involve wide-ranging practical knowledge and its global circulation, allowing knowledge production mechanisms to be understood as a more complex system, crossing different local and polycentric systems.

During the last decades, different strands of analysis have been running in the same direction. In colonial studies, there has been an increase in studies analyzing the role of local populations within the processes of empire building[1]. Another discussion that has become increasingly relevant concerns the importance of extra-official circuits and mechanisms, as well as self-organized networks connecting diverse worlds in contact, assumed both as trans-imperial and cross-cultural[2]. This question is intrinsically related to the circulation of artefacts of knowledge – material or cultural – through these connected structures[3].

In this context, it became crucial to look at the activities of various intermediaries, brokers, go-betweens and translators, without whom the colonial institutions or the religious orders could have successfully interacted with the local communities, nor gained access to their set of practices and knowledge. The origins of these individuals varied greatly, and they constituted an extremely diverse cosmos, with varied cultural, religious and linguistic backgrounds, building many dimensions of sociability, sharing knowledge and other cultural features. Foreigners, local inhabitants or those of mixed descent, these individuals represented the most diverse roles within or in the margins of the colonial structures. Whether merchants or ship-owners, whether surgeons, physicians, herbalists or missionaries, to say nothing of the village healers and midwives or just the curiosity collectors, such agents and their products and activities composed an exponentially more complex picture than the one which can be investigated only through reference to the official channels and the institutional action of the religious orders or other agents of the colonial powers[4].

The problems to be addressed by this collection, i.e., the processes of construction, circulation and reconfiguration of knowledge in the Early Modern colonial empires, are also connected with the historiographical dynamics that have been developing along the last decades, mainly in the history of science, also encompassing the domains of social history and cultural studies[5].

In August 2004, James A. Secord gave the opening lecture of an international conference on the History of Science in Halifax, Canada, which had the suggestive central theme of *Circulating Knowledge*. In

[1] RAJ, 2013.
[2] POLÓNIA, 2013: 133-158; POLÓNIA, 2017: 113-139; POLÓNIA & ANTUNES, 2017; ANTUNES & POLÓNIA, 2016.
[3] SUBRAHAMANYAN, 2012; MIGNOLO, 2000.
[4] POLÓNIA, 2017: 113-139; POLÓNIA & CAPELÃO, 2016; RAJ, 2010; BRACHT, 2016: 94-121; BRACHT, 2017.
[5] WALKER, 2002: 74-104; WALKER, 2007: 569-579; WALKER, 2011: 141-170; RAJ, 2009: 105-150; RAJ, 2010.

his intervention, which was later revised and published as an article[6], he took stock of a tendency that, he claimed, was gaining ground amongst historians, sociologists and philosophers of Science. Secord pointed out to the challenges that science historians were, at that time, beginning to face, from a fundamentally historical perspective, i.e. that knowledge cannot be seen only as an abstract production, but as a communication practice.

The notion that the production and circulation of knowledge, in historical terms, are closely linked to the establishment of communicational processes, has in itself several meanings. We would like, however, to direct this reasoning to the transmission of knowledge, techniques and concepts between frontiers, among many other possible meanings.

Most likely, many of the formative elements of any given culture, from the material artifacts to the intricate networks of meanings, rituals, beliefs, knowledge and linguistic tools, all parts of an intangible heritage, are elements that at some point in the past were incorporated through the contact with other cultures[7]. Besides the existing differences among cultures, the same cultural complex may also contain many dimensions. These are related to various aspects, such as religious and social stratification, contrasts resulting from the environmental diversity and even from random circumstances, which result from the contingency that is inexorably intrinsic to the historical process.

Recently, science historians, in particular those whose subjects are in some way linked to the colonial universes, have attributed increasing importance to the notion that, throughout the Early Modern Age, such spaces have sheltered intense dynamics of construction, extension and reconfiguration of knowledge[8]. The adoption of this perspective has provided an opportunity for deep historiographical analysis, especially with regard to the development of scientific knowledge throughout the Early Modern Era, and the role of local communities and their sets of practices and knowledge.

Perspectives which were thought to be consolidated are now being heavily questioned. The role of the local communities in the construction of knowledge had always been considered secondary, they were seen as mere receptors and reproducers of a science diffused unidirectionally, from its irradiation center in Europe, through the colonial institutions and the missionary activities[9]. However, new approaches have contributed to the broadening of this scope, to the point where the production of scientific knowledge is perceived as the result of a series of processes of cultural shared construction.

From these perspective, historians, sociologists and philosophers of science sought to understand the production of knowledge throughout the Early Modern Era as a sum of several processes, which involved the colonial spaces in a multidimensional manner[10]. This knowledge was constructed through exchanges and negotiations within *contact zones*[11]. Those spaces operated themselves as places (*locus*) of cultural encounters, spaces in which populations geographically disconnected until then came directly or indirectly into

[6] SECORD, 2004: 671.
[7] BURKE, 2009.
[8] HSIA, 2009; RAJ, 2009: 105-150; RAJ, 2013: 337-347; FURTADO, 2011: 21-81; BASTOS, 2010; DIAS, 2007; PARDO-TOMÁS, 2014: 749-776.
[9] BASALLA, 1967. This understanding is questioned, among others, by RAJ, 2013.
[10] RAJ, 2010; BRACHT, 2017.
[11] PRATT, 1991.

contact establishing continuous cultural, economic and political relations, frequently involving conditions of coercion by strength, endemically producing inequality and both social and racial conflicts[12].

The current understanding is that the production of knowledge in the colonial environment was much more than simply the result of collaboration; it also emerged from conflict, from cross-interests, and through sensible negotiation processes. The points of common interest arising from these processes were to a large extent a result of incomplete understandings with respect to one another, but also of a continuous establishment of «mutual and creative misunderstandings»[13]. This concept, «creative misunderstandings», has become the key of the most recent interpretations of the production of knowledge in the colonial universes[14].

Forged by the rationale and the concepts of these recent theoretical approaches, this book proposes a discussion between the history of science and other correlated disciplines, especially those concerning historical processes involving the circulation of scientific knowledge. It discusses the historical dimensions of science in its material, instrumental, physical, practical, social, political, and cognitive aspects, focusing on a perception of how the cross-cultural dynamics of knowledge circulation can be verified in the different universes of the colonial empires and the way they affected them.

In order to aggregate suitable discussions within this theoretical frame, this volume unites specialists who contribute to the state of the art in this field.

The book is divided in three parts, respectively, *Science as Power and the Power of Science*, *Perceptions and Interactions Within Colonial Natural Worlds* and *Colonial Medical Practices and the Transference of Knowledge*.

All together they aim at enlightening processes of knowledge production in colonial contexts and its circulation in Europe, and vice versa. Part I starts with a discussion on how science was power, mostly in the 18th century, when naturalists and medical doctors became allies of a central power aiming at controlling the body of their subjects, as much as the territories and the resources under their rule, in Europe and overseas. The activities of agents of knowledge production overseas and of circulation flows within Europe as networks of power is one of its main topics.

Part II concentrates on some of the information circulating between worlds, both as techniques, or as the actual content of a knowledge about colonial territories, frequently performing as exhibits to European eyes. The selection criteria underlining those representations and the means for communicating information are some of the topics arising in this section.

Part III illustrates several processes of knowledge circulation in the field of medical practices. The analysis of medical practices in Goa, as well as of pharmacy and surgery in Brazil contribute to a reflection on patterns of local production and European appropriation and uses of colonial knowledge.

The first section starts with the contribution of Gisele Cristina da Conceicão, *Science and power relations: Circulation of agents and natural philosophical knowledge between Portugal and Brazil in the 18th century – The case of António Nunes Ribeiro Sanches*. Her approach discusses the power relations established between knowl-

[12] PRATT, 1992: 6.
[13] WHITE, 2001.
[14] *Creative Misunderstandings* is the title of COOK, 2013. Cook being the author of various important books about themes related to this.

edge producing agents both in Brazil and Portugal in the late 18th century. As one of the most relevant contributions of her work, Conceição reveals an unpublished manuscript of António Nunes Ribeiro Sanches (1763), analysing this author' ideas concerning the exploitation of Brazilian natural resources in medicine or trade.

In the second chapter, *The Luso-Brazilian medical students at Montpellier and the establishment of an intellectual elite between two Atlantic empires*, Rafael Dias da Silva Campos explains the relations established by the circulation between Brazil, Portugal, and France, of a group of Luso-Brazilian intellectuals. In this context, according to Campos, these agents' political ties and the fact that they were part of the Luso-Brazilian intellectual and political elite are relevant for an understanding of their careers in the University of Montpellier. Their own careers reveal both how European teaching was able to frame Brazil, and how this group, as such, might potentially contribute to the diffusion of knowledge locally produced in Brazil .

In chapter three, Carla Vieira, with *From the garden of Mr. Lindo to the* Philosophical Transactions. *Scientific exchanges and knowledge legitimation in the mid-18th century Royal Society*, helps us to understand the dynamics of science and power through the analysis of the social relations of Moses Lindo. Vieira sustains that Lindo was able to achieve recognition and validation for his own work through his wide network of personal contacts, as well as his reputation and political influence.

Part II, starting with Ana Cristina Roque's text, *Towards a scientific approach of nature: Looking at Southern Africa biodiversity throughout the 16th century Portuguese records on marine fauna*, focuses on the importance of the South African biodiversity as seen through the analysis of 16th centuries' travel guides, reports and diaries. It opens up a discussion on contributions related to zoology and botany, focused on a demonstration, in historical terms, of how the early modern studies of the natural world influenced different aspects of human activities such as science and economy.

Additionally, Cristina Brito's chapter, *Connected margins and disconnected knowledge: Exotic marine mammals in the making of early modern European natural history* discusses the construction of knowledge about the natural world through textual and iconographic representations of sirens, mermaids and manatees. According to Brito, these representations offer a strong basis for a debate of the construction and evolution of an Early Modern natural science covering the exotic fauna. Crossing borders between colonial studies, natural science and the analysis of marine ecosystems, Brito provides a challenging illustration on how those cross yards might be perceived in historical sources by the eyes of a biologist.

Nina Vieira, in *A comparative approach to historical whaling techniques: Transfer of knowledge in the 17th century from the Biscay to Brazil*, illustrates both trans-imperial flows, by focusing on the use of Biscay fishing techniques in Brazil, and the impact of European catch techniques in a natural world which inevitably suffered imbalances derived from this transference of knowledge at the service of European goals.

The work of Julianna Morcelli Oliveros, *From the New World to Barcelona: American flora in the Salvadors's Cabinet*, transports the reader to the Early Modern Spanish Atlantic Empire and the discussions about its natural potentials for trade, medicine and economy. Oliveros' analyses of the botanic exchanges carried out by the Salvador family, important collectors and apothecaries based in Barcelona, provide evidence for what can be perceived both as a fashionable curiosity and as an economic asset.

The book ends with three chapters grouped around the theme of *Colonial Medical Practices and the Transference of Knowledge*. Fabiano Bracht's *The Eastern Portuguese Empire: Frontiers and contact zones in*

knowledge production contexts, whose main focus is on 18th century Goa, is supported by empirical evidence of the construction and the active circulation of medical and pharmaceutical knowledge, in a bi-directional flux between Europe and Goa. Bracht looks for historical continuities resulting from long-term processes, which involve such well-known historical agents as the Jesuits, and lesser – known individual contributors, like the Goan medical doctors.

Monique Palma's *Circulation of knowledge between Portugal and Brazil in the 18th century. The case study of thermal bathing* reveals ways and means of circulating chirurgical knowledge involving the prescription of thermal bathing. Palma analyses the role of surgeons in Portugal and Portuguese America, including military surgeons as a case in point to discuss the strength and authority of medical and surgical authors and practitioners, as academics and non-academics, performing in Europe or overseas.

A contribution by Wellington Bernardelli Silva Filho on *Medicinal plants of Brazil in the pharmacopoeias of the friar João de Jesus Maria* closes this third part. It analyses the unpublished work of this Portuguese friar with the aim of understanding how some local Brazilian medical practices were incorporated into the 18th century European *Materia Medica*, as evidence of circulation and assimilation of colonial knowledge by European Academia.

The book as a whole faces the challenge represented by the historical comprehension of the cultural exchanges, knowledge circulation, and their agents throughout the Early Modern colonial empires. It discusses power relations, political struggle and the demand for knowing and recognizing the natural potentialities of the colonial worlds, as well as the transference of knowledge facilitated by the multivariate networks of agents in practically every single place of the world. Its editors hope that those challenges were fruitfully addressed by the set of the selected authors that generously accepted to contribute to it.

Every book that answers questions opens up new ones. This is obviously true for the present volume as well. It can only pinpoint individual aspects which highlight the potential for future research in this world-wide field. Like the knowledge transferred by early modern practitioners, its findings will have been superseded at some point in the future. But at the moment, the authors and the editors are sure they can point to new, so far uncharted, and definitely worthwhile areas of knowledge building.

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PART I

SCIENCE AS POWER AND THE POWER OF SCIENCE

SCIENCE AND POWER RELATIONS: CIRCULATION OF AGENTS AND NATURAL PHILOSOPHICAL KNOWLEDGE BETWEEN PORTUGAL AND BRAZIL IN THE 18TH CENTURY – THE CASE OF ANTÓNIO NUNES RIBEIRO SANCHES

GISELE CRISTINA DA CONCEIÇÃO*

Resumo: No século XVIII, os estudos filosófico-naturais sobre as colônias foram orientados por um cunho mais academicista que, em alguns aspectos, transcendeu questões políticas, sociais e econômicas. Havia uma busca de complementaridade entre o Reino e a colônia, e nesse âmbito, as políticas do Estado foram postas em prática através de diversos processos de divulgação de instruções para a recolha de dados, formação de academias científicas, viagens filosóficas, e o envolvimento de diversos agentes com variadas atuações profissionais, tais como, militares, clérigos, médicos, cirurgiões e advogados. Estes indivíduos escreveram inúmeros textos sobre políticas de incentivo para que houvesse um maior conhecimento e domínio do território e as suas potencialidades naturais. Tais textos circulavam e fomentavam as políticas públicas, assim como, a própria construção de conhecimento. António Nunes Ribeiro Sanches, foi um dos agentes que participou deste processo. Muitos dos textos escritos por ele circularam através de sua extensa rede de contatos, e foram importantes para a formação e consolidação de diversas políticas públicas, principalmente a partir do Governo do Marquês de Pombal. Neste capítulo, pretendo expor algumas das ideias de Ribeiro Sanches sobre o reconhecimento dos recursos naturais brasileiros e sua exploração para o comércio e a medicina, em um manuscrito de 1763.

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Palavras-chave: António Nunes Ribeiro Sanches (1699-1783); natureza brasileira; século XVIII; filosofia natural; história da medicina.

Abstract: The 18th century natural-philosophical studies on the colonies were guided by a more academic stance that in some aspects transcended political, social and economic issues. Owing to the search for complementarity between the kingdom and the colony, State policies were translated into action in many ways: dissemination of instructions on data collection, set-up of scientific academies, philosophical travels, and the involvement of various agents from different work backgrounds, such as soldiers, clergymen, physicians, surgeons and lawyers. These individuals wrote many texts on policies geared to promote better knowledge and mastery of the territory, and its natural resources. These texts circulated and promoted public polices and the build-up of knowledge. The texts by António Nunes Ribeiro Sanches, one of the agents who took part in this process, circulated across his extensive network of contacts and were important to form and consolidate various public policies, especially during the government of the Marquis of Pombal. Our aim in this chapter is to disclose some of the ideas of Ribeiro Sanches contained in a 1763 manuscript on the Brazilian natural resources and their exploitation for commercial and medical purposes.

Keywords: António Nunes Ribeiro Sanches (1699-1783); Brazilian nature; 18th century; science; history of medicine.

INTRODUCTION

During the 18th century, the natural-philosophical studies on the New World conducted by the Europeans resulted in essays on a wide range of animal, plant species, minerals, native communities, climate, and geography. These studies are now important primary sources to those who dedicate themselves to studying the historical processes of how societies, politics and economy have been transformed, through theoretical and methodological perspectives of both colonial studies and the History of Sciences. These essays contributed to the building of knowledge about the natural environment in all its complexity, not only in the Old Continent but in the New World too. The systematic identification and cataloguing of fauna and flora done by agents in the 18th century produced material so that Natural Philosophy could develop extensively, while at the same time helped the mainlands strengthen their control over the colonies[1].

The 18th century was characterised by the increased interest of States in Nature and all matters related thereto, which helped the production and circulation of studies about the Natural World. This new interest in Nature, guided by the paradigms of the Enlightenment, enhanced by the wide circulation of texts and the creation of various dissemination institutions, such as science academies, botanical gardens, periodicals and private collections, also enabled the emergence of Natural History Offices.

[1] KANTOR, 2012: 239-250; DOMINGUES, 2001: 823-838; DOMINGUES, 2006: 150-174; PATACA, 2006; CARVALHO, 1987.

Funded by Science and Natural Philosophy patrons and sponsors, noblemen or the wealthy bourgeoisie, these institutions promoted the publication of books, memoirs and catalogues of plant and exotic animal collections. One of the most striking consequences of this tremendous interest in natural studies was the idea, often spurred on by national governments, that systematic research was needed in the still unknown areas of the world, in the established colonies and those still developing. Everything could be observable, experimented, catalogued, described, classified, and, finally, analysed as regards its uses, whether related to Science or Economy. This is what, to a large extent, boosted scientific production throughout the 18th century.

Various European nations financed natural-philosophical projects. Travels such as those of the English captain James Cook (1728-1779)[2], famous for exploring the Pacific Ocean, the Frenchman Louis Antoine de Bougainville (1729-1811), the author of a treaty on navigation calculations who sailed around the world[3], the Spanish Alejandro Malaspina (1754-1809) who travelled across America, Asia and Oceania[4], or even the Philosophical Travels in Portuguese America idealised by the Italian naturalist Domenico Vandelli, carried out by Alexandre Rodrigues Ferreira (1756-1815)[5], show that although nations like England, France, Spain and Portugal played different roles in the scientific domain called Enlightenment, they nonetheless recognised the need for studies on the Natural World and its resources.

As an intellectual movement, Enlightenment was far from being the privilege of one specific nation. It built up its own unique features in different parts of Europe, such as Germany, England, Italy, France and Spain, and spread practically to the whole of Western Europe and the Americas. A wealth of information resulting from the research and observation of nature and found in treaties, memories, botanical gardens and museums, driven by the principles of a new rationality disseminated by the achievements of the Illuminist thought flowed across Europe and its colonies[6].

Far from being a homogeneous movement, the Enlightenment Age produced a great diversity of ideas and approaches to the most varied themes, and the core concepts formulated by the enlightened were applied differently in the different European and colonial territories. Partly because of this, the 18th century was marked by the broad dissemination of Natural Philosophy and of other fields of knowledge[7]. The circulation of ideas as a result of the abundant intellectual activity throughout the «Enlightenment Age» was done through published and printed books, rapid flow and far-reaching periodicals, and manuscripts[8]. We can, therefore, say that like in France and England, natural-philosophical studies in Portugal were also part of this process. The Portuguese men of letters also presented various avant-garde propositions, especially as regards Natural History[9], their works showing

[2] FISHER & JOHNSTON, 1979.
[3] DUNMORE, 2007.
[4] PEDRO, 2010.
[5] PATACA, 2006.
[6] FURTADO, 2012; CARVALHO, 1987.
[7] HANKINS, 2002.
[8] FURTADO, 2012.
[9] CARVALHO, 1987; PATACA, 2006.

the descriptions and classifications of nature in their colonies, for various purposes. Moreover, they also wrote critical studies and proposed ways for science in Portugal and in the Empire to become more and more prominent.

This becomes clear when we analyse, for example, the case of the so-called *estrangeirados* – the Portuguese elite who left the country to study or work abroad and search for new knowledge in universities scattered across Europe. In some cases, upon their return they were imbued with the Enlightenment reformist ideals for restructuring the bases of scientific thinking in all areas of knowledge. An essential part of the activity of these individuals was done by establishing extensive networks of communication[10]. The role of the so-called *estrangeirados* in the transformation of State policies on science and teaching in Portugal was quite relevant. Our analysis, however, has a penchant close to that of Júnia Ferreira Furtado[11], who has some reservations as to the leading role assigned almost exclusively to the said *estrangeirados*, as other individuals were also involved in these processes, many of whom from the many colonies. This is based on the understanding that if we look at the history of European intellectuals since the Middle Ages[12], studying in various leading universities in Europe was something that had always been done, representing mobility of men and ideas essential for fostering the production of knowledge, not only in Portugal but also across Europe.

In this sense, the Portuguese intellectuals who travelled to other countries and who had an active part in the public teaching and science policies need not be classified differently, as if they were part of a unique circle specific to Portugal. Nonetheless, we also feel it would not be appropriate to abandon the term *estrangeirado* and replace it with *emboabas ilustrados* [learned foreigners], as Furtado suggested in *Oráculos da Geografia Iluminista*[13]. The risk here is that we would fall into the same error we wished to avoid, as we would wrongly call a relatively heterogeneous group of individuals by a name that, albeit more comprehensive, may still leave out other agents. This is why we have chosen not to use any specific terminology when referring to such individuals.

Against this backdrop, some figures deserve recognition, for instance, the Count of Ericeira, Luís António Verney (1713-1792), and Martinho de Albuquerque, who, during their travels in Europe, came forward with some innovative suggestions for reforming education and science in Portugal. Another exemple was António Nunes Ribeiro Sanches (1699-1782), who left the country to study in Spain and Holland and, although he never came back, played a relevant role in the more advanced discussions about the teaching of Medicine and Botany in the Portuguese universities. Based on the Enlightenment ideas, these and other men wished to help Portugal recover from what they believed was an intellectual delay compared to other countries[14].

The Portuguese State was quite committed to reforming the theoretical-methodological basis of teaching at the University of Coimbra. Although reforms began throughout the 18th century, they

[10] CARNEIRO *et al.*, 2000: 591-619.
[11] FURTADO, 2012.
[12] GRANT, 2002.
[13] FURTADO, 2012.
[14] BOXER, 2011; DISNEY, 2011.

increased in depth and speed from the second half of the century. To encourage a further approximation to the pedagogical structures in Europe and to how they were organised in the rest of Europe, Natural Sciences gradually gained more ground, especially with the work of Domingos Vandelli and his team, in both Portugal and the colonies. Besides being concerned with the recognition of the natural environment of Portugal within Europe, the research conducted in the colonies driven by the organised search for and exploration of resources promoted Portugal as a member of a network that contributed to the studies of Natural History[15] in a global context. To some degree, the lack of knowledge about Portugal's production activity may be the reason why the country was considered to be sitting on the sidelines in a transforming context of knowledge and in the implementation of the Enlightenment principles.

In short, despite the peculiarities regarding the problems and troubles experienced by Sciences in Portugal, amidst reforms, persecutions, political upheavals and distrust on the part of the main supporters of the *Ancien Regime*, the natural-philosophical production in that period was remarkable[16]. This works must be analysed as the essential basis for understanding any transformation processes of scientific knowledge in Portugal and in the colonies.

Against this complex background, a concerted effort mainly under the auspices of the State took place throughout the 18th century to promote the renewal of basic knowledge in both the kingdom and in the colonies. The period from 1750 on in Portugal, which Charles Boxer termed «Pombaline Dictatorship»[17], was extremely important for the country and its colonies. In our opinion, this period brought about some of the key policies on the implementation and reform of the educational and political bases of the kingdom, directly related to the Royal Court's interest in learning about the economic resources of its colonies. A considerable part of this effort was steered to the production of maps, to increasing the knowledge of the territory in order to strengthen the Portuguese ambitions in America, in terms of both strategy and diplomacy, in particular in relation to the territorial disputes with Spain[18].

Another aspect that caught the attention of several historians that have addressed the extent of the impact of the Enlightenment ideas in Portugal was the reform of university education and the State incentives given to sciences. Sebastião José de Carvalho e Melo (1699-1782), the Marquis of Pombal, directed part of his policies to the reform of Portuguese universities, especially its most important – and only one from 1759 on –, the University of Coimbra. Reforms in Coimbra began in 1772 with the hiring of qualified staff and changes in the curricula of various courses.

Much of the reform process also involved removing those at the helm of the university as a direct consequence of the broader process of expelling the Jesuits from the Portuguese territory. The University of Coimbra, steered by the brothers of the Society of Jesus, traditionally offered only courses in Medicine, Laws and Theology[19]. Changing the running of the institution by completely excluding the Jesuits furthered the direct subordination of the university to State interests, which in

[15] PATACA, 2006.
[16] DOMINGUES, 2001: 823-838; DOMINGUES, 2006: 150-174.
[17] BOXER, 2011.
[18] KANTOR, 2012; DISNEY, 2011.
[19] KANTOR, 2012; DISNEY, 2011.

the second half of the 18th century were opened, albeit selectively, to the various ideas circulating across Europe driven by the Enlightenment thinking[20]. The thrust of the reform was followed by the restructure of the organisation and education. A clear example of this was the faculties of Philosophy, Mathematics, and Medicine, which now offered subjects as diverse as Natural History, Physics, Chemistry, Geometry, and even the start of a Botanical garden, whilst at the same time it focused more and more on the training of naturalists[21].

Under the reforms of the university, Pombal kept contact with some of the ideas shares by Portuguese and foreign intellectuals all over Europe, such as António Nunes Ribeiro Sanches, Luís António Verney, José Monteiro da Rocha and Domingos Vandelli, even if he did not adopt them entirely[22]. In this sense, by championing the university reform process the Royal Court actively participated in the cultural and scientific renewal, with the help of funding and incentives for travels and expeditions, which resulted in attempts to reformulate and take stock of the knowledge there was of the Natural World in Portugal and in the colonies. In connection thereof, we note the travels promoted by the Portuguese Court, in particular from the reign of King D. José I (1750-1777) and Queen D. Maria I (1777-1816) onwards, known as «Philosophical Travels»[23] which, as we hope to demonstrate further ahead in this study, were a considerable part of the efforts made to produce knowledge about the Natural World in the Portuguese possessions.

The policies for encouraging philosophical investigations advanced and heightened in the aftermath of Pombal's ministry, during the reign of Queen D. Maria I. Greater projects were dedicated to the organisation of philosophical expeditions funded by the Court and coordinated by the University of Coimbra and Vandelli and his team[24]. The involvement of various sectors of society was encouraged, by coordinating the work of mathematicians, astronomers, physicians, surgeons, clergymen, Royal Court officials, engineering and naturalists, some even from other parts of Europe. This group of people also included some that had no specific academic training in these fields of knowledge, but who somehow learned of the instructions to gather information about the natural environment formulated by the reformed University, and later by the Lisbon Academy of Sciences[25].

Based on the relevance given by the various historians we have mentioned before to all these issues, we realise that the recognition of the general aspects of the transformation processes that aimed for the reorganisation of the exploration means and the survey of the colonial territories are the ideal starting point to the objectives of this thesis. This is the background against which the various information collection works must be analysed, which aimed at various purposes related with a myriad of issues, in particular of an economic and political nature[26]. From the 1760s on, and even more so during the reign of Queen D. Maria I, it was clear that the works were without any doubt influ-

[20] PATACA, 2006; BRIGOLA, 2003; DOMINGUES, 2001: 823-838; DOMINGUES, 2006: 150-174.
[21] PATACA, 2006; BRIGOLA, 2003; DOMINGUES, 2001: 823-838; DOMINGUES, 2006: 150-174.
[22] PATACA, 2006.
[23] PATACA, 2006; BRIGOLA, 2003; DOMINGUES, 2001: 823-838; DOMINGUES, 2006: 150-174; KURY, 2015: 243-277.
[24] BRIGOLA, 2003.
[25] BRIGOLA, 2003.
[26] DOMINGUES, 2001: 823-838; PATACA, 2006.

enced by the specific knowledge that emerged from the Enlightenment intellectual enthusiasm. Even if the initial aim was simply to survey the resources of the territory, we can nevertheless note that the observation of the Natural World in Brazil and the cataloguing, description and classification works were influenced by the enlightened thought that then permeated the intellectual realms in both Europe and in the colonies[27].

The 18th century was clearly a period of effervescence in the various fields of knowledge. The circulation of knowledge often involved the exchange of information through the networks of contacts created between philosophers from various areas of knowledge[28] and scattered throughout the whole Empire. The social and economic transformations that occurred in Europe at the same time as the scientific revolution promoted the emergence of a market for knowledge and brought a new momentum to the knowledge production process[29]. Many works that later became beacons of the construction of scientific thinking during this period focused on the understanding of the political, social and cultural aspects of Enlightenment, from the time it took to mature, during the Early Modern Age, to its consolidation as a set of ideas and practices corresponding to the various spheres of human action[30].

KNOWLEDGE IS POWER: THE CASE OF RIBEIRO SANCHES

It is a well-established fact that a significant number of agents works and scientific knowledge circulated across the Portuguese Empire throughout the 18th century. However, we need to understand how all these elements, together, were able to circulate and promote the complex production of natural-philosophical knowledge about the colonies, something quite beyond the studies carried out under the Philosophical Travels organised by Vandelli. Another issue in connection with knowledge production in the 18th century is the question of how Science produced in the Portuguese Empire is situated within the European contexts, regarded as models of the development of scientific thinking throughout the Enlightenment Age.

Based on the analysis of the diversified circulation of people and ideas, we note that the natural-philosophical studies carried out on Brazil, especially in the second half of the 18th century, have some peculiarities and consist of a complex network of producers and works, where applying a unique knowledge production model is unsuitable.

Having the circulation of knowledge and of individuals as the starting point, and assuming, as Francis Bacon said, that «knowledge is power» and that it is a means to overpower nature[31], and knowing that power games influenced the production of knowledge we can look into some case studies that reveal the types of works and agents during that period. To do so, we need to see how the discussions on

[27] PRESTES, 2000; DOMINGUES, 2001: 823-838; PATACA & PINHEIRO, 2005; KURY, 2015; KURY, 2008.
[28] DARNTON, 1979.
[29] DARNTON, 1979.
[30] DUPRÉ, 2004.
[31] BACON, 1992.

the policies for the promotion and implementation of new science development models in Portugal and in its Empire permeated the ideals of intellectuals, and how their ideas circulated and were validated.

Since the early 18th century, during the reign of King D. João V, the number of agents, books, ideas and correspondence in circulation in both Portugal and in northern European countries or colonies increased[32]. The Portuguese Empire was connected by sea routes[33] used for trading purposes and for circulating texts, whether letters, official documents, cash from trade, sermons or scientific texts.

In the first half of the 18th century, much of the scientific thinking circulated through the exchange of correspondence between diplomats, Royal Court officials and intellectuals[34]. These letters addressed several topics and, through them, scientific knowledge circulated and was validated. This situation did not change as we move on to the second half of the 18th century; quite the contrary, it increased. The number of written works from mid-century on political, economic and scientific issues in connection with the search for the natural resources of the colonies, especially Brazil, is unquestionably greater. The interest of the Portuguese State in expanding its knowledge about the colonies increased due to political, economic and academic reasons. This interest resulted in a significant increase in the number of agents, in the colonies or other territories, who sought to write specifically about the geography, the native populations, or to the natural environment of the colonies and suggest the mechanisms they believed should be used by the Royal Court to enhance knowledge and the use of natural resources for commerce and science. Many of such agents in or outside the colonies addressed this topic and produced a large number of documents in connection thereto, most of which are hand-written and can be analysed with the purpose of understanding the processes of learning about and using these natural resources.

This greater movement of intellectuals during the reign of King D. João V in turn spurred the rejuvenation of the Portuguese intellectual class, thus forming a republic of Letters. Some changes begun in this process, allowing for a greater intellectual openness, either with the circulation of individuals, books, ideas, and correspondence, or with the creation of spaces dedicated to scientific production, such as the Royal Academy of Portuguese History[35]. Júnia Ferreira Furtado discussed this process extensively based on the work, writings and diplomatic career of D. Luís da Cunha (1662-1749). A man of letters and trusted by the King, he overcame the boundaries of his diplomatic careers by playing a key role in the circulation of knowledge between Portugal and Northern Europe countries. One of his main duties was to select and purchase the latest books published and to send them to Portugal so that they could be added to the royal library. Some of those books were actually included in the black list of books prohibited by the Inquisition[36].

This is one of the many examples of Portuguese intellectuals that, in the first half of the 18th century, left the kingdom to travel across Europe. We could list many more agents who took the «grand

[32] FURTADO, 2012.
[33] ALENCASTRO, 2010: 115-144.
[34] FURTADO, 2012.
[35] FURTADO, 2012.
[36] FURTADO, 2012.

tour» across the main education institutions in Europe and picked up the most modern scientific thoughts on the Portuguese political and scientific situation. In fact, the circulation of agents across scientific institutions had been taking place since the Middle Ages[37] and intensified as the natural course of science education and production in Europe. Another emblematic example of such Portuguese agents taking the «grand tour» was António Nunes Ribeiro Sanches (1699-1783).

Ribeiro Sanches was born in 1699 in Penamacor, a town in central Portugal. As he was a new-Christian, he left the country at a young age and never returned. He first enrolled at the University of Coimbra in the early 18th century and then transferred to the University of Salamanca in Spain, where he received his Doctorate in Medicine in 1724. His life and work were studied extensively by the renowned Portuguese historian Maximiano Lemos[38] and is still studied today due to the impact that his thoughts and works had on some of the main reforms implemented in education and health, especially from the second half of the 18th century. His travels to the major intellectual centres of Europe and the influences he took in from those centres are clearly visible in his works and influenced the scientific and educational policies in Portugal. While in Europe, the Portuguese physician travelled to Genoa, Montpellier, Bordeaux and London, where he came into contact with local intellectuals, learned about new scientific trends, and practiced Medicine. He then left for Holland where he mingled and studied with the famous physician Hermann Boerhaave. Later, in 1731, Boerhaave himself advised Ribeiro Sanches to travel to Russia as an army physician, earning him fame and reputation and leading him to be appointed as the personal physician of the tsarina Ana Ivanovna. In 1739 he was appointed member of the St Petersburg Academy of Sciences and in the same year he was appointed member of the Paris Academy of Sciences[39]. His name figures in the membership roll of the Lisbon Academy of Sciences as of 22-05-1780.

As he was involved in State conspiracies, Ribeiro Sanches left St Petersburg for Paris (where he lived until he died in 1783). Here, he established significant relations with the French intellectuals, absorbing the Enlightenment thoughts and actively participating in shaping a new scientific environment in Portugal. Ribeiro Sanches wrote an enormous amount of texts in this period and his intellectual fame became even more prominent. His main works deal with topics connected with Medicine, Education and Natural History[40].

Ribeiro Sanches had an influential network of contacts and used it to express his thoughts and works. According to Júnia Ferreira Furtado, this network included D. Luís da Cunha (1662-1749), Denis Diderot (1713-1784), Buffon (1707-1788), Leonhard Paul Euler (1707-1783), Herman Boerhaave (1668-1738), D'Alembert (1717-1783), Sebastião José de Carvalho e Melo (1699-1782), Joseph-Nicolas

[37] GRANT, 2002.
[38] LEMOS, 1911.
[39] FURTADO, 2012; LEMOS, 1911.
[40] While in Portugal, Ribeiro Sanches wrote, in 1726, the *Discurso Sobre as Águas de Penha Garcia*. At the invitation of Diderot, he wrote the entry on venereal diseases for *Encyclopedie*. In the following years, the Portuguese doctor published his main works on the Portuguese political and scientific environment: *Tratado da Conservação da Saúde dos Povos*, 1756; *Cartas sobre a Educação da Mocidade* (Being one of the most important and influential for the period), 1760; *Método para Aprender e Estudar a Medicina*, 1763. And finally, in 1779, he wrote *Mémoire sur les Bains de Vapeur en Russie* (FURTADO, 2012; LEMOS, 1911; BOTO, 1998).

Delisle (1688-1768), Étienne-Maurice Falconet (1716-1791), *inter alia*, such as his nephew, physician José Henriques Ferreira.

As soon as he arrived in Paris, Ribeiro Sanches established an important contact with D. Luís da Cunha. Both the diplomat and the physician agreed on several ideas and thus a partnership was formed. The text written in 1730 by D. Luís da Cunha in collaboration with Ribeiro de Sanches, entitled *Método com que se deve estudar e ensinar a filosofia e medicina moderna* (On how to study and teach philosophy and modern medicine) shows precisely how their ideas converged. According to Júnia Ferreira Furtado, this text by D. Luís da Cunha shows some of the measures that were later implemented by the Marquis of Pombal in his reform works (1750-1777)[41].

Even though he never returned to Portugal, Ribeiro Sanches was a prominent figure in the establishment of many scientific and educational policies implemented in Portugal throughout the 18th century. Due to his connections with central figures of the Portuguese State, such as D. Luís da Cunha and the Marquis of Pombal, his ideas (even if not in their entirety) were incorporated in the Pombaline reforms. Ribeiro Sanches participated actively in the construction of the political and scientific bases for the reorganisation reform of the University of Coimbra, in particular in the development and reform of medical and educational thinking[42]. He strongly defended that the Portuguese Royal Court should increase the incentives so that the intellectuals could travel across Europe[43]. His ideas, works and critique were plentiful and circulated across and outside the Empire. His vast and varied works have for long been studied and analysed by historiography and includes studies, texts and letters[44] exchanged between his fellow workers and individuals connected to the State. Whether Ribeiro Sanches's ideas put into writing were published or not, or read or not, the fact is that he discussed many aspects of scientific knowledge production in his time and his works circulated among his extensive network of contacts. Therefore, we do know that the Portuguese physician wrote some pages, at different moments in time, about the colonies and their natural resources, and the use thereof by the Royal Court. This is where our interest comes into play.

The texts known to have addressed this topic are: *Discurso sobre as Colónias, sobre a América portuguesa e sobre a Agricultura*, of 1763; *Considerações sobre o governo do Brasil desde o seu estabelecimento até o presente tempo*, of 1777; *Sobre as lavouras e fábricas de tabaco do Brasil*, of 1778; and *Dos efeitos do descobrimento da América e conquistas, e se as colónias devem ser regidas pelas mesmas leis que o centro do Reino de que dependem*[45], the date of which is unknown[46]. In addition to these specific texts, Ribeiro Sanches also mentioned the situation of the colonies and their organised exploitation so that the natural

[41] FURTADO, 2012: 142.
[42] FURTADO, 2012; LEMOS, 1911; BOTO, 1998.
[43] FURTADO, 2012.
[44] The contents of his letters varied greatly. However, as part of the reform policies implemented by the Marquis of Pombal concerned the colonies and natural-philosophical studies in the colonies, some of these letters should have also dealt with this subject. After all, throughout that period the intellectuals, whether in Portugal or overseas, were concerned with the situation in the colonies and with the recognition of the countries' resources and, of course, also concerned with the recognition and establishment of borders (FURTADO, 2012; PATACA, 2006; BRIGOLA, 2003).
[45] While most of these texts have been microfilmed and are available for consultation at the National Library of Portugal, others are already published, and a large majority were listed and analysed by Maximiano Lemos.
[46] LEMOS, 1911.

resources could be properly used for Medicine and commerce, as we can see in the work *Cartas sobre a Educação da Mocidade*, of 1760, and in *Método para Aprender e Estudar a Medicina*, of 1763.

From among all these works written by Ribeiro Sanches, some of which focus on the colonies, their nature, natural resources useful for commerce, Medicine and Natural History, we find a unique manuscript on Brazil dating back to 1763: *Apontamentos para descobrir na America portuguesa aquellas produções naturaes que podem enriquecer a Medicina e o Comercio. Paris 2 de Outubro de 1763*[47].

ON THE POLICIES TO ENCOURAGE THE STUDY OF NATURAL RESOURCES IN THE COLONIES

The political-scientific scenario in Portugal in that period was totally directed to the construction of bases that could organise Science in the country according to the Enlightenment thought. The literate class criticised the Royal Court and suggested solutions for the country's intellectual enrichment. The manuscript by Ribeiro Sanches, divided into four parts, contains this vision: *Introdução; Alguns meios para descobrir as produçoens do Brazil e para virem no conhecimento dos Medicos e dos Mercadores Portuguezes; Instruções e qualidades dos que havião de indagar as produçõens das terras de Ultramar;* and *Obrigação destes Botanicos na indagação da História Natural das Conquistas e Colonias Portuguezas*.

The text sets out a few aspects adopted by the Marquis of Pombal in his reforms, not only of the university, but also of the State policies, for example, the fostering of research and introduction of crops, and the study of the colony's native plants that could be used in Medicine.

As he states in his introduction:

> *If the basis of Portuguese America had been rooted in universal agriculture and commerce, today we would have plenty of information about its crops that we totally ignore. It seems that this has not been looked into other than for overpowering the masses and removing the gold from its mines, overlooking the fact that agriculture also brings plenty of wealth*[48].

In this context, and according to Ermelinda Pataca[49], one of the instructions given by Vandelli as the coordinator of the Philosophical Travels at the post-reform University of Coimbra was that the naturalists should study the chemical composition of soils suitable for plant cultivation. This was a clearly to encourage agriculture in the colonies. The author also cited Ribeiro Sanches and showed the physician's concern in relation to this in his 1763 work, *Método para Aprender e Estudar a Medicina*. Pataca emphasised the criticism made by Ribeiro Sanches regarding the policies on the encouragement of closer relations between the mainland and its overseas colonies. Ribeiro Sanches had already suggested in *Método para Aprender e Estudar a Medicina* that the Royal Court should direct energies to

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[47] BNP – *Secção dos Reservados*, COD. 6941//4. *Apontamentos Para Descobrir na America Portugueza Aquellas Producçoens Naturaes Que Podem Enriquecer a Medecina, e o Commercio* [Manuscrito]. Paris: [s.n.], 1763. Disponível em <http://purl.pt/27752>. [Consulta realizada em 04/2016]; CONCEIÇÃO, 2017a.

[48] BNP – *Secção dos Reservados*, COD. 6941//4… p. 4.

[49] PATACA, 2006: 30-32.

the survey of natural resources in the colony that could be used not only in agriculture and commerce, but also in Medicine[50], an argument he reinforced in the 1763 manuscript.

This criticism towards to the Royal Court made by agents such as Ribeiro Sanches and by others known as the *estrangeirados* was essential to a significant part of recent historiography that studied this topic, giving rise to the idea that Portugal lagged behind in terms of intellectual knowledge. Now, this criticism needs to be filtered as these agents were in a specific context and used their texts to call the attention to their work and ideas, in an attempt to validate the knowledge they were producing. As we will see in the following chapters, the number of works and the quality of scientific production in the second half of the 18th century are no proof of the intellectual delay, or even of the studies on the natural resources of the colony. It may even be true that natural resources in the colonies were not properly used, but this does not confirm the idea that society was lagging behind in terms of science either in the mainland or in the colony.

We know that other letters besides this manuscript were exchanged between Ribeiro Sanches and Sebastião José de Carvalho e Melo. In Júnia Ferreira Furtado's opinion, the contents of these letters are somewhat unknown[51]. Yet, it is quite noteworthy that although the Marquis of Pombal contacted Ribeiro Sanches during his Pombaline reforms, he did not adopt all the suggestions made by the physician. The manuscript by Ribeiro Sanches dated 1763 reveals many of the ideas adopted by the Portuguese Royal Court in connection with teaching and research on the natural resources of the colonies, disclosing also some bits and pieces of information that may have been exchanged in other letters between these two men.

In this regard, Ribeiro Sanches not only presented what he believed should be the right approach of the Royal Court to the colonies, but also categorically criticised the University of Coimbra and the teaching of Medicine:

> *The money spent by the University of Coimbra on thirty Medicine students each one 40 years of age could be better spent by the State on the education of the students that I propose, rather than on those physicians whom the Royal service does not need today*[52].

Elsewhere in the same letter, Ribeiro Sanches spoke of the benefits of knowing the land, the possible crops that it could produce and stated that the King alone could not be able to research, know and work on this issue; he would need a group of professionals with specific expertise to do the job:

> *Even though a King may be driven by a creative spirit, always imitating the Omnibenevolence of God Almighty who created Man in his image, he will not be able to see everything, examine everything, and order everything all by himself. The King needs geographers, land measurers, men knowledgeable in Natural History, in Chemistry, in Metalworks so that they may give their findings to the Archives of the State Economic Court, and decide on their final destination. If such a Court were to exist in the Kingdom, if the income it*

[50] BNP – *Secção dos Reservados*, COD. 6941//4…; PATACA, 2006.
[51] FURTADO, 2012.
[52] BNP – *Secção dos Reservados*, COD. 6941//4… p. 6 – verso.

had or could have come solely from the work and industry, then the studies of the King's very extensive possessions overseas would only skim the surface[53].

In Ribeiro Sanches's opinion, studies should be conducted on the natural environment the colonies in order to find out what could be extracted and cultivated. Besides being a question of strategy, territorial delimitation, commerce and control, knowing more about the natural environment of Brazil would be a way of obtaining the largest amount possible of knowledge, in particular on Natural Philosophy and Medicine.

As a whole, Sanches's text talks about the benefits of Natural History knowledge for the economy, agriculture and science. So, based on the analysis of other countries like England, Holland and Spain, he gave examples of how these countries increased their trade and science through the natural-philosophical studies about their colonies:

I realise I lack the strength, expertise and news about that continent to achieve everything I have thought about on this topic. These difficulties have made me write separate treaties on everything I have about America. To try my strength, in this first treaty I wanted to learn how we should search for medicines, spices and other products to increase the mechanical arts, which are already known to the Castilians, English, and Dutch, in their possessions in America and in East India, and in Africa. And also how we could discover other products hitherto unknown in Medicine and in Commerce[54].

This same argument was also used by Domingos Vandelli in a letter sent to the Marquis of Angeja[55] a few years later, in 1777, where he applauded the success of the philosophical expeditions carried out by other countries, and how they valued the natural-philosophical studies of their overseas possessions:

Other nations have acknowledged this usefulness by sending, on these and other occasions, mathematicians and intelligent naturalists. This is what the tsarina of Moscow, the French, the English and the Danes have done. They know how to take full advantage of what natural sciences are able to produce[56].

This concern in comparing what other European countries were achieving permeated much of the discussions and philosophical thinking in the Portuguese political and scientific society throughout the 18th century. This concerning grew, especially in the second half of the century, when initiatives to implement a methodical research of the natural resources in the colonies intensified, on the basis of the idea of an organised exploitation of these resources, based on philosophical studies. From a methodological viewpoint, Ribeiro Sanches, and other agents such as Vandelli, used this argument in their discourses.

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[53] BNP – *Secção dos Reservados*, COD. 6941//4…
[54] BNP – *Secção dos Reservados*, COD. 6941//4… p. 1.
[55] VANDELLI, Domenico – *Carta de Vandelli ao marquês de Angeja*. In CAMARGO-MORO, Fernanda de; KURY, Lorelai – *O Gabinete de Curiosidade de Domenico Vandelli*. Rio de Janeiro: Editora Dantes, 2008.
[56] VANDELLI, Domenico – *Carta de Vandelli ao marquês de Angeja*…

In the sub-chapters of Ribeiro Sanches's manuscript – *Alguns meios para descobrir as produções do Brasil e para virem no conhecimento dos Médicos e dos Mercadores Portugueses*[57] and *Obrigação destes Botânicos na indagação da História Natural das Conquistas e colônias Portuguesas*[58], the author continues to criticise the Portuguese State regarding the knowledge of Natural History in the colonies and then use of these resources for Medicine and commerce. For him, natural sciences and the teaching and practice of Medicine should converge, adding that Botany was necessary to understand the natural resources of the colonies, and that physicians would be instructed on the uses and applications of plants and minerals in Medicine.

Following his arguments so that the Portuguese State could have a better economic and scientific use of its colonies, especially Brazil, Sanches spoke about the importance of university education and the reform he had proposed for the University of Coimbra. As to achieve so, he highlighted that the Portuguese intellectuals should have the opportunity of visiting the north of Europe, and showing that the circulation of agents was of the utmost importance for knowledge building:

> *While it is clear that the State needs to know about the products of its possessions and to make the best use thereof, no-one will doubt that learned men are required for this, and that this ie necessary for the State's economy. The State should find these learned men and hire them to conduct the research we propose herein. It should send five or six students of Medicine between the ages of eighteen and twenty, talented and resourceful, healthy and strong, capable of body work (the work of a pharmacist and naturalist, or as we say, herb collector, means walking across mountains and hills and being exposed to the elements and many dangers) and willing to learn Botany and Natural History, first and foremost, and, secondly, practical Astronomy needed for drawing geographical maps, taking note of heights, marking longitudes, all of which is required in the exercise of Natural History in the unknown, or at least little known, climates and lands*[59].

As this text was written in 1763, at a time when the State polices marked by the ideals of the Marquis of Pombal were being implemented, mainly those on educational reforms, we realise that Ribeiro Sanches's discussions, critique and notes on the possible measures that should be taken with a view to increasing the knowledge of the Natural World of Brazil fit perfectly well into the context of the period, and were in line with the ideas of other intellectuals, such as Luís António Verney (1713-1792), João Jacinto de Magalhães (1722-1790), Teodoro de Almeida (1722-1804), Manuel do Cenáculo (1724-1814) and José Monteiro da Rocha (1734-1819)[60].

Indeed, throughout the entire second half of the 18th century the various documents written by a large number of agents contain criticisms very similar to those of Ribeiro Sanches (1763). For example, years later, Manoel Joaquim de Souza Ferraz[61] wrote a book on Botany in 1792, in which he outlined

[57] BNP – *Secção dos Reservados*, COD. 6941//4… p. 4 – verso.
[58] BNP – *Secção dos Reservados*, COD. 6941//4… p. 7 – verso.
[59] BNP – *Secção dos Reservados*, COD. 6941//4… p. 6 – verso.
[60] CARNEIRO *et al.*, 2000: 591-619.
[61] Correspondent member of the Lisbon Royal Academy of Science, he practiced Medicine in Porto for four years before returning to Brazil in 1795. He worked in Minas Gerais during the vice-royalty of the Count of Resende, and later went to Rio de Janeiro. He was a Brazilian trained in Medicine in Montpellier, and correspondent of the Lisbon Academy of Sciences.

his criticism and spoke about the need of the Portuguese State to know more about its natural resources in Brazil.

According to Ferraz:

> *if the many strengths match my ardent desire that the love of this science inspires and propagates among the Portuguese youth, that is, the first to facilitate its path and the means of instruction; it is, however, a mammoth task and can only be done by a powerful force like the State; only the State can encourage progress in Botany, rewarding those who put their minds to it and excel: by giving then the necessary means for them to travel and make discoveries that will be useful for the whole society* […] *Everything there is unknown and glory belongs to Portugal for finding it; so when will the country engage in this important operation, on which all the learned men of Europe are impatiently waiting for? Can you imagine how natural history and medicine would benefit from this?*[62]

It is clear that even with a 20-year difference between the texts by Ribeiro Sanches and Ferraz, the concerns in the ideals of Portuguese intellectual remained practically the same. The political-scientific situation of Portugal and its colonies and the changes begun in 1750 and ended with the policies implemented by Queen D. Maria I drove the Portuguese intellectuals into writing on topics related with science and the recognition of the natural resources of its colonies. This situation lasted until the early 19th century. The policies to encourage the production of knowledge and the criticism made by the Portuguese intellectuals, at home or abroad, must be used as a guideline to understand the concerns and urgent needs, the latter in connection with science, but not as a bulwark to define the degree of quality of science in those times.

In addition to all these aspects relating to the discourse of Ribeiro Sanches on the need to implement sharper policies on the natural-philosophical studies in Brazil, we can suggest other avenues of analysis not only of the manuscript itself, but lf a complex circulation network of agents and knowledge that embodied the writings and ideas of Ribeiro Sanches about Brazil and its natural resources. All these may serve as an example to contextualise that period, which, in our opinion, was marked by the intense circulation of knowledge, to a great extent based on the relation between science and power.

CIRCULATION OF KNOWLEDGE IN ANTÓNIO NUNES RIBEIRO SANCHES'S MANUSCRIPT

To understand the knowledge circulation processes through Ribeiro Sanches's 1763 manuscript, we need to contextualise the document. To that end, we will base our reasoning on some Portuguese intellectuals from the early and late 20th century who studied the life and work of Ribeiro Sanches. First, we note that the Ribeiro Sanches exchanged many letters with other interlocutors. We also realise that the hierarchical relations underlying the circulation of knowledge were based on connections between science and power.

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[62] ACL – *Série Azul de Manuscritos*, COD 375. FERRAZ, Manoel Joaquim de Souza – *Memoria sobre a Botanica, e as vantagens, que della rezultão para a praxe Medica, prezentada á Academia real das sciencias de Lisboa*. Lisboa: [s.n.], 1792.

Maximiano Lemos (1860-1923)[63], for example, stated that Ribeiro Sanches had written and sent to D. Vicente de Sousa Coutinho (1726-1792)[64] in 1763, 25 handwritten pages on the colonies[65]. Another individual who also wrote about Ribeiro Sanches was Victor de Sá (1921-2004)[66], stating that there was a text dating back to 1763 entitled *Discursos sobre as colônias, sobre a América portuguesa e sobre a agricultura*[67]. We can also add to this list Innocêncio Francisco da Silva (1810-1876)[68], who also referred to a manuscript on Brazil dating back to 1763 written by Ribeiro Sanches and addressed to the Marquis of Pombal. In view of this, we can say that Ribeiro Sanches wrote not one but at least two texts on the same topic and sent to different agents in different territories, both of which held trustworthy positions in the Portuguese State. The contents of the manuscripts make the objective of Ribeiro Sanches quite clear: being a political-scientific document, he intended to discuss the State policies on the recognition and exploitation of natural resources in the colonies[69].

In this works prior to this 1763 manuscript, the Portuguese physician discussed the issue of Natural History for the Portuguese kingdom, and the importance of teaching Botany in medical schools. His texts already showed his criticism and suggestions in this relation, but they did not directly concern the Brazilian territory[70].

Throughout the 18th century, knowledge production agents disseminated their ideas and exchanged letters among a large number of individuals that formed a complex network of contacts[71]. This phenomenon, which basically involved handwritten documents, took place across the Portuguese Empire. Ribeiro Sanches, who was an active agent, wrote much and had an extensive network of contacts. We can say that, for him, it was clear that if he were to write to D. Vicente de Sousa Coutinho and the Marquis of Pombal, his ideas would be more easily accepted and adopted by the scientific community, thus validating his work. This is a stage on which power games were part of the royal court society, in which the social and hierarchical standing of whoever wished to expose their ideas, or the interpersonal and political relations were essential if their work were to be accepted, recognised and validated[72].

Ribeiro Sanches's network of contacts reached beyond the borders of France and Portugal and reached Brazil, through another letter he authored and sent to his nephew who lived in Brazil –

[63] Doctor and teacher of History of Medicine at the University of Porto.
[64] D. Vicente de Sousa Coutinho was an influential Portuguese ambassador in Paris.
[65] LEMOS, 1911.
[66] History teacher at the University of Porto.
[67] SÁ, 1980: 146.
[68] Important bibliographer, member of the Lisbon Academy of Sciences, and author of the *Diccionario Bibliographico Portuguez* – a seminal work sometimes referred to as *Dicionário de Inocêncio*, it consists of 23 volumes. The purpose of the *Diccionario* was to continue the *Bibliotheca Lusitana* (written by Diogo Barbosa Machado and published between 1741 and 1758). The idea was to catalogue and systematise the works, texts, and letters written by Portuguese authors (SILVA, 1867).
[69] CONCEIÇÃO, 2017a.
[70] CARVALHO, 1987: 30-35.
[71] FURTADO, 2012.
[72] BIAGIOLI, 2003.

doctor José Henriques Ferreira[73]. This letter written in 1788 contains arguments similar to those found in the 1763 manuscript.

This letter was transcribed and disclosed to the public by José Henriques Ferreira himself in his work on Cochineal in 1788. He stated that:

> *he also wrote some chapters of a letter written from Paris by Doctor Antonio Ribeiro Sanches to me, in reply to another letter in which I informed him of the 8th year of the Academy; that he had sought to determine some matters and products of this country*[74].

In this work, besides discussing specific issues on the cultivation, use and trade of Cochineal, the nephew of Ribeiro Sanches criticised the situation of the research on the natural resources of Brazil, the transposition and planting of species that could be useful for agriculture, and transcribed a long excerpt of the letter sent by his uncle, where Ribeiro Sanches once again criticised and gave his ideas so that the Royal Court could recognise and use the natural resources of its colony[75].

Henriques Ferreira transcribed part of the letter he received from his uncle, who complained about the lack of druggists and the need for natural products relevant to Medicine to be better organised. He said that:

> *There is no Royal druggist in Lisbon as I proposed, with a hired assistant to look for these natural products, and to send them with their description and what they are used for and how the natives use them: the correspondent is ordered to question the natives about the medicines they use to heal their complaints, fissures, fractures, syphilis, cancers. Without these advancements and expenses there will never be science, or arts, or commerce, or civil State*[76].

Note the transfer of discourse and the circulation of knowledge between Sanches and his nephew, further enhancing the idea that the knowledge produced, whether in Europe or in the colonies, was not limited to a few agents. The arguments presented by Ribeiro Sanches were disseminated to at least three different people – D. Vicente de Sousa Coutinho, the Marquis of Pombal, and José Henriques Ferreira. Moreover, perhaps D. Luís da Cunha also had access to the writings of Ribeiro Sanches on the natural resources of Brazil. After all, both the physician and the ambassador were close and kept an active relationship.

In this period, the complex networks of contacts and exchange of correspondence and works between agents gave rise to an extensive amount of scientific and critical texts about the Natural His-

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[73] José Henriques Ferreira was a prominent intellectual in Brazil. He was the doctor of the Viceroy, the Marquis of Lavradio. He was also a doctor at the Royal Hospital and actively participated in the foundation of the Scientific Academy or the Academy of Medicine and Natural History of Rio de Janeiro in 1772 (MARQUES, 2005).

[74] ACL – *Série Azul de Manuscritos*, COD 375 (30). FERREIRA, José Henriques – *Historia do Descobrimento da Coxonilha no Brazil da sua natureza geração, creação, colheita, e utilidades*. Publicado no «Patriota», vol. III, p. 3-13, conforme indicado por Innocêncio (Tomo IV, p. 367).

[75] ACL – *Série Azul de Manuscritos*, COD 375 (30)…

[76] ACL – *Série Azul de Manuscritos*, COD 375 (30)… p. 342.

tory of Brazil, which circulated beyond the borders between the mainland and the colony. For example, Ribeiro Sanches, who had never returned to Portugal and had never been to Brazil, mentioned in his 1763 text, repeating it in the letter sent to his nephew, a few natural products, their properties and means of production, such as *Quina*, *Ipecacuanha* and *óleo de Copaíba*[77]. He learned of this from other works written by other agents, which shows that knowledge of the natural environment of Brazil was broadly transmitted during the 18th century, especially in the second half of the century.

The figure below shows, through the analysis of the connections between Ribeiro Sanches and the agents involved in the exchange of correspondence on the natural resources of Brazil, how knowledge circulated based on their network of contacts.

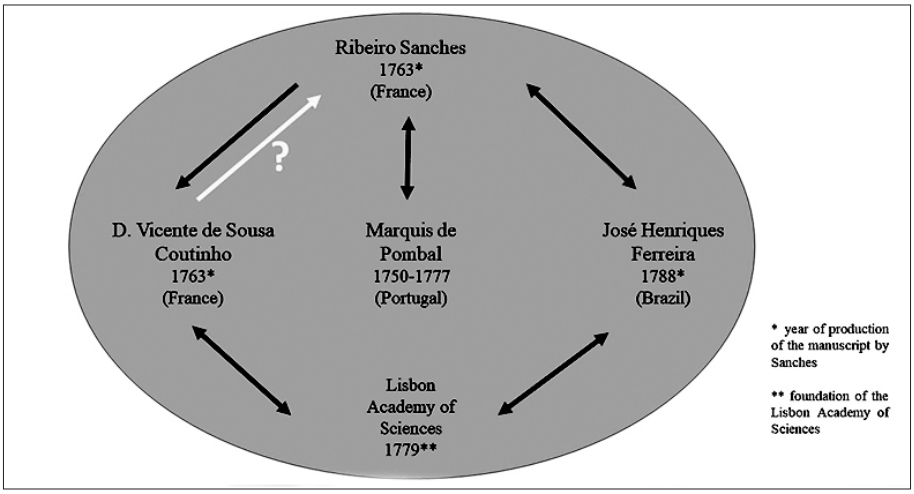

Fig.1. Connections and circulation of knowledge involving Ribeiro Sanches and his work

The circulation of knowledge was essential to the development of Science, so that it could be recorded in order to form its own bases in each scientific community[78]. But for that to happen, the political issues had to be overcome and power relations betwen agents had to be established. The simple production of knowledge was not enough for it to be validated. This knowledge had to be accepted and, therefore, political barriers had to be overcome. The knowledge circulation process in the Portuguese Empire, involving power games, was not inferior to that in other places. What we do find is that it has specific differences. For example, the lack of printed books in itself did not mean less works or the isolation, or a smaller degree of scientific development, but it does speak volumes about the policies on production and dissemination of knowledge in that period.

[77] BNP – *Secção dos Reservados*, COD. 6941//4…; ACL – *Série Azul de Manuscritos*, COD 375 (30)…
[78] RAJ, 2013: 337-347.

CONCLUSION

In the 18th century, the smaller number of printed works in circulation compared to the amount of manuscripts does not mean that ideas were locked in confined spaces, or just within the Portuguese empire. Scientific knowledge on various subjects did circulate and was validated through the exchange of correspondence in the colony, in Portugal, or in other places outside the empire. We believe this to be quite clear when we analyse the work of Ribeiro Sanches. Since there were quite a few agents, diplomats, physicians, and intellectuals in the colonies and in the centres of northern Europe, knowledge circulated and was disseminated through this complex network that involved many territories and a wide range of agents[79].

The circulation of these individuals in the scientific space of Europe and of the colony, the circulation of their ideas and texts provides us with an avenue of analysis to understand how scientific knowledge was produced, embodied and reshaped according to the peculiarities of each place[80], yet without turning it into a regional perspective, rather to let go of the idea that scientific knowledge construction only took place in the large centres. If we lock the topic of discussion to the European context or the colonial context, we are excluding some possibilities of analysis and leaving out some of the peculiar characteristics of the scientific knowledge construction process. This is quite clear in the case of Portugal and Brazil, because knowledge circulated not only between the kingdom and the colony, but rather in a broader realm involving many agents and territories. If we think of the process as a circle and not a two-way exchange, an outward and an inward movement, we realise that the dissemination of knowledge was much more complex, and that its transformation and reconfiguration processes occurred at different times, in various territories, and by the various producer agents. This circulation and reconfiguration of ideas is visible in the analysis of the text by Ribeiro Sanches (1763) and his interlocutors.

ACKNOWLEDGMENTS

This work was funded by Coordenação de Aperfeiçoamento de Pessoal de Nível Superior – CAPES/Brazil. Acknowledgement to the CITCEM – Assignment co-financed by the European Regional Development Fund (ERDF) through the COMPETE 2020 – Operational Programme Competitiveness and Internationalization (POCI) and national funds by the FCT under the POCI-01-0145-FEDER-007460 project, for financing the translation.

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[79] FURTADO, 2012.

[80] RAJ, 2013: 337-347; LIVINGSTONE, 2013.

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THE LUSO-BRAZILIAN MEDICAL STUDENTS AT MONTPELLIER AND THE ESTABLISHMENT OF AN INTELLECTUAL ELITE BETWEEN TWO ATLANTIC EMPIRES

RAFAEL DIAS DA SILVA CAMPOS*

Resumo: Este capítulo procura relacionar os estudos recentes sobre a circulação de ideias no final do século XVIII com sua congênere social, a circulação das elites. A ida de um conjunto de Luso-brasileiros até a França para se formarem em Medicina na Universidade de Montpellier permite perceber os diferentes elementos socioculturais que motivaram estes jovens. Mas os mecanismos de circulação de ideias não foram levados em consideração quando se trata destes filhos de famílias abastadas que empregaram seus conhecimentos em diferentes regiões do império «em troca» de honras e benefícios. A vida em França e supostos envolvimentos políticos têm sobreposto o que parece ter sido a mais forte razão para estes portugueses da América terem partido para o Languedoc.

Palavras-chave: História da Medicina; Universidade de Montpellier; Educação Médica; Ideias e elites.

Abstract: This chapter aims to relate recent studies on the circulation of ideas in the late 18th century with its social counterpart, the circulation of elites. The departure of a group of Luso-Brazilians to France in order to graduate in Medicine at the University of Montpellier allows modern scholars to understand the different sociocultural elements that motivated these young people. However, the mechanisms for the circulation of ideas were not taken into account when analyz-

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ing with these sons of wealthy families who applied their knowledge in different regions of the empire «in return» for honors and benefits. The life in France and alleged political involvements have overlapped what seems to be the strongest reason for these students from Portuguese America to have left for the Languedoc.

Keywords: History of Medicine; University of Montpellier; Medical Education; Ideas and elites.

INTRODUCTION

The transit of intellectuals and all sorts of people at the service of European states throughout the continent has been studied in recent years through different historiographical traditions and history fields[1], and historians of science and medicine have paid special attention to the practical implications of these relations: from the establishment of contact and knowledge networks to the configuration of state apparatuses for the benefit of monarchs and their subjects. In the Portuguese case, the reform of the University of Coimbra was the first and most important element of this willingness to investigate the colonial domains, looking at their peoples, animals, plants, and minerals, in short, their riches and secrets. Considerably influenced by the Enlightenment and its models of a practical science (knowledge and ordering the natural world through description and classification), the Portuguese crown took control of its university, which had been under religious rule. This change was followed by direct support of the crown in exploratory journeys into the imperial hinterlands in America, Africa, and Asia[2], and also in training journeys, in which former students of the restructured University of Coimbra received pensions and support in order to learn about distinctive products, as well as the different techniques and teaching methods used in other European empires[3].

All these connections have been part of a context in which different worlds were in contact. European students taking classes with Brazilian-born professors, collections and exchange of artifacts from the most various parts of the globe, introduction and adaptation of plants on a global scale, settlement of trained doctors in areas almost exclusively based on folk traditions of healing. In short, a variety of networks at the core of European empires along with an equally intricate circulation of ideas, «products» and peoples.

Nevertheless, although imperial states have given a significant amount of support and influence, the interconnection of these two worlds (inside empires, and between empires) was not exclusively the consequence of government decisions. Quite the opposite, plenty of them have been carried out by private individuals, even without financial aid. Many of these exchanges came along with ideas that totally contrasted imperial agendas, like the republicanism in regions controlled by monarchs far away from that territories. Those relations drove consequences in many aspects of people's lives, ultimately culminating, as recently shown by Fabrício Pereira Prado for the case of Uruguay, in an inde-

[1] DOMINGUES, 2001; FURTADO, 2012a; PRATT, 1992; CARNEIRO & SIMÕES, 2000; RAPOSO *et al.*, 2014.
[2] PATACA, 2006.
[3] VARELA *et al.*, 2004: 688-695.

pendence process. Prado was particularly concerned with the *Banda Oriental*, a Spanish dominion, but we can generalize to other empires as well. He states that the «transimperial interaction shaped colonial identities and political culture»[4], placing his work with the new historiographical perception over imperial states; as fluid empires, or «polycentric monarchies», and no longer described as rigid, structured, and totally controlled by the state.

Along with goods, plants, epidemics, and radical ideas, those very people and states also exchanged a hope for new possibilities: new relations with the mother country (and for some, with no relations at all), new conceptions of illness and death, of plants and its purposes. This chapter intends, therefore, to analyze these connections, in light of the new perception of imperial states and its subjects, essentially analyzing medical aspects and the transit of an American-born elite group between two Atlantic empires.

Concerning all those «non-state» actions, we might notice that in the world of health, the marked influences of the Enlightenment contributed to a more practical medical education, with perspectives that sought to make up for the state deficiencies in health care. With those influences, disapproval of popular knowledge (strongly related to rationalist ideals, although not taking equal opportunities in consideration because doctors remained attached to their elevated social status) led to criticism of popular care in itself. However, at the same time, those very doctors paid attention to people's health, and not only on an individual basis. Besides, as Jean Luiz Neves Abreu has noted, health was a striking element of «philosophical» journeys[5]; to mention just one example, it is important not to neglect that José Pinto de Azeredo was sent to Angola also to teach medicine[6]. Thus, government actions were carried out on behalf of the peoples of the Portuguese imperial dominions.

Throughout the 18th century, a total of fifteen Portuguese born in South America travelled overseas (extending both their physical and cultural frontiers) and settled in the south of France to study medicine at the renowned University of Montpellier[7]. Specifically considering these details, this chapter will attempt to investigate this group, seeking to analyze their motivations and participation in the set of actions guided by the Portuguese crown, which were promoted as a way to foster the empire's economy, reduce the mortality of subjects and slaves, and set up a state capability to act precisely based on the knowledge of the different regions (their environment, animals, and peoples), which until then had been totally unfamiliar or misapprehended by the state.

All fifteen who attended Montpellier went there in the second half of the 18th century, but there is a considerable temporal distance between the first two and the others: Joaquim Inácio de Seixas

[4] PRADO, 2015: 4.

[5] ABREU, 2007.

[6] PINTO *et al.*, 2005; AZEREDO, José Pinto de – *Essays on Some Maladies of Angola (1799)*. Eds. Timothy D. Walker, Adelino Cardoso, António Braz de Oliveira e Manuel Silvério Marques; trans. Stewart Lloyd-Jones. Dartmouth, MA: Tagus Press, 2016.

[7] We must point out that Montpellier was becoming lesser and lesser attractive, yet it was still one of the greatest centers for medical students. It's this very movement of people, from a region to another, that celebrate the circulation of knowledge. We realized it because of this passage: «Although groups of students with family medical traditions and more restricted finances continued to study in Montpellier, others invested both more time and more resources than ever before and traveled to Edinburgh, a medical center that was described by knowledgeable commentators as the best possible medical school at the time» (RIEDER & LOUIS-COURVOISIER, 2010: 584).

Brandão attended the college between 1766 and 1767, while the second student only joined him a decade later: Jacinto José da Silva Quintão was at the college between 1776 and 1778. The remainder attended between 1783 and 1794. This agglomeration at the end of the century allows us to conjecture that the first two students influenced the following ones to go to Montpellier, guiding them in an unusual and, for some, a controversial path.

From different areas of Portuguese America, these students illustrate that the wealthiest regions of that overseas domain were Rio de Janeiro, Minas Gerais, Pernambuco, and Bahia, with seven, five, two, and one student coming from these places, respectively. In this sense, it is important to stress the repeated references to the means of some students and the requirement for an education overseas[8]: Not only the cost of travel, but also their maintenance and survival in France depended heavily on their purchasing power, on their social relations, and the influence of their relatives or their families' protectors. Moreover, to study abroad, they also needed language skills. Not only did they need French to live, but also Latin for their classes (which, in general, they learned from tutors at home or, at a more advanced age, at religious seminars for children and adolescents). In short, the educational process for those who lived abroad demanded the possession of both cultural and economic capital sufficient to graduate and, equally, to attract their professors' attention (remembering that this was a society in which cultural literacy was strongly tied to social values and manners).

THE CHOICES FOR STUDYING AT MONTPELLIER MEDICAL SCHOOL

With all these rules and costs, would it not have been less laborious and costly to simply graduate in Coimbra, as did the vast majority of Luso-Brazilians? In other words, why did these fifteen attend Montpellier, knowing the greater convenience Coimbra represented and, at the same time, what the consequences of earning a medical degree in France would be? Answering these questions is an almost impossible task since the sources on these Luso-Brazilians are scarce and, as will be seen, quite concrete assertions have been made without any evidentiary basis for them.

Howsoever, through the sparse documentation that still remains, the main motivations for them to have chosen Montpellier as their destination can be inferred. Stressing that the different aspects of these motivations did not conflict with each other and might have been considered together by them in choosing this faculty of medicine; the first element, as mentioned above, was the effect of the first adventurers on Languedoc soil, which ended up provoking attention and attracting the other Luso-Brazilians. Of this cohort, perhaps the most significant were the Arruda da Câmara brothers, who were students of philosophy and mathematics at the reformed University of Coimbra. One of the brothers, Manoel, attended the Montpellier Faculty of medicine only after his brother, Francisco, had made the journey (in fact, he had practically completed his term there when Manoel attended). Similarly, Joaquim José de Souza Ribeiro and José Joaquim da Maia e Barbalho studied during the same periods at both Coimbra and Montpellier, attending the French medical school together.

[8] OLIVEIRA, 1977: 25.

The majority of them practiced as doctors after their return to the Portuguese empire. In total, nine students practiced the healing arts after they completed their educations, with two others not practicing medicine but engaging in medicine-related activities (namely, botanical knowledge applied for therapeutic purposes). Only some of those involved in seditious activities (José Joaquim da Maia e Barbalho and Domingos Vidal Barbosa Lage), Eleutério José Delfim (who did not finish college) and Joaquim José de Souza Ribeiro (who, after graduation at Montpellier, went to Santo Domingo) did not engage in medicine-related activities.

Another issue that should not be disregarded but has been overestimated lately is whether the choice to attend Montpellier was specifically to escape the oppressive reach of the Portuguese state and the Catholic Church. According to Bella Herson, many of these students were New Christians and chose to take their education in France and flee from the Portuguese Inquisition[9] because access to groups such as the New Christians was still limited[10], although the Portuguese purity of blood law had been abolished in 1772. Similar considerations can be perceived in relation to the Portuguese state, which had an eye on the students at the University of Coimbra: in fact, some authors argue that Diogo Inácio de Pina Manique had informers even at Montpellier[11]. However, it seems these answers are insufficient because while they might explain several reasons for not choosing Coimbra, they say nothing about the attractiveness of Montpellier (they could have chosen Paris or some British university, for instance, where they would also have escaped the aforementioned pressures). Moreover, unreliable explanations have been put forward, especially when we consider that some of these students previously attended the University of Coimbra, besides the fact that the evidence pointed to by Herson about the New Christians is not consistent. Yet, despite the caveats to these interpretations, we should pay attention to such possibilities, mainly because, in that context, such issues could have been considered by the fifteen Luso-Brazilians at Montpellier, although not to the extent asserted by the authors mentioned above.

The Catholic religion, for its part, could also have formed an essential element in this set of factors. This might even be the reason for choosing a university in France rather than in the United Kingdom, the Dutch Republic, or other regions (although, as pointed out earlier, this possibility would be for a decision to study in France or Spain, but not specifically at Montpellier). Indeed, some of these Luso-Brazilians stressed their beliefs in different manuscripts[12], but as this was also part of a rhetoric (not disregarding the possibility of them being real reasons), the existence of clearly Catholic statements does not enable us to define religion as an undeniable reason for the choice of the University of Montpellier. Therefore, we have a primary set of possibilities that were certainly significant in some cases, although not in the same way for all. Religion persecution, and the state, apart from the presence of other Portuguese students from America, may well have reinforced the decision to go to Montpel-

[9] For an appropriate approach to the correlation between healers and the Inquisition, see WALKER, 2005.
[10] HERSON, 1996.
[11] GONÇALVES, 1999: 361.
[12] José Mariano Leal da Câmara Rangel de Gusmão, for instance, states on the prologue of his thesis, Propositions about erysipelas which reign endemic among Brazilians, that they would be submitted «with God's help and auspices of the Saint Mary» (GUSMÃO, 1790).

lier, but participation in seditious movements after the return to Portuguese America has also been considered as a reason and still is the main element of this choice.

DID THE STUDENTS PARTICIPATE IN SEDITIOUS MOVEMENTS?

The names of several of these «Montpellerins» were linked to seditious and insurrectionary movements: Manoel Arruda da Câmara and his brother were claimed to be the founding fathers of Freemasonry in Pernambuco and for having fostered the foundation of the republican movements that followed in that region; José Joaquim da Maia e Barbalho sought Thomas Jefferson, looking for support for the independence of the Minas Gerais province; Domingos Vidal Barbosa Lage and José Mariano Leal da Câmara Rangel de Gusmão were also participants in the movement, and even the slave trader, Eleutério José Delfim, would have taken part in the *Inconfidência Mineira*; in Rio de Janeiro, Jacinto José da Silva Quintão and Vicente Gomes da Silva would have been active in the Carioca Conjuration (Rio de Janeiro Conspiracy), having even been arrested.

Thus, the dissemination of the idea that these Luso-Brazilians went to Montpellier for political reasons is not surprising: out of a total of fifteen students, eight subsequently become involved in insurgency movements. However, as we shall now discuss, it seems that many of these involvements were overestimated, creating the idea that life in Montpellier, far from the spotlight and Portuguese state repression, would have been the primary motive of the trip to France.

Beginning with the *Inconfidência Mineira*, it should be noted that the crucial source of analysis is the *Autos da Devassa* itself (hereafter ADIM), an official legal document produced by the Portuguese crown to prosecute those charged with participating in the movement. In the ADIM, one of the most important events was the story of the meeting between José Joaquim da Maia e Barbalho (known by the pseudonym, Vendek) and Thomas Jefferson (then an ambassador of the United States) at the ancient Roman ruins of the city of Nîmes, near Montpellier. This comprises a Roman coliseum, an aqueduct, the Maison Carrée, the Temple of Diane, and the Tour Magne. For us, the most likely place for this meeting was at some of the monuments near the city park, Les Jardins de la Fontaine, a more appropriate area for a secret meeting. At the time, the letters exchanged between them were not known, so that investigators only knew the facts through the report of third parties, since Maia e Barbalho died in 1788 in Lisbon. The main informers of the meeting were Domingos Vidal Barbosa Lage, also a medical student at Montpellier, and his cousin, Francisco Antônio de Oliveira Lopes[13].

Lopes reported that his cousin had told him that a student had contacted Thomas Jefferson[14]. In addition, he stated that his cousin had told him that, «while studying in Montpellier, he had met two people who said they were sent» (i.e., they were there to work for the «cause»)[15]. Barbosa Lage, on the other hand, confirmed the story of the meeting between Maia e Barbalho and Thomas Jefferson. However, after realizing the implications of his speech, he eventually backed down, representing the

[13] FURTADO, 2012b: 303-308; MAXWELL, 2003: 110.
[14] *Autos da Devassa da Inconfidência Mineira* (ADIM). Belo Horizonte: Imprensa Oficial de Minas Gerais, 1978, vol. 2, p. 62-63.
[15] *Autos da Devassa da Inconfidência Mineira* (ADIM)… vol. 2, p. 90.

meeting in a derogatory manner, stating that Jefferson had treated the Luso-Brazilian with disdain, that he was regarded as extravagant, and that they laughed at his ideas[16].

Besides, Barbosa Lage stated that José Mariano Leal da Câmara Rangel de Gusmão was about to arrive at Rio de Janeiro with Count of Resende's family and that Gusmão had heard the story from Maia e Barbalho himself[17]. The participation of Barbosa Lage and Vendek in the *Inconfidência Mineira*, was, with reason, never questioned, but the involvement of Gusmão in the seditious project is questionable since the only reference in this sense is that he would have heard the report of the meeting between Maia e Barbalho and Thomas Jefferson. In fact, he was only quoted by Domingos Vidal Barbosa Lage as a witness of the defence[18], but he was not even requested to testify[19]. Despite the scant documentation that would attest to Gusmão's participation in the sedition attempt, there are authors who identify this former student as one of those who acted in the seditious movements of the late 18th century. Both Carlos Rizzini[20] and Manuel Xavier de Vasconcelos Pedrosa claimed Gusmão participated in the movement. For Pedrosa, Gusmão had dreamed «about a revolution in favour of Brazil's independence», but he would not have been «disturbed by this youthful whimsicality»[21]. Lycurgo de Castro Santos Filho also indicated that Gusmão was a participant in the seditious attempt alongside Barbosa Lage and Vendek[22]. In addition to these, in a well-known recent work that also analyses the Luso-Brazilian students at Montpellier, Bella Herson continues to mention Gusmão as one of Montpellier's former students who would have acted in favour of the *Inconfidência Mineira*[23]. Perhaps Gusmão even participated in these events. This would not be unlikely, but there is no evidence for such vehement statements as those stated above, except for the testimony of Barbosa Lage (who only credits him as being aware of Vendek's meeting with Jefferson).

This non-involvement in the riots can be discerned, in a similar way, in relation to those supposedly involved in the Carioca Conjuration. Both Jacinto José da Silva Quintão and Vicente Gomes da Silva would have gone to Montpellier for political rather than medical reasons, but the so-called Conjuration was not an autonomous social and political movement. The repression of its members was, primarily, due to the fear of having another conspiracy like that of Minas Gerais, and worse, that a seditious movement in Rio de Janeiro would be successful. However, what occurred at most was a set of radical liberal discussions because there were no proposals for creating disruption. The Carioca Conjuration itself was the trial process conducted by royal authorities to see if the discussions held at the Literary Society of Rio de Janeiro were contrary to the order and the religion of the state, such as republican ideas. In the end, after verifying the interminable accusations of the viceroy, the Count

[16] *Autos da Devassa da Inconfidência Mineira* (ADIM). Belo Horizonte: Imprensa Oficial de Minas Gerais, 1976, vol. 1, p. 213; *Autos da Devassa da Inconfidência Mineira* (ADIM)… vol. 2, p. 93-94; *Autos da Devassa da Inconfidência Mineira* (ADIM). Belo Horizonte: Imprensa Oficial de Minas Gerais, 1982, vol. 5, p. 395-397.
[17] *Autos da Devassa da Inconfidência Mineira* (ADIM)… vol. 2, p. 94.
[18] *Autos da Devassa da Inconfidência Mineira* (ADIM)… vol. 5, p. 396; *Autos da Devassa da Inconfidência Mineira* (ADIM). Belo Horizonte: Imprensa Oficial de Minas Gerais, 1981, vol. 4, p. 145-146.
[19] *Autos da Devassa da Inconfidência Mineira* (ADIM)… vol. 4, p. 255.
[20] RIZZINI, 1957: 103.
[21] PEDROSA, 1959: 51.
[22] SANTOS FILHO, 1991: 385.
[23] HERSON, 1996: 240.

of Resende, the crown itself ordered, through D. Rodrigo de Sousa Coutinho[24], that either the defendants were to be considered guilty (sending, therefore, the trial to Lisbon) or be released. The order of the powerful secretary forced Resende to act, so he requested the opinion of the judge, António Diniz da Cruz e Silva. The decision of Cruz e Silva, the person who was in charge of the process and, thus, responsible for conducting various confrontations and statements, was that discussions with Republican content had taken place, but no seditious attempts had been made:

> *it should be noted that none of the same prisoners are said to, or proved, that they entered into the conspiracy project, being all the blame they are charged with (and that against some is proved) that they sustain in conversations either private or public: that the republican government should be preferred to that of monarchies, that kings are oppressive tyrants of subjects* […][25].

The conclusion of the judge is meaningful, especially because the fear of sedition had begun with a charge by José Bernardo Silveira Frade that in many discussions within the Society, a defence of the republican system had been made. The two Luso-Brazilians involved were cleared in the process: Vicente Gomes da Silva was not even accused[26] and Jacinto José da Silva Quintão, although arrested, was released for lack of evidence by the judge, Cruz e Silva. Gomes da Silva was acquitted by the informer himself (Silveira Frade), who said that the former student of Montpellier had not been there when the fateful discussion in defence of the republic would have been taking place. Quintão, an active member of the Literary Society of Rio de Janeiro, was, as we said, effectively arrested and had some of his properties confiscated. From the inquest that followed into his belongings, we know that he had a seditious book and that some letters were considered suspicious[27]. These were correspondence with a doctor, Manoel José Novais de Almeida, author of a controversial passage in which he effusively defended the achievement of Santo Domingo[28], although not long after that, he backed off from that liberating position, fearful that Brazil's enslaved people would become unmanageable[29]. The content of the conversation with his medical friend worried the investigators; however, as mentioned above, Quintão was cleared of all accusations for lack of evidence. His release did not dispel his liberal outlook, but at the same time, the absence of seditious inclinations does not allow us to point out that political issues were what influenced his choice to go to Montpellier.

This seems to equally apply to the most well-known Luso-Brazilian medical student at Montpellier, Manoel Arruda da Câmara. Arruda da Câmara died in 1810, before the great political movements in Pernambuco erupted on the streets, but his connection would be in the idealization of the Pernambuco revolt. We say «seems» because his death does not eliminate the possibility that Arruda da

[24] KURY & MUNTEAL FILHO, 1995: 112.
[25] SILVA, António Diniz da Cruz e – *Documentos relativos a prisão de M. I. da Silva Alvarenga, Marianno J. Pereira da Fonseca e outros, por ordem do conde de Rezende [1797]*. «Revista do Instituto Histórico e Geográfico Brasileiro», vol. 28 (Primeira Parte). Rio de Janeiro: Instituto Histórico e Geográfico Brasileiro, 1865, p. 157-161.
[26] Nevertheless, it is curious to realize that both Francisco Adolfo Varnhagen and Manuel Pedrosa, as well as Bella Herson, stated that he was arrested (HERSON, 1996: 248; PEDROSA, 1959: 53).
[27] MORAES, 2006: 36.
[28] SILVA, 2002: 184.
[29] SILVA, 2002: 181.

Câmara was familiar with the more radical aspects of the Enlightenment. Likewise, though, this does not allow us to be sure of his involvement in the implementation of these ideals or even in the idealization of the republican movements. Arruda da Câmara was, supposedly, one of the founders of the Areópago de Itambé, a Freemason society that would have been the focal point of the 1801 movement and, consequently, of the republican projects that followed, the Pernambuco Revolution (1817) and the Confederation of Ecuador (1824), therefore he is usually pointed out by Brazilian historians as one of the founding fathers of the emancipation/independence movement in Brazil[30].

However, the very nature of the 1801 movement is in doubt: By analysing the records of the inquest on this insurrection, we can see that there were no references to a seditious project[31]. In addition, Arruda da Câmara is often associated with the radical Enlightenment movement, not only because he is reported to be one of the founders of the aforementioned masonic society, but also because he was the mentor of Father João Ribeiro Montenegro, a major player in the Pernambuco Revolution, who became a member of the provisional government. However, it is well known that a disciple's tendencies do not necessarily follow those of the master. Nevertheless, the main proof of Arruda da Câmara's association with independence movements is the testament of Father Ribeiro declaring his desire to liberate his oppressed people from the clutches of Portugal:

> *My secret work, sends promptly to the British America to our friend N. because there are important things in it, that it is not suitable for the ferocious despotism to have even the littlest knowledge of it* […] *do not care about this wretched and absurd cabundá aristocracy, which must always present futile obstacles. With or without a monarchy, colored people must enter into the prosperity of Brazil*[32].

But the supposed letter was never found. The very existence of this letter depends on a copy because the document itself does not exist. Even authors strongly inclined to inflate the liberal achievements of Arruda da Câmara, such as Francisco Muniz Tavares, expressed uncertainty regarding the veracity of this letter: As the author of the laudatory, *History of the Revolution of Pernambuco,* he used the phrase «if this letter is authentic»[33], pointing to his doubts about the anti-slavery ideas of Arruda da Câmara. The biographer of Arruda da Câmara, José Antônio Gonsalves de Mello, questioned the existence of this letter, and, more recently, Guilherme Pereira das Neves also pointed out the reasons for his objection to the truthfulness of this document[34]. Neves was emphatic in noting that of Arruda da Câmara's letters that survived over time, their contents were ones of reverence rather than contestation. In addition, this researcher recalls that despite eliciting sympathy previously, the separatist proposal gained strength effectively only during the disagreements expressed at the *Cortes de Lisboa*[35].

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[30] TAVARES, 1917: 71-73; MELLO, 1910: 7; PESSOA, 1973: 489-490; MACHADO, 1990: 40.

[31] *Devassa de 1801 em Pernambuco*. In *Documentos Históricos*. Rio de Janeiro: Fundação Biblioteca Nacional/Divisão de obras raras e publicações, 1955, vol. 110, p. 164. Disponível em <http://memoria.bn.br/DocReader/DocReader.aspx?bib=094536&PagFis=45002>. [Consulta realizada em 18/08/2016]; RODRIGUES, 1955: 11.

[32] COSTA, 1882: 642

[33] TAVARES, 1917: 116.

[34] MELLO, 1982; NEVES, 1999.

[35] Recent analysis has shown that the idea of independence in Brazil was clear only at the eve of the process itself. Many of previous movements urged for a better govern, but did not proposed any separation with Portugal. For more, see CARVALHO *et al.*, 2014.

Besides, it is important to note that in all the writings of Arruda da Câmara, there are no references directly opposed to slavery, even though he expressed at different times an extremely positive outlook on Africans and Africa. In fact, from his letters that actually exist, he appears more concerned with matters of science than of politics: «If death surprises me before I complete the natural history of my country, I will carry it across my throat» (i.e., he will be disappointed or embittered)[36].

Thus, it does not seem that he chose Montpellier simply to escape from religious repression, as Adelto Gonçalves stated[37]. In Montpellier, Arruda da Câmara became a disciple of Antoine Gouan and when he returned to the Portuguese Empire, he even sought to practice medicine. In 1792, he applied for authorization – the so-called *Carta de Medicina* – to practice medicine in the Portuguese domains, since he had graduated in France, but his comprehensive training in the area led the crown to appoint him to handle issues closer to the philosophy learned with the master, Antoine Gouan, rather than the healing arts. Throughout his life, Arruda da Câmara traveled through the hinterland of the «Brazilian» Northeast and conducted different investigations and discussions about the natural products of Portuguese America seeking to establish a commercial usage and generate profit from the minerals, plants and animals that he found and classified. Therefore, no matter how much Arruda da Câmara knew and eventually shared about republican ideas, as Lorelai Kury[38] well observed, his perception of the imperial reality and eventual contestation of it did not lead him (at least there are no documents that prove it) to become an asset to the Brazilian independence movements, despite him certainly becoming a significant figure in the popular political imagination.

His brother, however, joined the ranks of the fight against Portuguese rule, first, in the movement of 1817. Although his role was a secondary one and, therefore, he was not sent as a defendant to the prison of Bahia, the loyalty of Francisco Arruda da Câmara was questioned as soon as he was accused of having taken part in a rebellion against the crown[39]. Years later, in 1824, he served in the Confederation of Ecuador and was eventually banned and sentenced to death *in absentia* after he had fled[40].

The other Luso-Brazilians who studied medicine in Montpellier are not identified as being seditious or for having discussions in favour of an alternative system to the Portuguese monarchy, although it is important to take into consideration that perhaps Joaquim José de Souza Ribeiro took part in the Haitian Revolution. He traveled to the region in the period when the revolt broke out, but his involvement is uncertain. Nonetheless, that initial presumption (that several of the Luso-Brazilian

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[36] CÂMARA, Manoel Arruda da – *Museu Bocage, Carta de Manuel Arruda da Câmara para Vandelli, Pirauhá (Pernambuco), 11-XII-1797*. In SIMON, William Joel – *Scientific Expeditions in the Portuguese Overseas Territories (1783-1808), and the Role of Lisbon in the Intellectual-Scientific Community of the Late Eigtheenth Century*. Lisbon: Instituto de Investigação Científica Tropical, 1983.
[37] GONÇALVES, 1999.
[38] KURY, 2012: 183.
[39] *Revolução de 1817*. In *Documentos Históricos*. Rio de Janeiro: Fundação Biblioteca Nacional/Divisão de obras raras e publicações, 1954, vol. 105. Disponível em <http://memoria.bn.br/DocReader/DocReader.aspx?bib=094536&PagFis=43600>. [Consulta realizada em 20/09/2016]; *Revolução de 1817*. In *Documentos Históricos*. Rio de Janeiro: Fundação Biblioteca Nacional/Divisão de obras raras e publicações, 1954, vol. 106. Disponível em <http://memoria.bn.br/DocReader/094536/43828>. [Consulta realizada em 20/09/2016].
[40] *Sessão de 15 de Junho de 1826, n.º 29. Diario da Camara dos Deputados a Assemblea Geral Legislativa do Império do Brasil*. Rio de Janeiro: Imprensa Imperial e Nacional, 1826, p. 406. Disponível em <https://books.google. pt/books?id=5rxOAAAAcAAJ>. [Consulta realizada em 05/07/2016].

students who studied in Montpellier participated in independence movements) has become controversial. Whereas before, one could point to eight of the fifteen students having acted in different movements, it is now clear that only three of them effectively took part in such movements.

All of this verification of whether these students participated in independence movements allows us to reject the commonly accepted and repeated idea that the reason for the fifteen Luso-Brazilians to go to Montpellier was one of political motivation. Of course, this was not the case for José Joaquim da Maia e Barbalho, since he had always been involved with the attempted sedition of Minas Gerais and had decided to go to France precisely to put into practice his part in the plans of the *Inconfidência Mineira*[41]. But the political trajectory of Francisco Arruda da Câmara, on the other hand, indicates that he only got involved with political issues later, sometime after his graduation in France. In other words, life in Montpellier may well have influenced his vision of the world and contributed to his involvement in the struggles for the implementation of a republic in Pernambuco, but it was not the reason for his choice.

Thus, it is important to note what the priority of these Luso-Brazilians was in choosing to do their medical training in France. We have already pointed out that the presence of other Portuguese natives, religion, persecution, or even political motivations in some cases were taken into consideration in the decision to graduate outside of the Portuguese Empire. However, while it seems that these elements might have contributed to this choice, the decision to attend the Faculty of Medicine of Montpellier involved the recognition and quality of the institution itself.

PHYSICIANS OF WELFARE, OR SOCIAL ASCENT AS A PRIMARY CHOICE

Before he got himself involved with the political riots in Pernambuco, Francisco Arruda da Câmara lived a «normal» life as one of the sons of the local captain-major (and plantation owner), and he used to practice the healing arts in his homeland[42]. That is, a medical education in Montpellier was attractive to those who could afford the training costs abroad. Academic training, regardless of the university, was a great attraction especially for social groups that sought the possibility of social ascent. Although a military career was also sought by many, the university represented for several families the essential means of rising in society. As perceived by Roberta Stumpf:

> *The good subject continues to be recognized as one who has been guided by Christian virtues, such as faith, hope, and charity, but his dignity would be even greater if he were equally useful to the monarchy.* […] *rewards were expected from the community, which would give it prominence, but also from the monarchy that granted «prize», as the graces [mercês] that could open the doors to the aristocratic stratum*[43].

The vast majority of the fifteen students discussed here sought this possibility of social ascent through public service. If it is now clear that just three of the fifteen Luso-Brazilian students took part

[41] BARBALHO, 1786.
[42] AHU – *Conselho Ultramarino*, Pernambuco, cx. 235, doc. 15871. *Carta da Câmara de Goiana, ao príncipe regente* [D. João], *queixando-se dos procedimentos do Bispo de Pernambuco, D. José da Cunha Azeredo Coutinho, a respeito da arrematação das carnes frescas, única para toda capitania, beneficiando seu protegido Francisco de Arruda Câmara, e se opondo às determinações régias que permite que as câmaras determinem os termos destas arrematações*, 1802.
[43] STUMPF, 2009: 35.

in the seditious movements, nine of them did participate in the public service immediately after their graduation from Montpellier[44], proving that these students really wanted to use their education to rise in society. With a relatively similar conclusion, Márcia Moisés Ribeiro also took into consideration the different perceptions regarding doctors and surgeons. Ribeiro noticed that life in Portuguese America did not attract the attention of known physicians, even though this was not the case for surgeons[45]. In a similar way, these students knew that going to one of the most famous and prestigious medical schools at the time would make it easier to achieve their desired social goals. Besides, the medical training in an institution like Montpellier was meant to be *pari passu* to others centers where «the status of traditional medical knowledge as it was taught in conservative universities was declining whereas empirical practitioners were very much the fashion»[46]. Even for those who did not finish their education, as was the case for Eleutério José Delfim, the choice to attend the Medical School of Montpellier seems to have been based on this social criterion: Despite him preferring to live as a slave trader, he initially sought medical training, even though he was the son of a wealthy businessman in Rio de Janeiro, which leads us to interpret his hesitant attendance at that medical school as a first attempt to achieve a better social status for himself and for his family (although the hard path of the medical education led him to withdraw).

Ronald Raminelli has specifically emphasized the importance of a university education, to achieve the much desired social ascent. Naturally, as discussed above, an academic education demanded financial resources. It was an investment in achieving a better family condition that only a few of them could afford. Because Coimbra was the only university of the empire and had easier access conditions (it was forbidden for those who graduated abroad to carry out activities in the empire, except with special authorizations), Coimbra became the first step in the social ascent process of many Luso-Brazilians:

> *from Coimbra* […] *the students aspirated positions in the administration* […]. *Graduated in Law, Mathematics, or Natural Philosophy [and we can add Medicine too]* […] *they soon received assignments* […]. *Training was, therefore, the first step in social mobility, a means of accumulating prestige and reaching posts and distinctions*[47].

Even for the fifteen «Montpellerins», Coimbra was essential since six of them attended the Portuguese university before they went to Montpellier. As Kenneth Maxwell has stated, an apprenticeship in Coimbra was very much a social recognition criterion of the families of Minas Gerais[48]. The families sent their sons to be educated in Coimbra, later guaranteeing them a profession that did not connect the family to manual jobs. However, the people from Minas Gerais were not alone in seeking this

[44] Faustino José de Azevedo was Judge of Sesmarias, Joaquim Inácio de Seixas Brandão became «first physician» (sort of director) of the Royal Thermal Hospital of Caldas da Rainha, Inácio Ferreira da Câmara was sent to the Botanical Garden of Bahia, Manuel Arruda da Câmara took philosophical journal into the Northeast region of the Portuguese America with the royal support, José Joaquim de Carvalho was sent to the Military Royal Hospital in Recife, Manuel Joaquim de Souza to the Botanical Garden of Rio de Janeiro, José Mariano Leal da Câmara Rangel de Gusmão was physician of the Royal Chamber, Jacinto José da Silva Quintão became judge of the Protomedicato Tribunal (board of royal physicians) and, finally, Vicente Gomes da Silva was sent to the Military Royal Hospital in Rio de Janeiro.

[45] RIBEIRO, 2005: 66.

[46] RIEDER & LOUIS-COURVOISIER, 2010: 579.

[47] RAMINELLI, 2005: 324.

[48] MAXWELL, 2001: 397.

«shelter». Analyzing the Faculty of Medicine of the University of Coimbra, we can see that most of the Luso-Brazilian students in this course were from Rio de Janeiro (40.6%), followed by Bahia (26.3%), and then Minas Gerais (20.3%). The other regions together come to 12.8% (Goiás, Maranhão, Ceará, Paraíba, Pernambuco, and São Paulo)[49].

Following these indications, therefore, we should note that medical education was even attractive when it came to the social ascent of the Luso-Brazilian families. Thus, it was not by chance that these students decided to embark on the world of university education, because as it was one of the planks for achieving social mobility, the possession of a diploma in the oldest and one of the most important medical colleges of that time was an attempt to improve this social strategy: «knowledge was the bargaining chip for social ascension»[50].

If before Montpellier none of the fifteen students discussed here had relations with the Portuguese nobility, at the end of their lives, following their education in France and subsequent services to the Portuguese imperial state, some of them did correspond with nobles of the Portuguese court and prominent members of the state apparatus around the empire. Most of them managed to achieve diverse social positions, from receiving a royal appointment to perform a public function (with pensions and ordinances) to recognition as Commander of the Order of Christ. These honors, as Raminelli[51] pointed out, created for their «holders» conditions of special access to a select world, where exemptions and privileges were the order of the day. An understanding of the pursuits of these students in this world prompts us to point out that this was the main reason for the choice of a medical training, where it can be deduced that the prominence and indisputable recognition of the Medical School of Montpellier was, in turn, the main reason for choosing this faculty over Paris or any other educational institution.

FINAL CONSIDERATIONS

The decisions by these students to attend the Faculty of Medicine of Montpellier rather than other colleges represent not only a history of cultural contacts or political and cultural influences. They are the very history of Atlantic encounters, of the generation of an intellectual elite from Portuguese America that came to be seen by the state as essential to the «people's happiness» and to economic development around the empire. For nationalists' reasons, the movements of this South American elite were analyzed over many years according to the exclusive perspective of the process of the Brazilian independence movements. However, as we discussed, the interests of these sons of plantation owners, merchants, and judicial personnel were much more related to a social and political dynamic that, in some cases, even culminated in the defense of ideas that were the opposite of imperial interests.

[49] The college students were almost exclusively from Portugal (93.5%), with the Luso-Brazilians accounting for 4.9% of the total (students from Angola, Spain, France, England, Ireland, and Sweden did not add up to 1%). The production of these data was carried out mainly through the information provided by the Archive of the University of Coimbra in the *Index of students of the University of Coimbra* (*Índice de alunos da Universidade de Coimbra*), and we received the assistance of Joana Alves to collect the information and for the general review. To analyze this data, see CAMPOS, 2017. Lastly, it is important to inform that was maintained the references of students with unknown or undetermined location.

[50] RAMINELLI, 2005: 299.

[51] RAMINELLI, 2006.

Yet, political associations had not driven the lives spent abroad. When we dwell on the documentation that still exists, we can see that even some of those involved in radical political events sought at first to insert themselves into the rationality of honor and royal favors. Most of them ended up working in the health area and obtaining expected graces, elements that reinforce the perception that it was the medical training in a prestigious university that attracted those students to attend there.

The interactions between students from different parts of Europe and mostly from the Americas, a situation different from Coimbra, which had few students from other parts of the globe at its medical school, were just some of the elements that were added to the circulation of knowledge within the walls of the medical school of Montpellier. In the end, these former students performed functions that required the exchange of knowledge learned in France, and they used this «power» to seek to aspire to the conditions of an elite between two empires.

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

CARLA VIEIRA**

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

* This paper had the support of Fundação para a Ciência e Tecnologia (SFRH/BPD/109606/2015).

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I would like to thank Maria João Estêvão for her review of the text. I am also grateful for the relevant comments and suggestions made by the referee who review this text.

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»[2] – 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»[3].

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[4], 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[5]. 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 organisation. 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

[2] LINDO, 1763: 238.
[3] STEARNS, 1970: 675.
[4] 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 18th century. About this discussion, see SHAPIN, 2003 and FISSELL & COOTER, 2003.
[5] 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[6].

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 contemporarily published in the *Philosophical Transactions*, particularly those by other authors from North America, we will try to relate it to the mid-18th 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[7] 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

[6] SCHIEBINGER & SWAN, 2005; COOK, 2008; DELBOURGO & DEW, 2008.
[7] 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*[8].

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*[9].

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[10]. 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»[11]. Therefore, Lindo settled in Charleston as an

[8] LINDO, 1763: 239.
[9] GOODMAN, 1947: 137-138.
[10] PHILLIPS, 1894: 52.
[11] 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[12].

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[13].

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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[12] ELZAS, 1903: 10-18.
[13] 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[14]. 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[15]. 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[16].

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[17]. 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[18].

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 18th 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[19].

[14] ROTH, 1971: 259-260; The National Archives (Kew) – *Public Record Office*, 11/619/258. Will of Elias Lindo, January 27, 1728.
[15] PERRY, 1981: 11-25.
[16] ENDELMAN, 2002: 15-40.
[17] ENDELMAN, 2002: 74-75.
[18] ROUSSEAU & HAYCOCK, 2000: 130-131.
[19] 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[20]. 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[21]. Actually, Lindo's account found Emanuel Mendes da Costa at his zenith, shortly before having fallen in disgrace[22]. 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[23].

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*[24]. 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 18th-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[25]. 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[26]. 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.

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[20] CANTOR, 2001: 590-593; ROUSSEAU & HAYCOCK, 2000: 149-153.
[21] HAYWARD, 2003.
[22] 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.
[23] COSTA, 2009: 25.
[24] FREEMON, 1985: 191.
[25] McCLELLAN III, 2003: 90-95.
[26] 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*[27].

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 18th-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 18th 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[28].

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

[27] FORSTER, 1772: 58.
[28] SORRENSON, 1996: 37-39.

and other men of science all over the world[29]. 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[30].

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 18th 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[31].

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 18th-century scientific circles[32].

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[33]. 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»[34].

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[35] – 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[36].

[29] RUSNOCK, 1999.
[30] SPRAT, 1667: 64.
[31] MILLER, 1999: 200.
[32] SHAPIN, 2003: 178-179.
[33] HORNE, 1763: 48-61.
[34] WATSON, 1769: 379.
[35] WOLFE, 1764; WOLFE, 1766.
[36] ELLIS, 1761.

A paper closer to the approach and intentions of Lindo's account is found in the *Philosophical Transaction'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[37] 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*[38].

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 18th-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[39]. 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 18th-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[40]. Beside this, he wrote about a wide

[37] Prickly pear or Indian fig was the fruit of *cactus opuntia*.
[38] BAKER, 1757: 297.
[39] 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*.
[40] 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»[41], 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 18th century, other eight Jews reached the fellowship, among them Emanuel Mendes da Costa[42]. 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[43]. 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»[44].

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-

[41] SPRAT, 1667: 63.

[42] VIEIRA, 2014: 135-149.

Besides Samuda and Costa, also the physicians Meyer Schomberg (1726) and Jacob de Castro Sarmento (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).

[43] BORLASE, 1749: 250-277.

[44] 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 18th century, which Steven Shapin named as a «civic expert»[45]. 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»[46]. 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 subside indigo production, emphasising the quality of the South Carolina indico, which was «equal to the best French»[47].

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[48].

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»[49].

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.

[45] SHAPIN, 2003: 178-182.
[46] ELZAS, 1903: 13-14.
[47] ELZAS, 1903: 2.
[48] FEESER, 2013: 17-18.
[49] 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*[50].

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* […][51].

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[52]. 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.

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[50] ELZAS, 1903: 4.
[51] ELZAS, 1903: 7.
[52] 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 Transaction's* articles were often translated and sent to other people across the world or even published in other journals[53].

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-18th century Royal Society was still, as it had been since its early times, an «assembly of gentlemen»[54]. 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»[55]. 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[56]. 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»[57] – 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[58].

[53] COSTA, 2009: 18-19.
[54] COSTA, 2002: 156.
[55] SORRENSON, 1996: 35-36.
[56] RUSNOCK, 1999: 166.
[57] ELZAS, 1903: 13.
[58] 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»[59]. 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»[60]. 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»[61]. A merchant, pursuing profit and requiring trade secrecy, would not be an ideal witness for the validation of scientific knowledge[62]. 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[63]. Furthermore, science and commerce shared common values as the need of reliable, up-to date and exacting information[64] 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.

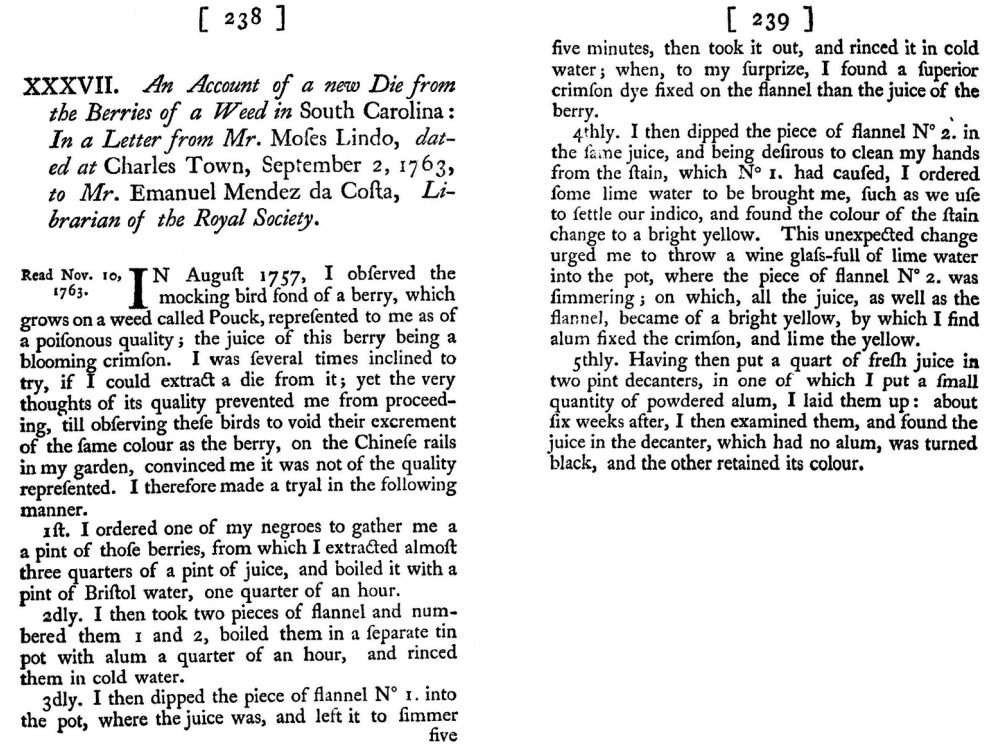
Lindo's trade experience was an important asset for the delineation of his communication strategy: the perfect timing; the «consumer friendliness» of his speech, in line with the methodological requirements of scientific experimentation as well as with the agenda (or propaganda) of the Royal

[59] SHAPIN & SCHAFFER, 1985: 77, passim.
[60] SPRAT, 1667: 67.
[61] SPRAT, 1667: 67.
[62] SHAPIN, 1988: 396.
[63] LUX & COOK, 1998; RUSNOCK, 1999.
[64] 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[65], 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-18th century Royal Society.

ANNEX



[238]

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. IN 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.

1ſt. I ordered one of my negroes to gather me a 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.

2dly. 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 rinced them in cold water.

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

[239]

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

4thly. I then dipped the piece of flannel N° 2. in the ſame juice, and being deſirous to clean my hands from the ſtain, which N° 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° 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.

5thly. 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)

[65] SPRAT, 1667: 85.

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PART II

PERCEPTIONS AND INTERACTIONS WITHIN COLONIAL NATURAL WORLDS

TOWARDS A SCIENTIFIC APPROACH OF NATURE: LOOKING AT SOUTHERN AFRICA BIODIVERSITY THROUGHOUT THE 16TH CENTURY PORTUGUESE RECORDS ON MARINE FAUNA*

ANA CRISTINA ROQUE**

Resumo: Considerando as informações dadas nos Roteiros e Diários de Navegação do século XVI sobre a fauna marinha da África Austral, pretende-se avaliar não só a relevância desta informação e a importância desses documentos na época, como a sua possível relevância atual para uma melhor compreensão da dinâmica desta região, numa perspetiva global, na qual questões como a biodiversidade, os recursos naturais ou a sustentabilidade se tornam cada vez mais importantes.

Palavras-chave: África Austral; Biodiversidade; Fauna marinha; Registos portugueses do século XVI.

Abstract: Considering the historical information on Southern African marine fauna given in the Portuguese 16th century Log Books and Diaries of Navigation, this chapter addresses both the relevance of these documents at the time, and the possible present-day importance of this information for a better understanding of the dynamics of this region from a global perspective, in which factors such as biodiversity, natural resources or sustainability become increasingly important.

Keywords: Southern Africa; Biodiversity; Marine fauna; 16th century Portuguese records.

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PREVIOUS CONSIDERATIONS

One of the most relevant consequences of the 16th century transoceanic Portuguese travels concerns the acknowledgement and documentation of regions until then unknown to the Europeans. Landscape, fauna and flora were carefully observed and described and for some areas, such as Southern Africa, these records are the first known written documents informing of the regional ecosystems and wildlife.

Fig. 1. Study area

Information on wildlife is particularly significant as it provides important data on local and endemic species, regional distribution and animal behaviour which, in turn, when compared with other data from different scientific fields, allows the possibility of using it in a wider context, opening perspectives for interdisciplinary work involving diverse areas of the humanities and natural sciences as well as of the History of Science(s).

In this context, this chapter proposes an approach to Natural History from a broader perspective, considering both Southern Africa biodiversity and Environmental History, making use of information from 16th century Portuguese Log Books and Diaries of Navigation and questioning the European perspective on the processes of construction of scientific knowledge.

When thinking about natural sciences or natural history in the 16th century, what immediately comes to mind is not the idea of science or scientific expeditions but the idea of European expansion, trade and discoveries, discovery being mostly associated with the exotic, strange or monstrous which was, in fact, the general idea conveyed by the official discourse. This idea of the exotic feeds the imagination of the European, raising fears and anguishes very well expressed in literature and iconography of that period[2]. No matter the relevance of the new discoveries and the possible scientific impact, this feeling of fabulous-mysterious or «abnormal» things persisted in the mid-16th century discourse, giving priority to the description/representation of what was seen/experienced rather than to the record of a possible systematic observation required by a scientific methodology still under construction.

[2] CLASSEN, 2013.

None of the early 16th century Portuguese travellers had been previously instructed on the process of observation and/or classification of the natural world, but regardless of their professional skills, they were expected to describe and collect «natural objects» whenever possible. Indeed, most of the observations were made and recorded to assist and support specific activities such as navigation, to which marine fauna and flora were considered one of the main signs of what was then called the «conhecenças da terra», i.e. the «vital signs» to help travellers and navigators locate when at sea and recognize the nearby land[3].

Seafarers were familiar with the observation and use of these signs as their correct interpretation was crucial for safe sailing. Each observation was framed by each experience and a set of descriptive practices related to specific purposes with a practical and immediate result, even though contributing to structure a specific *corpus* of knowledge on each region, which in the case of maritime travels included navigation instructions, geographic coordinates and magnetic variations, geo-climatic features, information on marine fauna and flora. A *corpus* of knowledge, based on multiple personal experiences and capable of being transmitted to sequential travellers who, in turn, could confirm, disprove or add more information according to their own experience. It is probably too much to talk about «acquired habits of perception cultivated by observation»[4] essential to consider it as result of scientific observation but, it's certainly a dynamic process, based on continuous learning and practical experience that we may consider pre-scientific.

Keeping this in mind and while focusing on the dialogue nature/science my proposal is that we look at the Portuguese 16th century Log Books and Diaries of Navigation informing about Southern Africa marine fauna, considering both the importance of the information they provide and the possible present-day relevance of this information for a better understanding of the dynamics of this region from a global perspective, in which factors such as biodiversity, natural resources or sustainability become increasingly important.

Such an approach will allow a wider perception of the importance of these documents in the sense that, as the scientific impact was not prompt – there is no evidence of its immediate circulation outside the specific groups collecting and using it – and imagination prevailed in many descriptions, we may be led to think that their contribution was not significant. Yet, despite this apparent lack of «scientificity», knowledge on marine fauna was of utmost importance within the Portuguese Expansion project and the data collected was (and still is) of extreme relevance, from a scientific perspective.

Additionally, this approach will bring us to specific questions related either to the documents selected to address this subject – Portuguese Log Books and Diaries of Navigation from the first half of the 16th century – or the way the information was collected and used and therefore the reliability of the data and its possible scientific validation or how to «authenticate eyewitness's testimony about distant places»[5] and different «natures».

[3] ROQUE, 2003.
[4] DASTON, 2008: 98.
[5] DAVIES, 2016: 10.

CONTEXT AND SOURCES

Both Log Books and Diaries of Navigation have been mostly used to approach the technical aspects of navigation or the art of sailing during the period of the Portuguese Expansion and thus primarily used to emphasize the technical aspects of navigation and the art of sailing[6]. Most of them were written by pilots, seamen used to observe the sky and the sea to prevent travel accidents, predicting the weather conditions, perceiving in time possible storms or land distances, readjusting or confirming sea route directions. None of them were scientists or had any training in natural science, thus enabling them to realize the potential importance of the information collected for further scientific validation[7]. Yet, their registry provides crucial information on the described areas, among which marine fauna is of paramount importance.

Integrating the body of a technical record, the marine fauna – seabirds and marine mammals – benefited from a privileged position. The fauna was extensively mentioned according to seasonal or sporadic occurrences along the sea road to India, and described in detail in view of the use of this information as a reliable indicator for navigation and recognition of the different Southern African coastal areas. And all the regions had a set of specific information on their peculiar signs.

Let's take the example of the Cape of Good Hope and how seamen could easily recognize its proximity.

Following these documents, the proximity of the Cape was recognized by the increasing number of flocks of birds and one or other sea lion. The most common birds would be *calcamares*, *antenais* and *feijões pintados*[8], but other birds could appear, depending on the season or on the route followed, closer or further away from the coast.

Accordingly, while travelling nearer the coast, the concentration of seabirds around the Cape would be huge from February on. The end of February was marked by flocks of *alcatrazes*, *gaivotas* and *corvas*, all laying together on the sea[9], before the arrival of the *negritas* which in early March could also be seen in big groups resting on the sea[10]. *Negritas* and *gaivotas* were always together[11] and both persisted in the Cape area until June, when the *gralhas* arrived[12]. However, from June onwards the number of seabirds decreased and only a few groups of *calcamares*, *antenais* and *feijões pintados* would remain[13].

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[6] ROQUE, 2001; ROQUE, 2003; ROQUE, 2013.

[7] GANNIER, 2009: 27.

[8] *Regimento de Portugal para a Índia (1550)*. In *Livro de Marinharia de Bernardo Fernandes (cêrca de 1548)*. Pref. e notas por A. Fontoura da Costa. Lisboa: Agência Geral das Colónias, 1940, p. 55-64.

[9] FERNANDES, Bernardo – *Diário de Navegação da Nau Boquica-a-Velha, saída de Lisboa para a Índia no anno de 1548*. In *Livro de Marinharia de Bernardo Fernandes (cêrca de 1548)*. Pref. e notas por A. Fontoura da Costa. Lisboa: Agência Geral das Colónias, 1940, p. 176-203.

[10] VAZ, André – *Diário de Navegação da Viagem de Inverno que, em 1537, fez André Vaz*. In *Livro de Marinharia de Bernardo Fernandes (cêrca de 1548)*. Pref. e notas por A. Fontoura da Costa. Lisboa: Agência Geral das Colónias, 1940, p. 152-175.

[11] FERNANDES, Bernardo – *Diário de Navegação da Nau Boquica-a-Velha*… p. 176-203.

[12] CASTRO, D. João de – *Roteiro de Lisboa a Goa (1538)*. In *Obras Completas de D. João de Castro.* Ed. crítica por Armando Cortesão e Luís de Albuquerque. Coimbra: Academia Internacional da Cultura Portuguesa, 1968-1982. 4 vols.

[13] *Regimento do Cabo da Boa Esperança para a Índia (1535-1555)*. In *O Livro de Marinharia de Manuel Álvares*. Ed. por Luís M. de Albuquerque e Armando Cortesão. Lisboa: Junta de Investigação do Ultramar, 1969, p. 102-105.

As for marine mammals, sea lions, whales and porpoises would also be very common[14]. In February, it was possible to observe big groups of porpoises and sea lions[15] but, if passing the area in June, sea lions would not be seen there as they took shelter on land to protect themselves from the low temperatures[16].

Yet, if forced to travel further from the coast most of these signs would not be seen. For over 40 leagues off the coast, the *altarizes*, the *mangas de veludo* and the white *alcatrazes* with black tip wings dominated[17] and for more than 60 leagues from the coast, the only sign would be the black *corvas* with white beaks[18]. However, though these last ones were a very good sign they could not be seen if travelling near the coast.

This example gives us quite a good idea of the type of information given in these documents on Southern Africa marine biodiversity in the 16th century and calls our attention to the potential of this data.

Far from scientific purposes, safe travelling made these observers/writers very cautious and precise in all their records, reporting everything considered unusual or simply noting the lack of significant signs, which was equally important[19]. In a way, it could be said that these records were never concluding documents, but a set of comprehensive notes able to be modified, so as to enlarge and improve as every new travel could bring new observations and changes and, at any moment, these observations could be revised and turned into significant signs. Over the years, and based on observation and practical experience, more information on the region would mean better knowledge plus better chances of travelling safely and the possibility to compare and integrate regions and information in a global *corpus* of knowledge.

With respect to marine fauna, the result was the creation of a body of coherent and consistent data, based on continuous observations and permanent updates of information, that goes far beyond navigation purposes and leads us directly either to the field of History and Natural Science(s) or to present day concerns regarding marine biodiversity and nature conservation in Southern African coast.

The information provided by these documents – identification of animal species, regional distribution, breeding rookeries, displayed behaviours, species associations, migrations routes – reveals and enhances their importance as a pertinent *corpus* of reference, historically supporting and framing some of the major debates of the 21st century, such as biodiversity, sustainability or the management and usage of the different natural resources.

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[14] *Regimento de Portugal para a Índia (1550)*… p. 55-64.
[15] FERNANDES, Bernardo – *Diário de Navegação da Nau Boquica-a-Velha*… p. 176-203.
[16] AFONSO, Diogo – *Roteiro da Navegação daqui para a Índia (1535)*. In *O Livro de Marinharia de Manuel Álvares*. Ed. por Luís M. de Albuquerque e Armando Cortesão. Lisboa: Junta de Investigação do Ultramar, 1969, p. 84-104.
[17] *Roteiro das Costas Sul e Oriental de África (post. 1535)*. In *Documentos sobre os Portugueses em Moçambique e na África Central, 1497-1840*. Lisboa: National Archives of Rhodesia/Centro de Estudos Históricos Ultramarinos, 1969, vol.VI, p. 440-457; AFONSO, Diogo – *Roteiro da Navegação daqui para a Índia (1535)*… p. 84-104.
[18] AFONSO, Diogo – *Roteiro da Navegação daqui para a Índia (1535)*… p. 84-104.
[19] *Diários da Navegação da Carreira da Índia nos anos de 1595, 1596, 1597, 1600 e 1603*. Dir. por Quirino da Fonseca. Lisboa: Academia de Ciências de Lisboa, 1938.

The current discussion around these issues has evidenced the need to identify these resources as well as the different ways and strategies developed by the populations to make good use of them, thus stressing the importance of assessing the available resources while looking for solutions for their preservation and rational management without prejudice of its traditional use by the populations.

Far from being a problem confined to specific areas, this subject has today a worldwide dimension, stressing the deterioration or extinction of natural communities (plants and animals), whose balance also affects human communities. In turn, the transversality of the subject is also reflected in the possible involvement of different scientific branches of knowledge and methodologies working together in an interdisciplinary perspective and thus providing the possibility of a different and more global approach to this issue. In this context, History can play an important role as the specific research, to make available the existent historical information on these issues, provides the essential framework for a wider perception of its evolution and changes as well as a better comprehension of the present-day situation[20].

Accordingly, the choice of Southern Africa marine fauna was not random. On one hand, most of the historical references which has been used for the Atlantic and the Indian oceans were, for the 15th-16th centuries, polarized around iconographic representations, fanciful but visually attractive, or ambiguous descriptions making it difficult to identify the sketched or described species. On the other hand, Southern Africa, more precisely the coastal area from the Cape up to Natal's border is a very peculiar region either from the bio-geographical point of view, or from the perspective of the History of the Portuguese Expansion[21].

For the 16th century Portuguese navigators, sailors, travellers or merchants, Southern Africa embodied the double meaning of Expansion/Discovery, Fears/Expectations, as was rather well expressed by the double name given to the Cape – Cape of Good Hope or Cape of Torments –, and the huge universe of hypotheses and possibilities before the unknown, which is extensively described and understood as a whole.

HISTORICAL INFORMATION, KNOWLEDGE AND SCIENCE

Considering the existent written sources, the historical contextualization of Southern Africa brings us to very recent periods. As far as we know by now, the first written documents date from the late 15th century and were produced in the context of the Portuguese maritime expansion.

This particularity bestows a special importance on the Portuguese documents from the late 15th century/early 16th century also because these documents testify the progressive process of acknowledgement of the coastal areas related to the continuous and regular pursuance of the travels of the *Carreira da Índia*.

The regularity of the travels allowed a progressive awareness of the specific features of the region, emphasizing the urgent need to transmit and explain what was observed by means of comparison with known environments: first, by identifying novelties and comparing them with European

[20] DAVID & SITTERT, 2008.
[21] ROQUE, 2012.

references (roughly till the mid-16th century), secondly, by comparing the observations made in the different African and Indian Ocean regions, to which the Portuguese were gradually becoming familiar (second half of the 16th century). Consequently, divulging distant and unfamiliar regions until then unknown to the Europeans also became a way of integrating these regions into the European world. From then on, there was one more place to observe, to compare, to study and think about when considering the relation with the non-European world.

Accordingly, the regularity of the travels, as well as the occasional and often forced stops of the route followed, allowed the building of a data repository quickly incorporated into the official discourse. This repository enabled, at the time, the acknowledgement of the different places along the African coast, by pilots and travellers, while, today, it can contribute to a better understanding of the characteristics, evolution and changes of the described regions.

Obviously, one cannot expect these records to be as exhaustive as the later European ones. Unlike the Dutch and the English, the Portuguese never considered Southern Africa as a regular stop but only as a waypoint to reach the Indian Ocean and the Far East. Most of the observations and records were made from inside the vessels while travelling as stops to go ashore were not foreseen, except in case of lack of fresh water or of exceptional situations. Thus, we cannot expect systematic records resulting from a continued and effective presence in the region that would disclose more precise and detailed information like the one provided by the records used by David and Sittert[22] for their work on the South African cape fur seals.

However, this cannot question the importance of the information collected. In the case of the Cape fur seals, for instance, if the Portuguese documents had been used, namely the account of the 1st Voyage of Vasco da Gama to Índia[23], the reference to the species, their distribution, occurrence and specific behavior could have been accurate, based on substantiated information which referred to the «discovery» of this species at the end of the 15th century. Instead, the use of later information did not allow more than to erroneously assume that Cape fur seals were «first discovered by itinerant sailing vessels in the late 16th century»[24] and that they were abundant before the arrival of the Dutch and their harvesting for commercial purposes (skins and oils).

In fact, specific references on animal populations, with more or less precise data on population and certain aspects of animal behaviour, migratory birds and their routes and stops, on the regional ecosystems, on the identification and locations of drinking water reservoirs, on the reference to the use and exploitation of wild resources by populations or on the degradation of particular *habitats*, are quite well documented in these records, allowing us to realize today the historic problems of their uses and threats to which they were subjected, as well as a better perception of the degradation of the natural communities in the region and its reflection in everyday life of the populations[25].

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[22] DAVID & SITTERT, 2008.
[23] VELHO, Álvaro – *Diário da 1.ª Viagem de Vasco da Gama à Índia (1497-1498)*. Lisboa: Publicações Alfa, 1989. (Biblioteca da Expansão Portuguesa).
[24] DAVID & SITTERT, 2008: 107.
[25] ROQUE, 2001; ROQUE, 2003; ROQUE, 2013.

Opening a door to the unknown, the voyages of the Portuguese and their records in the fifties displayed knowledge of other worlds, created opportunities for interaction in spaces up to then unknown and often established a relationship between us and the Other, in a context that we today can call a first globalization. Their observations and records are at the origin of a new perception of nature and were the starting point for a sequent scientific practice of observation, essential to all empirical sciences[26].

THE DATA: OBSERVING AND RECORDING MARINE FAUNA

Marine fauna was considered one of the most distinctive signs for the recognition of the diverse geographic areas mentioned in these documents, with emphasis on seabirds and sea mammals. Both have been described and referred according to their contribution to the identification and recognition of the different areas of the South and Southern East African coast[27].

Contradicting all medieval expectations and fears of unknown monsters who were supposed to inhabit the Southern seas and lands[28], Southern Africa marine fauna was a real surprise to these first travelers as it made them feel at home. Hoping to find a completely unknown world they were confronted not only with very similar landscapes and geo-climate conditions, enabling them to recognize most of the species, but also with the fact that Southern Africa was, like some regions in Portugal, a migration pole and breeding area and therefore a region where they could easily appeal to their common knowledge regarding the use of traditional «navigation signs».

Both Log Books and Navigation Diaries from the first half of the 16th century are full of quotations, particularly related to seabirds, testifying to this proximity and especially the possibility of using ancestral knowledge of seamanship in waters so distant, and allegedly different from the ones they knew and were used to sailing.

In fact, throughout the centuries experience had taught these men that, once at sea and no matter where, the careful observation of marine fauna's behaviour would be of great help to predict the weather conditions and the distance of nearby land, as well as to readjust or confirm sea route directions. That is why they were so careful and precise in their records, mainly on what concerned the occurrence of seabirds; the most important sign and thus the one to be recorded, every day, immediately following the registration of the latitude values. Seabirds were most often the only sign of nearby land that no one could see but knew was there.

SEABIRDS

The relevance of seabirds as navigation signs is mainly responsible for the huge amount of information collected, namely on the diversity, distribution, behavior or frequency of the various species observed in Southern Africa. As shown in Table 1, with the example of *alcatraz*, the references

[26] DASTON, 2008.
[27] ROQUE, 2013.
[28] DUZER, 2013; DAVIES, 2016.

clearly point to the possibility of assessing not only the frequency of observations but, for each trip, where and when the species was observed and which were the features worth of being incorporated as «knowledge» to report to subsequent travelers.

Table 1. Seabirds referred to Southern Africa coast – gannets (*alcatrazes*) (first half of the 16th century)

***ALCATRAZ* (GANNET) – REGIONAL DISTRIBUTION AND ANNUAL OCCURRENCE: CAPE OF GOOD HOPE – ALGOA BAY[29]**				
Reference place[30]	**Latitude**	**Period of the year**	**Comments**	**Information[31] Source**
Cb. Boa Esperança	35.º/36 ½ S	-	In groups. In the sea, 30-40 leagues from land	AFONSO, 1940 [1553] (see n.º 2)
	-	March	In association with big black birds looking like chickens (Penguins)	AUTOR DESCONHECIDO, 1969 [*post* 1535] (see n.º 19)
	-	April	Small groups	AUTOR DESCONHECIDO, 1940 [1538] (see n.º 7)
	-	May/ June	Big groups	CASTRO, 1968-1982 [1538] (see n.º 4)
Cb. Boa Esperança/ Cb. Agulhas	34.º ½ S	February	1 gannet and 1 *paturca*	FERNANDES, 1940 [1548] (see n.º 12)
	35.º 1/6 S		Big groups	CASTRO, 1968-1982 [1538] (see n.º 4)
Pta. S. Brandão / Cb Falso	-	April	Small groups	AUTOR DESCONHECIDO, 1940 [1538] (see n.º 7)
Cb. Agulhas (55 leagues North)	-	February	Big groups with gannets, seagulls and *negritas* or only gannets and seagulls	FERNANDES, 1940 [1548] (see n.º 12)
Cb. Agulhas (North of)	-	March	Big groups of gannets, white seagulls and *antenais*. Early in the morning along with seagulls though gannets fly far away from land	AUTOR DESCONHECIDO, 1940 [1538] (see n.º 7)

(cont.)

[29] Current Port Elizabeth.
[30] Names in Portuguese as they appear in the documents used.
[31] The bibliographic references included are necessarily brief and simplified. To see the complete citation, check the final bibliographic list at the end of this paper.

Reference place	Latitude	Period of the year	Comments	Information Source
		June	Small groups. In the sea, early in the morning, in big flocks	AUTOR DESCONHECIDO. 1940 [1534] (see n.º 9)
			In association: big groups of gannets flying over porpoises and sea lions	AUTOR DESCONHECIDO, 1940 [1538] (see n.º 7)
		July	Big groups of gannets flying over flocks of birds looking like seagulls standing in the sea	AUTOR DESCONHECIDO, 1940 [1534] (see n.º 9)
Cb. Agulhas	-	February	Groups of gannets and seagulls	AFONSO, 1969 [1535] (see n.º 1)
		March	Groups of gannets and white seagulls and, sometimes, sea lions	AFONSO, 1940 [1553] (see n.º 2)
Cb. Agulhas (South of)	36/35.º 2/3 S	-	Groups of gannets with white beak *corvas*	AFONSO, 1969 [1535] (see n.º 1)
Angra de São Brás	35.º S	March	Flocks of gannets flying over porpoises	AFONSO, 1969 [1535] (see n.º 1)
			1 gannet isolated flying along with a flock of birds looking like seagulls	CASTRO, 1968-1982 [1538] (see n.º 4)
Baía de Alagoa	34.º ½ and 35.º S	February	Very large flocks of gannets, seagulls, black *corvas*, *negritas* and other unknown birds or flying along with seagulls over porpoises and flocks of *antenais* and black *corvas* lying in the sea. In the sea, lying in large groups, 18 leagues away from land	FERNANDES, 1940 [1548] (see n.º 12)
		March	Groups of gannets and seagulls	FERNANDES, 1940 [1548] (see n.º 12)
			Flocks of brownish gannets flying, sometimes over porpoises	AFONSO, 1969 [1535] (see n.º 1)
		July	Gannets isolated	AUTOR DESCONHECIDO 1940 [1538] (see n.º 7)

Seabirds were such a significant indicator that one simple text, combining direct observation with cumulative knowledge, can inform on more than a dozen of birds observed in a certain area.

This symbiosis is quite evident in the Log Book of the Ship S. Martinho written by Gaspar Ferreira Reimão in 1597 where, regarding Southern Africa, he reports the occurrence of two

dozen varieties of birds. Reimão combines data from new observations with the information already collected earlier, opposing what he saw to what was expected to be seen, as expressed in this short text about the «conhecenças» of the Cape of Good Hope: Hoping that the signs of approaching the Cape would be «*altarizes* with white breast […]. White birds called *cemtenais* […] and most probably some called *mangas de veludo* that are black and have white breast»[32], Reimão didn't find anything but «one *feijão* and one *gaivotão* and some *borrelhos* […] a bigger bird, some corva, which is an all white *feijão* like a seagull, and in the sea one or two *calcamares*»[33]. Follow-up travelers would, henceforth, be forewarned and meet these new signals, whether they were casual or really occurring; and in the case of usual occurrence, validate the information as indicator signs for the Cape.

This dynamic process combining observation, registry and validation enable us, today, to identify 32 different types of birds occurring along the Southern Africa shore line, from the Cape of Good Hope to the Coast of Natal, in the 16th century (Table 2).

Most of these birds were then named according to the 16th century designations used by Iberian seamen, appealing to specific cultural references and navigation experiences in other waters, and joining a reference system of knowledge recognized by seamanship even in unfamiliar waters.

The identification is clear when it comes to known species but, when the distance can be misleading there's only a «seems to be», having however particular care when finding something new, never seen before and therefore cause for attention in view of future identification[34].

As previously said, the comparison with known references was the starting point for classifications and descriptions, allowing a quick identification. However, many of these names have changed or fallen into disuse and only a serious research on specific documents concerning the Portuguese maritime fauna in the modern period and the morphological or the behaviour description potentiate the possible identification of some of them. Such is the case, for instance, of the birds called *Calcamares*, whose name stems from the specific way these birds seem to walk on water and even in the case of different species, make them easily recognizable by the seafarers.

Unfortunately, most of the time this information is no more than a name and a brief description as is the case of the *cagalhos*[35] and thus clearly insufficient to enable any identification, even when both the historian and the biologist engage in a joint analysis of the information.

Identification is indeed one of the greatest challenges to the interpretation of this data. In most cases, it is hard to reach a conclusion about what kind of bird they were describing, being this situation even more complicated when the same bird name appears under different descriptions, making consensus about which bird or birds might be involved difficult, as in the case of the *borrelhos* (Plovers?

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[32] *Roteiro das Costas Sul e Oriental de África (post. 1535)*… p. 440-457.
[33] REIMÃO, Gaspar Ferreira – *Diário da Navegação da Nau S. Martinho, em viagem para a Índia, no ano de 1597, por oeste da Ilha de S. Lourenço (1597)*. In *Diários da Navegação da Carreira da Índia nos anos de 1595, 1596, 1597, 1600 e 1603*. Dir. por Quirino da Fonseca. Lisboa: Academia de Ciências de Lisboa, 1938.
[34] CASTRO, D. João de – *Roteiro de Lisboa a Goa (1538)*… p. 136.
[35] VAZ, André – *Diário de Navegação da Viagem de Inverno que, em 1537, fez André Vaz*… p. 152-175.

Sandpipers?). According to Castro[36] they are «small birds that roam the beaches, to the edge of the sea, and now run after the waves, sometimes after they make waves». Rodrigues[37] says they are «small white birds» while others wrote they were «small as a house sparrow but grey» or, in a more elaborated form, describe them as a «water bird, the starling species, brown with white belly, long legs and a beak»[38]. Therefore, though frequently mentioned for all Southern Africa in the second half of the 16th century, descriptions of the *borrelhos* are not consistent with each other, making it difficult to agree on which bird or birds they might refer to, or if it is always the same bird and the different color of plumage corresponds not to different birds but to differences between males and females, juvenile and adults.

Still, in 8 cases it was possible to identity the species, and in 17 the family (Table 2). Major references concern seagulls, gannets, cormorants and terns flying alone, in clouds or in association with other species, such as *corvas*, *garajaus*, *negritas*, *paturcas* and *alcatrazes*, to which notes on their specific behaviour can be added: the *alcatrazes* have heavy flight and are never further out at sea than 40 leagues[39]; the *paturcas* prefer to be further, between 80 to 100 miles of the coast and are inseparable companions of the *negritas* and the seagulls[40].

Table 2. Seabirds referred to Southern Africa coast (first half of the 16th century)

Portuguese name	Species	Family	Obs.
Alcatrazes		*Sulidae (?) / Laridae (?)*	Portuguese generic name covering different species of the) *Laridae* and *Sulidae family*
Alcatraz do Cabo	*Morus capensis*	*Sulidae*	
Altarizes	*Haliaetus vocifer (?)*	*Accipitridae* (?)	Location and description suggests the African Fishing Eagle
Antenais	*Diomedea exulans* and/or *Thalassarche chlororhynchos*	*Diomedeidae*	*Antenal, Entenais*, *Centenais* or *Albatrozes* Portuguese common names formerly assigned to various species of this family
Borrelhos		*Charadriidae*	
Cagalhos		*Oceanitidae (?)*	
Calcamares		*Oceanitidae (?)*	Portuguese generic name given to several species of this family

(cont.)

[36] CASTRO, D. João de – *Roteiro de Lisboa a Goa (1538)*…
[37] BNP – Biblioteca Nacional, mç. 222, n.º 5. RODRIGUES, Vicente – *Roteiro da Carreira para a Índia com os ferros da Agulha, debayxo da Froll de Lys*.
[38] *Diários da Navegação da Carreira da Índia nos anos de 1595, 1596, 1597, 1600 e 1603*… p. 324.
[39] *Roteiro das Costas Sul e Oriental de África (post. 1535)*… p. 440-457.
[40] *Diário de Navegação da Nau Espera, que partiu da Índia para o reino, de Cochim, a 26 de Janeiro (1538)*. In *Livro de Marinharia de Bernardo Fernandes (cêrca de 1548)*. Pref. e notas por A. Fontoura da Costa. Lisboa: Agência Geral das Colónias, 1940, p. 147-151.

Portuguese name	Species	Family	Obs.
Coleiradas			Portuguese generic name given to all birds showing «a leash»
Corvas		*Phalacrocoracidae*	*Corvas pretas*, *Corvas marinhas* and *Corvetas* Probably Cormorants
Estopegados or Estopagados			Portuguese generic name assigned to a coastal water bird of South Africa, namely in Angola
Farilhões			
Feijões and Feijões pintados		*Procellaridae ?*	
Fradinhos	*Tringa ochropus*	*Scolopacidae*	Also known in Portugal as *Rabilongo*
Gaivotas		*Laridae*	Portuguese generic name assigned to several species of this family
Gaivotões		*Laridae*	Portuguese generic name assigned to several species of this family
Garajaus	*Sterna sandwicensis*	*Laridae*	
Garajinas or grazinas	*Sterna albifrons*	*Laridae*	
Gralhas		*Corvidae*	
Maçaricos		*Charadridae*	
Mangas de Veludo	*Macronectes giganteus*	*Procellaridae*	
Negritas	*Bulweria bulweria*	*Procellaridae*	
Pardaços		*Scolopacidae*	Portuguese generic name given to some species of this family
Pardelas		*Procellaridae*	Portuguese generic name given to some species of this family
Paturcas		*Diomedeidae (?)*	This is probably a species of the family of the Albatrosses
Pintadas			
Quelhas			
Rabiforcados		*Fregatidae*	Portuguese generic name given to some species of this family
Rabos de Junco		*Phaethontidae*	Portuguese generic name given to some species of tropical waters

(cont.)

Portuguese name	Species	Family	Obs.
Rolas and roletas			
Rombos			
Sotelicários	*Sheniscus demersus*	*Sheniscidae*	African Penguin
Tinhosas			
Birds looking like abetardas or alcatrazes		*Sulidae (?)*	Description and location suggests *Morus capensis* or other species of this family

In the case of unknown species, the penguins were headliners. Even if mistakenly considered a bird unable to fly by lack of feathers in the wings, African penguins were thoroughly described under the name of «sotelicários».

They are a good example to feature the way the descriptions were made, always appealing to a European referential to allow an approximate idea of the physical and behavioural characteristics of these animals: they were like ducks, though bigger, had beaks, walked like chicken and heehawed like donkeys. We probably would never describe the penguin this way but, in the European bestiary chicken and ducks were, for most people, the only known flightless birds and the comparison was crucial to give the idea of something that would allow the appropriation of an image/representation of these new animals.

A few years later, the Dutch reaction regarding the Dodo of the Mascarenhas Archipelago would be very similar. It was strange that they had no fear of men but the exotic remained in that they were birds unable to fly, not because they had no feathers but because they were too heavy and the wings had been replaced by a few black quills[41].

How many of these seamen were familiar with strange big birds unable to fly? Other than the smaller domesticated birds there was little information on flightless birds in Europe in the late 15th century, as most of these species are non-European.

Yet they did describe them as birds and tried to give a possible explanation for this fact. Today, 40 flightless species are known and the description of the «sotelicário» is, no doubt, the first historical testimony of the existence of flightless birds in Southern Africa.

Besides these cases, special care was taken on the information on migration periods, nesting or wintering places, on the association of different species and their behaviour during certain periods of the day or the year, particularly in big concentrations and migratory movements related with changing season periods. The major concentration points were then, as today, Cape Agulhas and Algoa Bay/ Port Elizabeth (*Baía de Alagoa*) where most of the species could be observed in great clouds between the end of February and beginning of June.

[41] HUME, 2006; SELVON, 2012.

SEA MAMMALS

Though less referenced than the seabirds, the data collected on sea mammals is of no less importance. South African fur seals – *Arctocephalus pusillus*[42] – and several kinds of whales and dolphins are a permanent reference in these documents. Most of them, even if not pertaining to the same species, as in the case of the seals, were well known by all those used to sail the Atlantic waters and the descriptions show clearly that they were able to see and register the differences and similarities by comparing them.

In a universe of several species of sea mammals referenced to the Southern African waters, these accounts report at least 5 different types, even though sometimes the reference is nothing more than a vague or generic allusion to a whale or something resembling a whale, not allowing any possible identification. Anyhow, in 1 case it is possible to identify the species while 2 offer some doubts on the family's identification (Table 3).

Table 3. Sea mammals referred to Southern Africa coast (first half of the 16th century)

Portuguese name	Species	Family	Obs.
Baleatos			Portuguese generic name covering different species of the *Zhiphidae, Delphinidae* and *Physeteridae* family
Baleias			Portuguese general designation for whales covering different species of the *Balaenopteridae* and *Balaenidae* family
Botos		*Delphinidae*	Portuguese generic name covering different species of the family. According to the region they can be named by «botos» (dolphins) or «toninhas» (porpoises)
Lobos marinhos	*Arctocephalus pusillus pusillus*	*Otaridae*	South African Cape fur seal
Toninhas		*Phocoenidae*	Portuguese generic name covering different species of the family. According to the region they can be named by «botos» (dolphins) or «toninhas» (porpoises)

As for the seabirds, references underline associations, geographical distribution, location and breeding rookeries, occurrences or absences as well as several associations with flocks of birds, that in certain periods of the year share the same waters[43], as well as specific aspects of their

[42] One of 16 species of marine mammals in the family of Eared seals which include sea lions and fur seals. It is the only resident species of seals in Southern Africa and occurs from the Angola South border along the Namibia coast till Port Elizabeth in South Africa. South African Cape fur seal, *Arctocephalus pusillus pusillus,* is one of the two sub-species, endemic to South Africa, with a regional distribution on the south and southwestern coast of Africa (*Encyclopedia of Life*, 2011…).
[43] Table 4.1, 4.2 and 4.3.

behaviour[44]; being the unknown species or their strange behaviour, namely the displaying behaviour, the ones worthy of special attention.

Unlike seabirds, throughout the years the records become more detailed, mainly related to the time of the year when the travellers could observe the animals and watch and describe their specific behaviours, while registering with precision attendances and absences, when they accounted for extraordinary situations that contradicted previous records.

Every unknown detail was a priority to write down and describe and even for similar species they were used to finding in the Atlantic waters, the descriptions clearly highlighted the caution in posting the differences and similarities, by comparing the different species.

Table 4.1. Southern African coast: sea mammals referred to place and period of observation – whales and dolphins (*baleias*, *baleatos e botos*) (first half of the 16th century)

Portuguese name	Place of observation[45] with reference to latitude	Period of the year	Obs.	Information source
Baleias	Cb. Boa Esperança		– In large groups – They appear at times in conjunction with the Cape fur seals	FIGUEIROA, 1964 [1505-1511] (see n.º 13)
	Cb. Boa Esperança		– In large groups – They appear at times in conjunction with porpoises and associated to large flocks of birds similar to seagulls and gannets	AUTOR DESCONHECIDO, 1940 [1522] (see n.º 8)
	Cb. Boa Esperança / Cb. Agulhas	June (end of)	– 1 whale and 1 Cape fur seal isolated	CASTRO, 1968--1982 [1538] (see n.º 4)
	Cb. Agulhas (40 leagues Northeast of)	March	– Group under a flock of «paturcas»	AUTOR DESCONHECIDO, 1940 [1535] (see n.º 10)
Baleatos	Cb. Agulhas	July	– Very few	AUTOR DESCONHECIDO, 1940 [1534] (see n.º 9)

(cont.)

[44] VELHO, Álvaro – *Diário da 1.ª Viagem de Vasco da Gama à Índia (1497-1498)*…
[45] Names in Portuguese as they appear in the documents used.

Portuguese name	Place of observation with reference to latitude	Period of the year	Obs.	Information source
Botos	Baía de Algoa (Latitude 34.º ½ South)	February	– In association: dolphins with porpoises under flocks of seagulls, *bulweria* and a few «antenais»	FERNANDES, 1940 [1548] (see n.º 12)
	Baía da Alagoa (Latitude 34.º South)	February	– In association: dolphins with large groups of porpoises, and bands of cormorants (?corvas) resting at sea under few «entenais» and flocks of gannets and seagulls; – In association: one dolphin with large groups of porpoises under small groups of «entenais», seagulls and *bulweri*a – In large groups	FERNANDES, 1940 [1548] (see n.º 12)
	Cb. Agulhas (45 leagues North of)	March	– A few big dolphins in association with large groups of «pardelas» and other seabirds	FERNANDES, 1940 [1548] (see n.º 12)
	Cb. Agulhas	July	– Plenty	AUTOR DESCONHECIDO, 1940 [1534] (see n.º 9)

Table 4.2. Southern African coast: sea mammals referred to place and period of observation – porpoises (*toninhas*) (first half of the 16th century)

Portuguese name	Place of observation[46] with reference to latitude	Period of the year	Obs.	Information source
Toninhas	Cb. Boa Esperança		– In large groups – They appear at times in conjunction with whales and associated to large flocks of birds similar to seagulls and gannets	MAYR, 1989 [1505-1506] (see n.º 15)
	Angra de S. Brás (Latitude 35.º South)	March	– In association: large groups of porpoises with flocks of gannets – In big flocks	VAZ, 1940 [1537] (see n.º 21)

(cont.)

[46] Names in Portuguese as they appear in the documents used.

Portuguese name	Place of observation with reference to latitude	Period of the year	Obs.	Information source
	Baía da Alagoa (Surroundings. Latitude 34.º ½ South)	February	In association: large groups of porpoises, black cormorans (? «corvas») and «entenais» at sea, all resting in water under big groups of seagulls and gannets – In big flocks	FERNANDES, 1940 [1548] (see n.º 12)
	Baía da Alagoa (Surroundings. Latitude 35.º South)	February	– In association: groups of porpoises under flocks of gannets with some seagulls – In big flocks	FERNANDES, 1940 [1548] (see n.º 12)
	Baía da Alagoa (Surroundings. Latitude 34.º ½ South)	February	– In association: groups of porpoises and some «entenais» and cormorans (? «corvas») resting on the sea, under groups of gannets and seagulls – Very large flocks of porpoises and dolphins under small groups with seagulls, «entenais» and *bulweria*	FERNANDES, 1940 [1548] (see n.º 12)
	Baía da Alagoa (Surroundings)	March	– In association: large groups of porpoises under groups of gannets – In big flocks	VAZ, 1940 [1537] (see n.º 21)
	Natal (South)	March	– In big flocks	FERNANDES, 1940 [1548] (see n.º 12)
	Cb. Agulhas (close to)	March	– Many porpoises along many birds, lodgings at sea	FERNANDES, 1940 [1548] (see n.º 12)
	Cb. Agulhas	March	– Many porpoises associated with «paturcas» and some other birds	FERNANDES, 1940 [1548] (see n.º 12)
		June (end of)	– In association: groups of porpoises and Cape fur seals under large groups of «entenais», jays, «fradinhos», «feijões pintados» and seagulls	AUTOR DESCONHECIDO, 1969 [*post* 1535] (see n.º 19)
	Cb. Agulhas (North)	June (end of)	– In association: large groups of porpoises under large groups of gannets – In big flocks	CASTRO, 1968--1982 [1538] (see n.º 4)
		June (end of)	– In association: large groups of porpoises under large groups of gannets – In big flocks	AUTOR DESCONHECIDO, 1969 [*post* 1535] (see n.º 19)

In the case of seals, and as these tables show, most of them were observed from the Cape of Good Hope till Natal's border, but the most significant groups, namely of South African Cape fur seals, were mainly referred in the areas between Namibia coast and the Great Fish River (Rio do Infante) with a major concentration around the Cape of Good Hope, the Cape Agulhas and Algoa Bay, especially the local endemic species known as South Africa Cape fur Seal (*Arctocephalus pusillus pusillus*).

Table 4.3. Southern African coast: sea mammals referred to place and period of observation – cape fur seals (*lobos marinhos*) (first half of the 16th century)

Portuguese name	Place of observation[47] with reference to latitude	Period of the year	Obs.	Information source
Lobos marinhos	Ilhas de Tristão da Cunha / Cb. Boa Esperança		– Many, depending on the season. – Not seen in cold weather. – Specific behavior in cold weather	AUTOR DESCONHECIDO, 1969 [*post* 1535] (see n.º 19)
	Cb. Boa Esperança		– In large groups – They appear at times in conjunction with whales	FIGUEIROA, 1964 [1505-1511] (see n.º 13)
	Cb. Boa Esperança (Latitude 35.º South)		– In association: groups of cape fur seals with groups of several birds («altarizes», «entenais» and Southern Giant Petrels)	AUTOR DESCONHECIDO, 1969 [*post* 1535] (see n.º 19)
	Cb. Boa Esperança (Latitude 34.º 1/3 South)		– In association: Cape fur seals along the coast and offshore groups of «calcamares», «feijões pintados» and «entenais»	VAZ, 1940 [1537] (see n.º 21)
			– In association: Cape fur seals along the coast and offshore along with groups of «calcamares», «feijões pintados» and «entenais»	AUTOR DESCONHECIDO, 1940 [1550] (see n.º 18)
	Cb. Boa Esperança	March	– In association: groups of sea lions with *bulweria* and many other birds at sea, all resting in water	VAZ, 1940 [1537] (see n.º 21)
	Cb. Boa Esperança / Cb. Agulhas	June (end of)	– 1 cape fur seal and 1whale (isolated) – Very few	CASTRO, 1968--1982 [1538] (see n.º 4)

(cont.)

[47] Names in Portuguese as they appear in the documents used.

Portuguese name	Place of observation with reference to latitude	Period of the year	Obs.	Information source
	Angra de S. Brás	March	– Great concentrations – In herds, covering the sea	AUTOR DESCONHECIDO, 1940 [1535] (see n.º 10)
	Ilhéu da Angra de S. Brás	November (end of) December	– Great concentrations – Breeding rockery – description; displaying behaviour – Sometimes in conjunction with the African Penguins	VELHO, 1989 [1497-1498] (see n.º 22)
			– Great concentrations	AUTOR DESCONHECIDO, 1966 [1518] (see n.º 5)
			– Great concentrations – Description; displaying behaviour	AUTOR DESCONHECIDO, 1969 [*post* 1535] (see n.º 19)
	Baía de Alagoa (Latitude 34.º 1/3 South)	February	– In large groups – In association: Cape fur seals with large flocks of segulls and *bulweria* – At sea, 12 leagues from land	FERNANDES, 1940 [1548] (see n.º 12)
	Baía de Alagoa (Latitude 34.º 1/2 South)	February	– In large groups – In large groups on the sea with his tail up	FERNANDES, 1940 [1548] (see n.º 12)
	Baía de Alagoa		– Great concentrations	PEREIRA, 1892 (see n.º 16)
	Rio do Infante	March	– In association: groups of Cape fur seals under flocks of «entenais», seagulls, «pardelas», gannets and *bulweria*	FERNANDES, 1940 [1548] (see n.º 12)
			– In association: groups of Cape fur seals under flocks of «entenais», seagulls, «pardelas», gannets and *bulweria*	AUTOR DESCONHECIDO, 1969 [1535-1555] (see n.º 17)
	Cb. Agulhas	March	– In association: groups of Cape fur seals under flocks of gannets and seagulls	VAZ, 1940 [1537] (see n.º 21)

(cont.)

Portuguese name	Place of observation with reference to latitude	Period of the year	Obs.	Information source
		June (end of)	– In association: groups of porpoises and Cape fur seals under large groups of «entenais», jays, «fradinhos», «feijões pintados» and seagulls	AUTOR DESCONHECIDO, 1969 [*post* 1535] (see n.º 19)
		July	– In groups with flocks of seagulls resting at sea and under flocks of gannets	AUTOR DESCONHECIDO, 1940 [1534] (see n.º 9)
	Cb. Agulhas (North of)	June (end of)	– In association: groups of Cape fur seals and flocks of gannets	AUTOR DESCONHECIDO, 1940 [1538] (see n.º 7)
	Cb. Agulhas (55 leagues North of)	February	– In association: groups of Cape fur seals and flocks of seagulls, gannets and *bulweria*	FERNANDES, 1940 [1548] (see n.º 12)

Today, as was probably in the early 16th century, the biggest and most significant colonies can be found along the Western coast[48] but, as it was impossible to sail safe near the coast, Portuguese accounts rarely inform on their occurrence in the Southwest African coast.

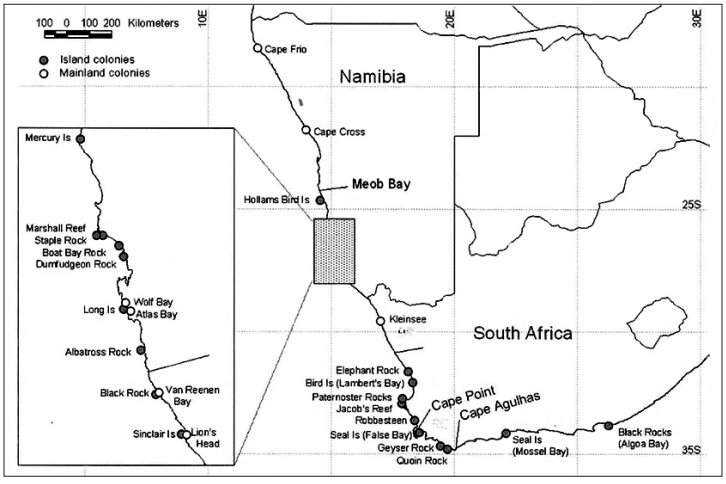

Fig. 2. Present-day distribution of Cape fur seal population in South Africa and Namibia[49]

[48] See Fig. 2.
[49] KIRKMAN, 2010: 63.

Information for the Western Cape areas is mainly on small groups or isolated individuals that exceptionally could be far from the coast. In fact, this is not a species of high seas. A maximum of 160 km from land has been recorded for this species but this cannot be considered a common situation[50]. The few explanations given for this situation in the Portuguese documents concern not the capacity of the animals to swim away from the coast in open waters nor the need to look for food but because in June, due to the extreme cold, they try to protect themselves in the coastal areas[51].

This is a very interesting comment because it's not a record made for navigation purposes. If this was considered an important sign for the navigation in the area, the information would include a reference to latitude or an indication of the distance from land to inform future navigators that, when seeing these small groups of Cape fur seals in that precise location, it meant that mainland would be about «x» km away. However, as there is no record of any of these figures, we can state that this comment refers to a specific behavior of these animals they had opportunity to witness, namely how they behave and react to the cold sea temperatures and winds characteristic of the Benguela Current Ecosystem, seeking shelter in the deepest and narrowest continental areas of this region as described in the synthesis presented by Kirkman[52]. Therefore, this reference, from an ethologic standpoint is probably the first one for this species in this geographical area.

As for the big concentrations, they were reported especially for Cape Agulhas and Algoa Bay, with relevance for Cape Agulhas, where the documents give information on the presence of all the species identified in the area, particularly at the end of June, beginning of July, with emphasis on Cape fur seals. Considering the seasonal migrations of several species, late June/early July is pointed out as the main period for the large concentrations of marine fauna in Southern Africa and the documents often report associations of seabirds with sea mammals, as shown in Table 4.1 and 4.2, in close relation with local marine flora and shoals of fishes[53].

Despite the fact that the Cape fur seal is a non-migratory species, there is considerable movement between their colonies and the documents show that if in early July they could be seen in Cape Agulhas, in March big herds of seals and porpoises were mostly concentrated further east on Mossel Bay (Angra de São Braz in the Portuguese documents). Apparently, these movements were not commented at the time and the reports don't mention the possibility of being the group being the same. Only some notes can inform that this kind of «distribution» was normal and if travellers and sailors didn't find them in those places at those precise periods, they should be very attentive because something wrong was going on.

The most frequent associations join cape seals, whales and porpoises with numerous clouds of birds with special relevance to seagulls and several migratory species but, only for the sea mammals do we have an approximate number of animals, and not just a simple general consideration on big or small herds, specifically for Mossel Bay where at least in late November one could count more

[50] *Encyclopedia of Life*, 2011…
[51] AFONSO, Diogo – *Roteiro da Navegação daqui para a Índia (1535)*… p. 66.
[52] KIRKMAN, 2010: 13-15.
[53] ROQUE, 1994.

than 3000[54]. Numbers that are not very far from the actual statistics on the size of the Cape fur seal colonies. Present day references point out colonies of 500-3000 individuals, although some have been spotted with over 3000[55].

Very often, the reports give information about thousands of birds in the sky or resting at sea, waiting for the right moment to start the migration North, side by side with the non-migratory Cape fur seals. However, from the Great Fish River up to the North, Cape fur seals disappear from the accounts and there are only references to whales, «baleatos» and porpoises in small or large groups, isolated or in association with other species, according to the time of year.

Besides the accurate description of most of all this species associations and the possible interpretations and meanings in terms of navigation signs, early travellers and sailors paid special attention to the breeding areas and the displaying behaviour of certain sea mammals. In some cases, as for the Cape fur seal, the description given by Álvaro Velho in 1497 is so detailed and rich that it is more than enough to give us, approximately, the period of the year they were passing by if we didn't know this information previously.

> *in this small island, there are lots of «sea lions» and some are as big as big bears and they are very dangerous, have many big teeth, attack men; no spear can trespass or hurt them; and there are other smaller and other even more smaller; and the big ones, roar like lions and smallest yelling like young lambs* […][56].

We know that Vasco da Gama's fleet passed by the Cape region between 25th November and 8th December and though the breeding period of this species starts in mid-October, most females give birth to their young by the end of November, exactly in the period that the Portuguese arrived and could observe the entire colony at this very special moment and could made the distinction between the males – the big ones as big as bears and roared like lions –, the females – smaller and calmer –, and the new born ones – the smallest, yelling like lambs.

That is probably why they noted that males could be dangerous to the point of attacking men, as during the breeding period males are even more fiercely territorial and will fight viciously to defend their chosen territories and their females. In fact, during all the 16th century there are no reports of seals attacking any boat of the *Carreira da Índia* in this area, and the threatening behaviour was most probably related to their male function of protecting the colony as a safe place for breeding and nursing the new born babies.

Despite the considerations on how dangerous they could be, there's absolutely no reference sustaining this risk for humans, even when the Portuguese started shooting at them from the boats[57] either because they were afraid or because they thought they could use them as food. In fact, though there are some references pointing out the opportunity of hunting for food purposes, none of them

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[54] VELHO, Álvaro – *Diário da 1.ª Viagem de Vasco da Gama à Índia (1497-1498)*…
[55] *Encyclopedia of Life*, 2011…
[56] VELHO, Álvaro – *Diário da 1.ª Viagem de Vasco da Gama à Índia (1497-1498)*… p. 14.
[57] VELHO, Álvaro – *Diário da 1.ª Viagem de Vasco da Gama à Índia (1497-1498)*… p. 14.

are conclusive regarding this possibility and all the information concerning the inclusion of the sea mammals in the daily diet regards the comments on local people's behaviour and traditions.

As for the furs, one of the main purposes of slaughtering the Cape fur seal population from the late 16th century till late 19th century, there is not a single reference in the Portuguese accounts, as well as no indication of any interest in its trade in this region, though there is information on the Portuguese trade of seal products (furs and oil) in the Northern West coast, North of the Guinea gulf, in the first half of the 15th century[58].

However, with or without Portuguese participation, the harvesting of seals seems to have been one of the major contribution for the decreasing of the seal population in the area from the late 16th until 1893, when the first legal restrictions over sealing in Southern Africa were introduced – Cape Fish Protection Act / Act No. 15 of 1893 of the Cape of Good Hope – which prohibited commercial sealers from operating without a government permit[59].

Back to our Cape fur seal and though a similar species – *Monachus monachus* (Mediterranean Monk Seal) – occurs in the Atlantic waters of Madeira, Azores and the Canary Islands, and the same species occurs in the Southwest African coast –, the fact is that there was no previous record of any observation of a breeding rookery. And this simple fact makes this description very special.

Moreover, it is not only the first written account on the displaying behaviour of this species during the breeding period, but also the first reference to one of the regional breeding rookeries, the *Ilhéu da Angra de S. Braz*, now Seal island in Mossel Bay. Among the 25 known existent breeding colonies from the Skeleton Coast to Port Elizabeth[60], Seal Island is the only one to have, in the early 16th century, a detailed written registry including location, an estimate of population and the description of the displayed behaviour of the species during breeding and nursing period.

It is interesting to note that this description is unique and none of the other references support the possibility of identifying or locating any other colony or breeding rookery in the region. On the South African coast, at least until the Great Fish River, boats sailed quite near the coast and it would have been easy to notice other colonies, even the ones on the rocky beaches of the mainland.

Today, three breeding colonies are known between Mossel Bay and Algoa Bay – Seal Island (Mossel Bay), Rondeklippe (Plettenberg Bay) and Black Rocks (Algoa Bay). Yet, it might have been that in the early 16th century, Mossel Bay was the biggest one or that the two other areas were not even used at the time; a possible reason for not being mentioned.

After a long period of threats due to poachers particularly interested in their pelts, blubber and meat as well as the genitals of the male puppies, taken and sold as an aphrodisiac[61], the actual population of Cape fur seals increased in Southern Africa during the 20th century and Seal Island in Mossel

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[58] ZURARA, Gomes Enes de – *Crónica dos Feitos da Guiné (1453)*. Lisboa: Publicações Alfa, 1989. (Biblioteca da Expansão Portuguesa).
[59] *South African/Australian Fur Seals, Arctocephalus pusillus*…
[60] There are estimated to be about 25 breeding colonies and a further 10 non-breeding colonies along the South African and Namibian coastlines, which together support a current estimated population of nearly 2 million seals (*Cape fur seal*…).
[61] *Encyclopedia of Life*, 2011…

Bay remained a breeding rookery for this endemic species. Additionally, Mossel Bay has also become one of the main feeding grounds in the area.

Nevertheless, today the whole resident community is being permanently and closely followed by the international organizations engaged in global nature conservancy. These organizations fear the possible damages caused to the community due to the habitat degradation mainly because of the marine pollution caused by the oil tankers in the Cape region. Yet, other than the oil pollution, plastic, pieces of netting, pieces of fishing line or even organized commercial hunting is still ongoing[62], killing or injuring thousands of these seals every year.

FINAL CONSIDERATIONS

It is important to mention that the information used here is only part of what we can find in the 16th century Portuguese Log Books and Diaries of Navigation to approach this subject. And, although the focus was on seabirds and marine mammals, similar information exists also on fisheries and fish banks or on marine flora.

Yet, even considering only the data presented here, it seems clear that these documents, as wells as giving technical records for navigation purposes, provide relevant data on 16th century South African marine biodiversity. And that this data, as historical information, reveals and enhances the importance of these documents as a pertinent *corpus* of reference either to help clarify the evolution and current situation of local marine communities, or to support and frame some of the major debates of 21st century on biodiversity, sustainability and on the management of the different natural resources.

Accordingly, the study of these documents can also be taken into a broader perspective which falls, for example, in the specific concerns of some recent institutions and organizations such as the African Marine Mammals Colloquium (AMMC) which, at its first meeting in South Africa in 2010, drew attention to the need to carry out data collection of the existing information on marine mammals for a better identification of the regional resources in view of building up databases supporting possible programs and conservation politics in the area.

As previously said, though these documents are not the result of systematic records resulting from a continuous observation of the Portuguese in the region, they provide valuable information on the animal populations and the regional ecosystems, allowing a better perception of the historic problems of their uses and threats to which they had been subjected throughout the centuries.

In this sense, it's not only necessary to show their relevance at the time, but to evaluate present-day importance by recognising that these documents deserve the attention of both historians and natural scientists and consequently to emphasise the need of a transdisciplinary work for a new perception of the 16th century' Southern African marine biodiversity and a much wider and global approach to the History of this region.

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[62] *South African/Australian Fur Seals, Arctocephalus pusillus…*

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CONNECTED MARGINS AND DISCONNECTED KNOWLEDGE: EXOTIC MARINE MAMMALS IN THE MAKING OF EARLY MODERN EUROPEAN NATURAL HISTORY*

CRISTINA BRITO**

Resumo: Sereias e manatins, assim como as representações híbridas destes seres marinhos, representam um bom caso de estudo para debater a construção de uma história natural do exótico no período moderno, assim como a evolução do conhecimento produzido e atores envolvidos. Tendo por base fontes escritas e visuais, é aqui discutida a produção e circulação de conhecimento natural sobre as sereias antigas e modernas, em comparação com as novas informações obtidas no Atlântico sobre manatins, e a sua inclusão na história natural Europeia. Este tipo de informação torna ainda possível discutir a relevância e persistência de certos mitos e de vários tipos de monstros marinhos. Assim, é apresentada uma cronologia dos autores que contribuíram para a construção deste tipo de conhecimento do mundo natural, desde humanistas, cartógrafos e naturalistas Europeus passando por missionários, colonizadores e viajantes do Atlântico. Estes últimos observaram em primeira mão uma abundância e novidade que transmitiram na forma de mapas, registos, cartas, manuscritos e livros, quase sempre em línguas vernaculares, os quais não entraram nos circuitos centrais da Europa letrada sobre história natural nos séculos XVI, XVII e nos que se se seguiram.

Palavras-chave: História Natural; Mamíferos marinhos; Circulação de conhecimento; Atlântico.

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* This study was supported by CHAM Strategic Project (FCSH/NOVA-UAc) sponsored by FCT (UID/HIS/04666/2013). The author was supported by a research contract from FCT (IF/00610/2015) at FCSH – NOVA University of Lisbon. The author would like to acknowledge Tânia Ferreira and Marta Fiolic for their help in the production of a short dissemination video of the current work that is available in the following link: https://www.youtube.com/watch?v=6a5K0lFvTxk.
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Abstract: Mermaids, manatees, and hybrid representations of both marine beings, offer a case for debating the construction of an early modern history of exotic natural history, knowledge evolution and key actors involved. Based on written and visual sources, production, circulation and interconnections of well-established knowledge on mermaids as real elements of the old and new natural marine world, in comparison to the slow development of natural knowledge related to manatees in Europe, will be discussed. Also, a discussion on the relevance and persistence of monsters from the sea, during early modern Europe and Atlantic will be conducted. This will allow to establish a chronologic representation and understanding of this natural knowledge created by authors ranging from European writers, naturalists and cartographers to Atlantic travellers, settlers and missionaries. The novelty and abundance these latter witnessed was shared through maps, logbooks, letters, manuscripts and printed publications, mostly in vernacular languages, but did not make its way into central routes of European natural knowledge production and exchange in the 16th and 17th centuries and beyond.

Keywords: History of natural history; Marine mammals; Knowledge circulation; Atlantic.

INTRODUCTION – ROUTES OF KNOWLEDGE CIRCULATION IN EUROPE AND ACROSS THE ATLANTIC

During the Early Modernity, European naturalists and humanists built important networks of contacts to exchange novelties and singularities, from local and remote realms of nature, to enrich their collections and their massive books of natural history. Even though most of them did not move from their locations, or nearby geographies, they had access to wider localities and natural realities both from far away locations within Europe and exotic places overseas[2]. Ulisses Aldrovandi, for instance, followed the work of his predecessors, such as Pierre Belon, Guillaume Rondelet and Konrad Gesner[3], who he quotes. He supported much of his writing in the knowledge produced in the Classical Antiquity (he refers profusely to Aristotle and Pliny), but he also relied on correspondence, pamphlets, traded specimens and word of mouth from his own time. This allowed him to reach a near exhaustive list describing all living beings in the known world, including both real and imaginary ones. Aiming to encompass all the natural world, Aldrovandi included in his tomes birds and dragons, whales and sea monsters, rhinos and unicorns, manatees and mermaids.

In fact, from early modern times onwards, mermaids are a strong component in natural history treaties and, moreover, mermaids and manatees became strongly related and interconnected. It would be right to expect mermaids to vanish from natural history treaties and other kinds of publications, from the moment tropical manatees were known and described by Europeans, for instance. This would reflect a similarity with other mythological beings, which were soon replaced by their

[2] BROCKEY, 2012: 265-285.
[3] GUDGER, 1934: 21-40.

real counterparts, after the discovery and consolidation of natural knowledge about exotic terrestrial species. However, this purified objective knowledge of nature is truly an illusion, constantly belied by the incredible hybridity and continued interpenetration of knowledge spheres[4]. Mermaids are one of the most persistent legends in the marine environment; they endure to this day and are present across different cultures, geographies and timescales[5]. As many other monsters of nature, they may find its origin in real animals from local or exotic[6] and distant parts of the world, such as Africa and Brazil. Still, their source may also be found in strange and quite rare natural events. Mermaids are present in different cultures, traditions, religions and stories since the dawn of human histories. In early modern Europe, they were portrayed in church iconography, in the artwork and architecture of aristocratic homes, commercial wares, handicrafts, signs of heraldry and in cabinets of curiosities. On the other hand, mermaids appeared frequently among the pages of early modern printed texts, were visually represented in illuminated manuscripts and maps and subject of literary, scientific and religious texts[7]. The definition-defying and boundary-crossing mermaid offers a fascinating window into the malleability of early modern concepts such as sex and gender, selfhood and mystery[8], as well as natural and unnatural. This is similar to the construction of the concept of (early) modern zoology or natural history, where nature and culture were co-players and knowledge production was hybrid and connected.

Mermaids are common in 16th century Portuguese humanist productions[9], but not that much in the works from the overseas and about tropical environments. Different kinds of sea monsters, nevertheless, abound in the exotic realm of the Portuguese overseas[10]. However, most of the early modern accounts on exotic fauna in the Portuguese Atlantic did not enter the European natural history treaties and encyclopaedia. The latter do not include several 15th and 16th centuries new overseas' observations of the natural world – and this is particularly true for exotic marine animals. While some African and Brazilian terrestrial animals and birds are comprised in the works of several European authors[11], only two marine mammals are mentioned (and sometimes repeatedly): Gân-

[4] MACKENZIE, 2014: 329.

[5] «Mermaids are a good example of the persistence into comparatively modern times of a legend that is nearly as old as the written records of man. There is not an age, and hardly a country in the world, whose folklore does not contain some reference to mermaids or to mermaid-like creatures. They have been alleged to appear in a hundred different places, ranging from the mist-covered shores of Norway and Newfoundland to the palm-studded islands of the tropic seas. Wherever they have been seen, the legends tell us that they have stirred up men's hearts to a strange mixture of emotions – to wonder and fear, ecstasy and irresistible desire. The persistence of the mermaid legend, and the similarity of so many of the reports from independent sources in different areas, suggests that it is based on more than an idle fantasy of the human imagination. It seems certain, that some real animal or, more likely, a number of different animals lie behind the legend in its various forms» (CARRINGTON, 1957).

[6] Exotic is associated to the idea of an animal, or object, with an exterior provenance, connected with the concept of marvellous, and evokes fantastic and idealized perceptions of the Other and of the unknown Nature. Even though the term «exotic» was only used in the 16th century, the concept is part of a medieval cultural phenomenon. So, the concept indicated where certain objects did not came from rather than a specific origin (SIMÕES, 2014; EGMOND & DUPRÉ, 2016; BRITO, 2016: 120).

[7] PEDERSEN, 2016.

[8] COLVILLE, 2016.

[9] GÓIS, 1554.

[10] BRITO, 2016: 120.

[11] For a revision on this topic see the work by PAPAVERO & TEIXEIRA, 2014.

davo's sea monster[12] – the Tupi *igpupiára* – and the manatee – the Tupi *igoarágoa* or the Kikongo *ngulu-maza*. Sea turtles, seals, large fish and cetaceans are sometimes described but in rather generic terms (such as the sheer occurrence of some of them in nearby shores) and not as a new Atlantic species. Authors such as Belon, Rondelet, Ambroise Paré, Gesner, or Aldrovandi did not include Portuguese coeval sources, quotations or authors' references in their works, when referring to marine mammals. For instance, typically they do not mention chroniclers Gomes Eanes de Zurara or Duarte Pacheco, writers Luís Vaz de Camões or Fernão Mendes Pinto, missionaries Father Joseph de Anchieta, Fernão Cardim, or explorers such as Pêro Magalhães de Gândavo or António Galvão, and their detailed descriptions of large and new Atlantic marine fauna. With just a couple of noticeable exceptions, European naturalists relied essentially on Classical authors to describe marine species and, in some cases, made use of contemporary examples from European occurrences to add some originality. Most of these networks of exotic news and natural knowledge circulation, or the lack of contact in some other cases, remain to be understood.

The main objective of this work is to contribute to the discussion of why Portugal did not make the most of its unique geographic and political position by bringing news, illustrations, remains or marine animals from overseas into the European natural history circles[13]. It seems that most of the novelties from the Southern Ocean and tropical shores being found, described and written about (mostly in Portuguese and Castilian) did not contribute to the European knowledge production and cultural exchanges that strongly developed from this period on[14]. Moreover, the construction and transfer of the well-established knowledge on mermaids as real elements of the old and new natural marine world in Europe, contrasting with the slow development of natural knowledge concerning manatees (Order *Sirenia*, Family *Trichechidae*, Specie *Trichechus sp*) will be addressed.

It could be assumed a linearity in the description and natural concept of the rare and strange marine animals eventually developing from imaginary to real beings over time, and that a linear evolution of knowledge development and circulation of nature information, aesthetics and ecological representations could be found. Previously other scholars have assumed the existence of an evolution from medieval sea monsters and prodigies to Renaissance wonders and novelties and from there to the Enlightenment naturalised objects[15]. Here a different approach will be taken both through analysing the sources and interpreting the chronology, trying to extrapolate from the case-studies an early modern natural history of the aquatic realm[16]. Written information and visual representations of mermaids and manatees, based on documental, iconographic, and cartographic sources from European authors and Iberian accounts on the early modern Atlantic are discussed. A total of 55 sources were considered, ranging from European writers, naturalists and cartographers to Atlantic travellers, settlers and missionaries, spanning from the 15th to the 18th centuries. This will allow for establishing

[12] BRITO, 2016: 120.
[13] COSTA, 2009: 59-82.
[14] BRITO, 2016: 120.
[15] DASTON & PARK, 1998; MACKENZIE, 2014: 329-333.
[16] MACKENZIE, 2014: 334-349.

a long-term chronology of marine knowledge production and circulation, and for comparing it with the persistence and relevance of myths from the sea, during early modern Europe and the Atlantic. Attention is given to some Renaissance authors such as Coenen, Aldrovandi, Cavazzi and Piccardo. Most focused Iberian authors were the Portuguese Pêro Magalhães de Gândavo, Father Cristóvão de Lisboa and Cadornega[17], and the Spanish Fernández de Oviedo and Acosta. As we will come to understand the Italian missionary Cavazzi will also be referred in detail. All of them authors who seem to be central points in this discussion about the construction of hybrid information about mythological and real marine animals, using manatees and mermaids as examples. The main focus of almost all consulted works is natural history, even though the authors' «naturalist» concerns or intents vary from one another. A review of local descriptions of geography, environments and cultures, natural histories, correspondence, large encyclopaedic tomes, cartographic and geographic treaties, for early modern Europe and different Atlantic areas, was conducted. This enabled a characterization of both early modern (pre) conceptions of nature and real descriptions of these beings – mermaids and manatees – and the interconnections between myth and reality.

MERMAIDS IN THE EARLY MODERN EUROPEAN PERSPECTIVE

Across the historiography and mythologies, mermaids or sirens[18] vary from angels to demons, deities to animals, nymphs to monsters and birds to fish. The siren (like the triton) – a half-human half-fish being – can be regarded as one of the links connecting the fish gods and goddesses of pre-Christian mythology and the more recent developments of mermaid's lore throughout European medieval ages[19]. Mermaids[20] were widely documented through illustrations or written descriptions in medieval herbaries and bestiaries, using its dual character to represent both human qualities and imperfections. In addition to the mermaid's pre-classical and classical history, the figure's presence and development in western religions also illustrates how difficult it is to trace its genealogy and different embodied forms, as mermaids are represented by many diverse shapes[21]. Here, we will be dealing with the mermaid/animal, or the merpeople/marine beings, in all their interrelations with real marine animals.

By the late 15th century, in *Hortus Sanitatis*[22], *syrenas* are still considered deadly animals with a female figure and a hideous face (Fig. 1).

[17] Several transcriptions are here presented in a translated format for the first time. Iberian sources for this period represent a very important still much neglected corpus of information to the understanding of early modern concepts regarding nature and the uses of the environment and natural resources.

[18] Typically, Anglo-Saxon traditions make a distinction between the classical siren (half-woman half-bird) and the mermaid (the aquatic form of this hybrid being). In Portuguese the word is the same for both forms (the current word is «sereia»), as it is for the Spanish (currently «sirena»).

[19] CARRINGTON, 1957.

[20] By the Renaissance, the term «siren» was arguably interchangeable with the term «mermaid» (PEDERSEN, 2016).

[21] PEDERSEN, 2016.

[22] *Hortus Sanitatis. De herbis et plantis. De animalibus & reptilibus. De fluvibus et volatilibus. De avibus et volatibus. De piscibus et natatilibus. De lapidibus et in terra venis nascentibus… Tabula Medicinalis cum Directório Generali per Omnes Tractatus*. Estrasburgo: Johannes Pruess, 1491 (M.N.C.N.), p. 121.

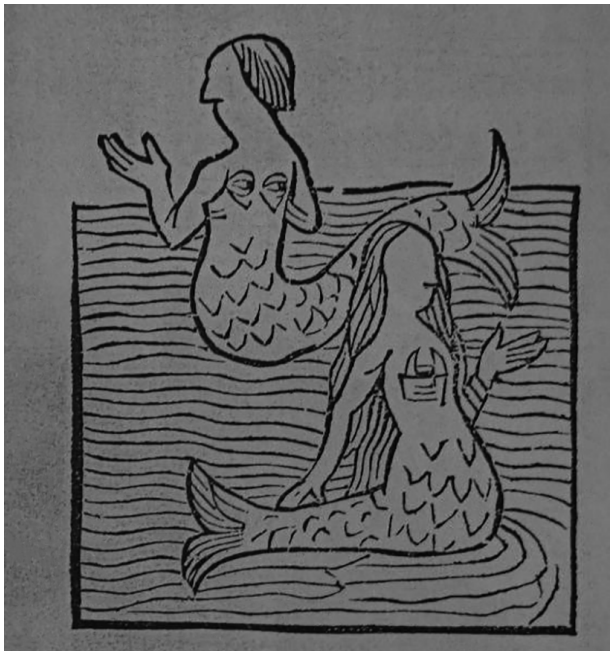

Fig. 1. Mermaids in *Hortus Sanitatis* (1491)
Reproduction from microfilm copy from the Library of the Museo Nacionale de Ciencias Naturales de Madrid

In his treaty, the author goes on saying they «resemble the *cetibus*, and that females have fetuses and breast-feed their young». Even though first encounters with and descriptions of the exotic manatees are contemporary, as we will see, the preconception of the antique and medieval mermaid will prevail for a long time. For instance, different humanist pieces in Portugal refer to the occurrence of mermaids, tritons, nereids and water nymphs, such as the work of Damião de Góis, where the author describes «a kind of people that the locals started calling marine men because they have the skin surface with scales scattered almost over the entire body […] such people owed their origin to marine men or tritons […] The tritons jumped to the shore and, once in a while, they would come to the beach […]»[23]. Similarly, the Portuguese poet Luís Vaz de Camões included sirens («sirenas») in his epic poem *Os Lusíadas* exalting the qualities of their voice and beauty. Antique mermaids were seductive and vindictive, using their beautiful faces and melodic calls to attract mariners into the seas and devour them in the end. In this way, they became the metaphor of the sailing dangers and even the picture of death. However, in early modern expeditions and explorations' chronicles and literature, mermaids, the sea maidens, are used sometimes as a symbol of all the beauty, exoticism and abundance that was awaiting Europeans on the other side of the ocean. Nevertheless, their nature remained contradictory, the essence of good and evil in one being, the reflex of the monster and the beauty in the same body, the presence of water and land in one natural element.

[23] GÓIS, 1554.

Across different European encyclopaedias of natural history, several Renaissance authors[24] also found room to include all different kinds of anthropomorphous beings or merpeople such as the *Satyrus marinus*[25], alongside with other specimens of the natural and fantasy world. These encyclopaedic tomes, as some humanist publications, included specific entrances on these beings within their chapters of fish and marine animals, most of them repeating and commenting classical works such as Aristotle's or Pliny's[26]. One could argue that some of these authors did not have access to all knowledge about the natural world, which was starting to be produced and disseminated, but in fact almost all of them were contemporary to one another and engaged in very active networks of communication and exchange[27]. This may be clearly understood by the visual representations of these and other animals, copied from one work to the other. Moreover, most of them were well acquainted with local natural novelties and marine coastal ecosystems and their inhabitants, and travelled across Europe offering descriptions (or comments on previous ones) through the eyes of experience. Yet, they did not see most of the exotic novelties with their own eyes and these reached them via correspondence, illustrations, and possibly specimen exchange and trade. First cabinets of curiosities were being established, and so were zoological and botanical gardens, and even though marine animals were not ideal to be preserved, they might have had a presence in such settings. A good example of all the previous and of this paradoxical representation of fictional and real marine animals is very clear in the books by Adriaen Coenen[28]. He was raised in a fishmonger's family, being very familiar with the local reality of some parts of the North Sea and its marine resources, and in his books he describes, with careful detail, the marine fauna of the region, including patterns of migration of fish and cetaceans, fishing techniques, anatomy and other characteristics of the fish[29]. He also includes real accounts from the New World, such as the famous Brazilian sea monster described by Pêro Magalhães de Gândavo in the middle 16th century, which indicates his active participation in networks of European traders, collectors and naturalists[30]. However, he also describes different types of mermaids and tritons (Fig. 2),

[24] COENEN, Adriaen – *The Whale Book: Whales and other marine animals as described by Adriaen Coenen in 1585* (1585). Ed. by Florike Egmond and Peter Manson; commentary by Kees Lancester. London: Reaktion Books, 2003; GESNER, 1558; PARÉ, Ambroise – *On Monsters and Marvels (1585)*. Translated with an Introduction and Notes by Janis L. Pallister. London: The University of Chicago Press, 1982; ALDROVANDI, 1613; JONSTON, 1657.

[25] RONDELET, 1554.

[26] The earliest naturalist to deal with mermaids in any detail was Pliny the Elder, whose famous Natural History appeared in the first century A. D.. Pliny was a man of forthright character, a cavalry officer and a writer of military history, whom one could never have suspected of undue credibility. Yet he not only believed in mermaids, being convinced that they were real creatures, but cited the most illustrious personages to support his opinion (CARRINGTON, 1957).

[27] GUDGER, 1934: 21-40; BRITO, 2016: 120.

[28] COENEN, Adriaen – *The Whale Book: Whales and other marine animals as described by Adriaen Coenen in 1585* (1585)…

[29] EGMOND, 2007: 245-271; BENNEMA & RIJNSDORP, 2015: 384-399.

[30] BRITO, 2016: 120.

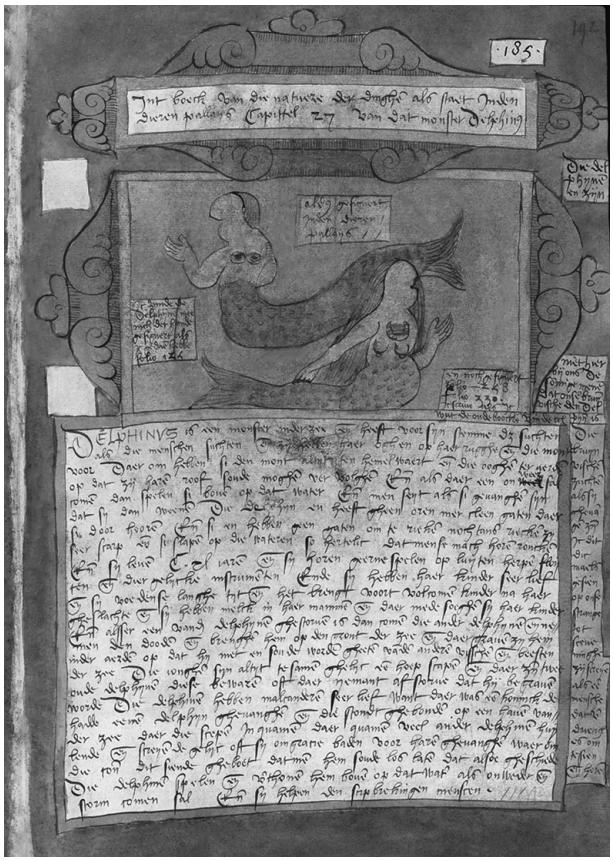

Fig. 2. Mermaids in the *Fish Book* by Adriaen Coenen (1557). More information on this book and its content can be found at the Public Domain Review (https://publicdomainreview.org/collections/adriaen-coenens-fish-book-1580/)

mostly following former accounts and illustrations, from *Hortus Sanitatis* and Olaus Magnus, for instance. Early modern authors, publishers and audiences might have questioned the finer points of such picturesque descriptions, but the existence of mermaids was firmly established. They were regularly sighted off the European shores and travellers brought back tales of encounters with them from every corner of the seas. There are several examples from this period, reported by seamen of great knowledge and experience whom it would be difficult to accuse of an exaggerated gift for fantasy. One is the stolid, prosaic narrative of the voyages of Henry Hudson, published in London in 1625[31]. Another mermaid report is taken from a description of the colony of Newfoundland by Richard Whitbourne, a sea captain who made numerous voyages to that country and in 1620 published his *Discourse and Discovery of New-found-land* to give a picture of its amenities and encourage new settlers. His mermaid is afterwards depicted in the works by the de Bry family. This pattern of mixing

[31] CARRINGTON, 1957.

elements of the natural and the imaginary world, with the inclusion of mermaids, runs well into the 18th and 19th centuries. In fact, the 18th century, which prided itself on its worldliness, cynicism and good sense, was nevertheless as passionately addicted to mermaids as the preceding age. One of the main protagonists of their cause was François Valentijn, a Dutch colonial chaplain, who, in his *Natural History of Amboina*, published in 1726, gives numerous accounts of their appearances in the East Indies. The fame of this Amboina mermaid quickly spread into the most exalted circles. The original of her picture was presented to King George III of England, while His Imperial Majesty, Peter the Great, Czar of Russia, saw a copy of it in the office of Louis Renard, a publisher, in Amsterdam. But as the early 18th century wore on, naturalists found it increasingly difficult to maintain even in their own minds a whole-hearted belief in the mermaid's real existence[32]. Nevertheless, accounts for mermaids, either fanciful or resulting from true encounters with marine beings, occurred in the worlds' oceans across all 18th, 19th and 20th centuries.

MANATEES DISCOVERED IN THE ATLANTIC AND EUROPE

Nonetheless, centuries before, encounters of Europeans with manatees[33] occurring during the Atlantic navigations and explorations of the West coasts of Africa might have caused the rebirth of the mermaid myth during the 15th century. First descriptions of this tropical animal happened soon after the first crossings of the Atlantic. In 1493, while sailing off the coast of Hispaniola, Christopher Columbus reported seeing three «female forms» (*serenas* or sirens) which «rose high out of the sea» and described them matter-of-factly as «not so beautiful as they are painted, though to some extent they have the form of a human face»[34]. Columbus is a great influence in the creation of monsters of the Latin American imaginary. He was well-acquainted with the variety of monstrous beings he might expect to encounter in his travels, as well as their value as portents of virtue, vice, wealth or divine intention. When he arrived to the Caribbean Sea, Columbus was convinced he was arriving to the mythical East. He was astonished by the beauty, heat and lushness of the landscape and interpreted these as signifiers of possible wealth and divine providence. He had seen similar creatures off what was called the Grain Coast of Guinea; his comparison of the two suggested them to be harbingers of gold[35]. In the historiography this is stated as the first sighting of the West Indies manatees by Europeans:

> *On the 9th January, 1493 three mermaids emerged from the sea waters, not so kind as they were thought to be, but «somehow they had a human face»* […] *They would often be seen by the Portuguese sailors, and Columbus himself had to point out the fact that he had already seen others in the coast of Guinea.* […] *the monsters the admiral described were far from having a touch of distinction or novelty, because these*

[32] CARRINGTON, 1957.

[33] Manatees are herbivorous fully aquatic mammals that live in Atlantic coastal waters and rivers, ranging from the west shores of Africa to the Caribbean and the shores of South America. Its historical range is presently strongly constricted due to overexploitation and habitat degradation over the centuries and all the current species (West African manatee, Trichechus senegalensis, the West Indies manatee, Trichechus manatus, and the Amazonian manatee, Trichechus inunguis) are considered vulnerable to extinction according to the IUCN.

[34] BRAHAM, 2012.

[35] BRAHAM, 2012.

fudges were frequently discussed between the Portuguese sailors. On the other hand, these mermaids do not sing for our souls […][36].

António Galvão also wrote about manatees referring to the Antilles in 1497[37]:

There is a fish called monatim; it is big and has a cow's head and face, and looks very much like it in the flesh. Its arms are close to its shoulders, which it uses to swim; it eats mostly herbs that spring across the water. It is rather tasty; it has some stones on its head that can be used to calm the pain from kidney stones, and the female has breasts with nipples to feed its children who are born alive […][38].

Soon after these two accounts, descriptions of the West Indies and Brazilian manatees abound in the journeys' literature, letters, and natural history and geography treaties describing the New World. Some authors repeated from one another, but strongly reflected the symbolic and material importance of the animal, particularly in the south Atlantic shores.

Father Joseph de Anchieta clearly refers to the animal, and not to the myth, when he writes about the «Província do Brasil»:

In the torrential rivers that rush into the sea there are sea cows that weight between 20 and 30 arrobas. Inside their brains there is a very medicinal stone for the ones who have kidney stones, and their meat is valuable, it accompanies collard and tastes like cow meat; if spiced, tastes like mutton and also like pork and is easily slaughtered[39].

Later on he refers how manatees were abundant and easily captured:

sailors cast the net towards the sea, and picked with only one cast, two of these sea oxen. Despite their size, the animals did not break the net, even when only one specimen would be big enough to tear several nets into pieces[40].

Descriptions of Brazilian manatees are not only common during the entire 16th century, but also regular and repeated. Pêro Magalhães de Gândavo[41], Gabriel Soares de Sousa, Fernão Cardim, Father Cristóvão de Lisboa[42] and António Brandão[43] also included descriptions of manatees in their works. Several similarities between all descriptions are to be found; they all indicate it is undoubtedly an aquatic

[36] See the work about Christopher Columbus, with references to his perceptions of a new nature, GIL, 1989.
[37] The author also wrote about the dugong (the Indian Ocean Sirenia): «It was said there were fish in this coast [from the Cape of Good Hope to Sofala, Quiloa and Melinde] that mostly swam upright, most of the time they were along the water and had faces and bodies of women, and the sailors would feel cheered, while eating them; and if they sold them, they would swear an oath they had not slept with them, and, if they had not, they would then be sold. Otherwise, they would be worth nothing» (GALVÃO, António – *Tratado dos Descobrimentos (1573)*. Lisboa: Publicações Alfa, 1989, p. 20. [Biblioteca da Expansão Portuguesa]).
[38] GALVÃO, António – *Tratado dos Descobrimentos (1573)*… p. 41-42.
[39] ANCHIETA, Joseph de – *A província do Brasil (1585)*. «História», IV série, n.º 2. Rio de Janeiro: Imprensa Nacional, 1946, p. 16, 34. (Colecção Brasileira de Divulgação).
[40] ANCHIETA, Joseph de – *A província do Brasil (1585)*…
[41] GÂNDAVO, Pêro Magalhães de – *Tratado da terra do Brasil. História da Província Santa Cruz (1550-1557)*. Belo Horizonte: Ed. Itatiaia; São Paulo: Ed. da Universidade de S. Paulo, 1980, cap. 8.
[42] LISBOA, Cristóvão de – *História dos Animais e Árvores do Maranhão (1647)*. Lisboa: Arquivo Histórico Ultramarino, 1967, p. 60-64.
[43] BRANDÃO, 1943: 55.

animal, referring several morphological characteristics such as the big size and weight, and all the details of its hunting and its use as remedy and food. All authors emphasise that it is a special kind of «fish» given it breastfeeds calves and needs to breath out of water. Thus, even though referring to it, and using it, as a fish, its characteristics of an aquatic mammal (reproduction and breathing) were clearly observed and are always mentioned. Sousa, for instance, refers to the manatee with its native name *Goarágoá*[44].

The intents of appropriation of such exotic and new animals become clear from the excerpts from different authors of that period, when reading the zoological descriptions, as well as the ones on the way people used them (both local and European)[45].

Gândavo, besides the description of the animal, includes details about its capture and use in culinary:

> *Killed with harpoons, they are so fat and big, that some even weight thirty or forty arrobas. It is a very flavourful fish that almost tastes like pork or deer tenderloin. It can be cooked with kale and stewed like meat, nobody would consider it a fish, unless knowing it first*[46].

Brandão refers several times to the manatees in his work, by the late 16th century or early 17th century:

> *a fish they call ox is found in large scale* […] *with a strange size and face, lives in groups in those places, as in a vivarium, and there they are easily killed with barbs; because they are easily caught and found while swimming. These manatees are no different (food, whatsoever) from cow meat; they are very similar to meat and several people would eat them as such, and after telling them and affirming it was fish what they ate, they did not believe. These manatees, which exist here in large scale, are food to the dwellers of Maranhão, due to their deficient supply of meat*[47].

After this quotation, the author inserted in the text an additional note about other authors, who equally refer to this species and the native *goaragoá* or *guaragua*, also translated as *guará-guará*, or as *y-guá-ri-guá*[48].

The manatee was by then usually referred to as sea-cow or ox-fish in the Portuguese America, besides its native names, or, in the Western African shores, as fish-woman. The term manatee («monati» or «manati») was coined by the Spaniards for the Caribbean. It has been registered for the first time in Castillian in 1526 in the *Sumario de la Natural Historia de las Indias* by Fernández de Oviedo, when the author describes «los pescados y pesquerías»:

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[44] SOUSA, Gabriel Soares de – *Notícia do Brasil: Descrição verdadeira da costa daquele Estado que pertence à Coroa do Reino de Portugal, sítio da Baía de Todos-os-Santos (1587)*. Lisboa: Publicações Alfa, 1989, p. 198-199. (Biblioteca da Expansão Portuguesa, 11).
[45] CARDIM, Fernão – *Tratados da terra e gente do Brasil (1540?-1625)*. Introd. Rodolfo Garcia. Belo Horizonte: Ed. Itatiaia; São Paulo: Ed. da Universidade de S. Paulo, 1980, p. 45-46.
[46] GÂNDAVO, Pêro Magalhães de – *Tratado da terra do Brasil*… p. 19-20.
[47] BRANDÃO, 1943: 55.
[48] The marine mammal, which is described in several narrations is an herbivore and was known in fact as the ox-fish («peixe-boi») among the Portuguese from Brazil. This designation was also common among the Portuguese from Angola, while it would be usually called «peixe boaz» among the Portuguese from Guinea. Also, all across West African shores, it is known since the early modern period to the present time as fish-woman («peixe-mulher»).

they are so different and so many, one cannot refer to all without many words and paper; here I shall only expand on three fish: turtle, shark and manatee. […] *The manatee is a fish of the sea, a big one, and is far larger than a shark in greatness and length, and is very ugly* […][49].

In 1590, Acosta also refers to the manatees in the Antilles:

In the islands of Barlavento, namely Spanish Cuba, Puerto Rico, Jamaica, there is the so-called manati, a strange kind of fish, if one can call fish an animal that has teats, and raises with milk the cubs born alive, and eats herb in the fields; but, indeed, usually lives in the water. Considering the mentioned reasons, they are eaten as fish, but when in the Holy Sunday, when I ate it in a Friday, I almost had scruples, because the colour and flavour seemed like nothing but veal chops or knuckle chops, the slices of this fish: Is big as a cow[50].

Acosta was, in fact, the source for the translation made by Clusius[51], which in turn was the source for the description of the manatee by Ulisses Aldrovandi, which, again, might have been the origin for the «official» description of the species by Linnaeus[52]. This discussion will follow in the next chapter of this work, but it is important to mention it here in this chronology of manatees' descriptions and knowledge production. It is in the work by Acosta that the animal was early pictured and then copied and republished in several natural histories in the centuries to come. Fernández de Oviedo also provided a visual representation of the manatee, probably the first representation of the animal to be published (Fig. 3),

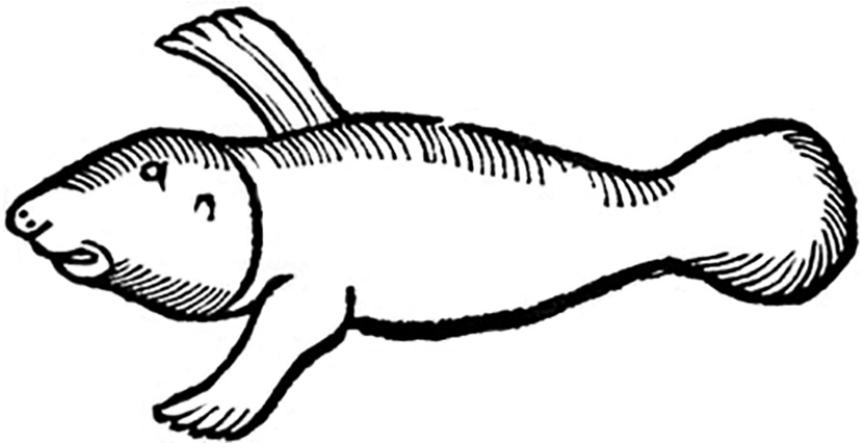

Fig. 3. The earliest illustration of a sirenian to be published: the West Indian manatee, from the 1535 edition of *La Historia General de las Indias* by Gonzalo Fernández de Oviedo. The slightly different woodcut that has been reproduced several times as the earliest figure of the manatee is actually from the 1547 edition
Obtained from the website *Bibliography and Index of the Sirenia and Desmostylia*
Available at <http://67.59.130.204/biblio/ consulted on 30/11/2016>

[49] FERNÁNDEZ DE OVIEDO, Gonzalo – *Sumario de la Natural Historia de las Indias*. Ed. de Nicolás del Castillo Mathieu. Santafé de Bogotá: Instituto Caro y Cuervo, 1995, p. 145-149.
[50] ACOSTA, 1590: 72.
[51] CLUSIUS, 1605.
[52] LINNAEUS, C. – *Systema Naturae (1758)*. 10th ed. London: British Museum, 1939.

but it was a rather simple and incorrect illustration. With regard to the use of new knowledge and the evolution of mermaids and manatees in a natural history of the exotic (in Europe), one should also refer to Father Cristóvão de Lisboa that produced a realistic description of the Brazilian manatee by the middle 17th century:

> *Guaragua is the sea cow, its length is about ten or twelve palms, it is thick as a cow; it is grizzly grey, the guts and inwards are like the cow's and it breastfeeds the cubs and has the teats underneath the arms; the males' genitals are as big as the horse's and of the same shape; the bottom is all fat, good to make butter to fry and for lamps, and some sizes can reach ten or twelve arrobas and almost ten litres of butter; there is no waste, we can eat everything, even the guts, and the skin is good to make soles* […] *one year three hundred or more fish were killed* […] *and I want to tell you what I saw being done to this fish: I saw a female being killed and skinned and they put the skin on the shore; and in the next day, when they went to collect water, they found the cub lying on the skin and took it*[53].

He describes the anatomy of the animal, its habitat, the hunting and uses for local consumption, and some behavioural traits of the species. In his words, we can also read a degree of empathy towards the animal given the close link between mother and calf being described. All the same, his own drawing, from 1647, shows very high scientific quality and is much superior to other visual representations of this animal (both before and after this date). This piece, however, should be accepted as a lost item, as we will see below. The scientific knowledge it contained has only been restored much later on, providing a «simple» interesting piece of the history of natural history, instead of the rather valuable and correct information it could have added to coeval authors and historiography.

From the late 17th century well into the 18th and 19th centuries, several authors kept on writing about manatees across different Atlantic geographies:

> *The Lamentyn is by some call'd the sea-cow, and by others Manati, the head whereof is much like a pig's, except that its snout is not altogether so long. The largest of them are about twenty foot long, having no fins, but the tail, and two paws: the body is pretty thick or round, till towards the navel; the tail like that of a whale and porpoise, has an horizontal breadth when the animal lies flat on his stomach or belly. Its skin is blackish, with some thin hairs, rough and hard, and so very thick, that the Indians cut it into narrow long flips, which they dry, and become as stiff as a cane; wherewith the Europeans chastise their slaves. Others make of the skin a sort of bucklers, musket-proof* […].
> […] *The flesh of this creature is excellent, very wholesome, and tastes much like veal of Europe, when young; for the biggest are not so delicate and agreeable to the palate. Their fat is hard, and very sweet, as that of our hogs; the flesh resembles veal. It dies with very little loss of blood, and is not observ'd to come upon dry land; nor is there any likelihood it should, considering its shape, as in the cut, whence it is concluded not to be amphibious*[54].

[53] LISBOA, Cristóvão de – *História dos Animais e Árvores do Maranhão (1647)*… p. 60-64.
[54] BARBOT, 1732: 592.

This animal kept being considered surprising and interesting, for many different reasons ranging from mere curiosity to its economic importance to several European Kingdoms and their overseas colonies:

> *The first place in the aquatic republic should go to the manatee, or, as the Europeans call it, the ox-fish. It is the biggest fish in the Amazonas river, and maybe also the best. Its body is as big as an ox, although it is not called like that due to its size but rather because its lips and mouth are like the ox's, just like the teeth. In the rest of the body it is shaped as a fish, very round, like a barrel, but has no fishbones, unlike the other fish, not even in the spine.* […] *There are two species, both with the same colour, and size, the second of them has much more fat, and is thus used to make butter in big quantities* […][55].

As aforementioned, within the same accounts, detailed and correct information on the animals' anatomy and behaviours is provided, alongside with methods of capture and use of meat, fat and derived products. More zoologic descriptions just come along from the the middle 18th century onwards[56]. Also, if the first descriptions do not show any content related to the exploitation of these animals as a finite resource, from the middle 18th century onwards these concerns become more frequent. Thus, different authors start to diverge their discourses from the first descriptions and uses, into questions related to its continuous overtime capture and some concerns regarding its maintenance in the natural environment due to overexploitation. This is clearly present in the work by Alexandre Rodrigues Ferreira about the manatees and its exploitation, dated from 1783, as it is in the works by other authors[57]. Since its discovery by European settlers and explorers, manatees kept themselves in the order of the day throughout the centuries[58].

OLD MERMAIDS AND NEW MANATEES: CROSSED TRAJECTORIES OF NATURAL HISTORY KNOWLEDGE PRODUCTION AND CIRCULATION

A global compilation of early modern references to mermaids and/or manatees is almost impossible to achieve because these animals have been represented, described, chanted, depicted, classified and categorised by numerous authors from across the scientific, humanities and economic spectrums[59]. Mermaids are discussed in the historiography since the early modern to present days[60],

[55] DANIEL, João – *O Máximo Rio Amazonas (1758-1776)*. In *Saragoça* – Edição parcial de *O Independente*. [S.l.: s.n.], 2001.
[56] BRU DE RAMÓN, 1784-1786.
[57] SILVA, 1790; CUNHA, 1862.
[58] BRITO & VIEIRA, 2016: 175-191.
[59] The most complete compilation of all available sources related to the history of manatees can be found in the website <http://67.59.130.204/biblio/>. [Consulted on 30/11/2016].
[60] WILKIN, 1888; CARRINGTON, 1957; CARRINGTON, 1960; ALMEIDA, 1964; ALMAÇA, 1991; ALMAÇA, 1998; BRITO, 2013; BRITO, 2016; PEDERSEN, 2016.

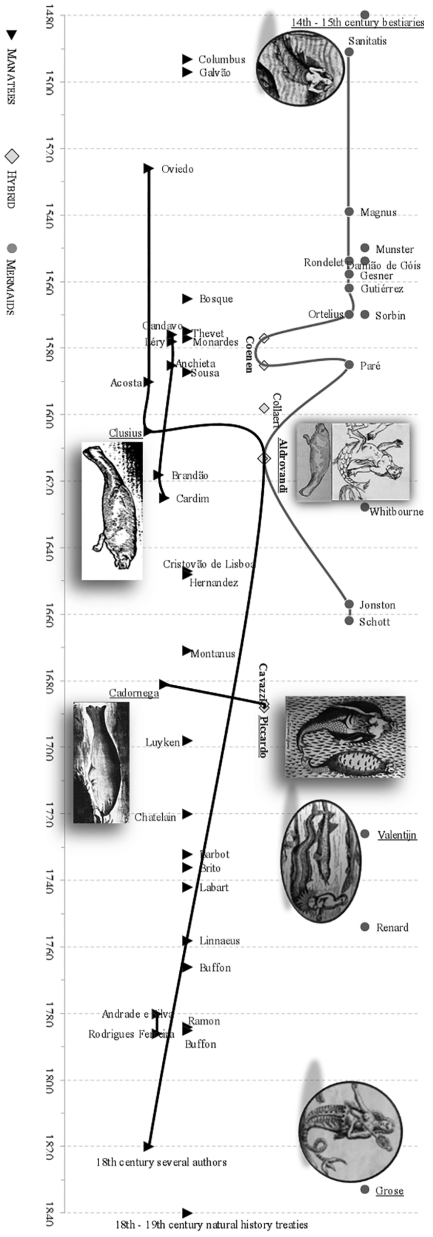

Fig. 4. A chronological representation of exotic natural history knowledge produced and circulated during the early modern period in Europe: mermaids (grey circles); manatees (black triangles); hybrid views of these marine beings (grey diamond). A total of 55 early modern authors are shown in the graph, ranging from European writers, naturalists and cartographers to Atlantic travellers, settlers and missionaries. Underlined names correspond to the picture presented next to it. Interconnections (i.e. copied written or visual information about mermaid, manatees and «hybrids» identified in the sources) are represented through the continuous lines (grey for mermaids; black for manatees). Several authors are linked to one another, but mostly this connection is made within the same line of knowledge production (encyclopaedic versus empirical type); Coenen, Aldrovandi, Cavazzi and Piccardo (grey diamonds) are central points in the construction of hybrid information about mythological and real marine animals

and they were part of and frequently represented in the 16th– and 17th century English culture, as well as in Southern European cultures. However, the genealogy of mermaids and of mermaids' relation with manatees (or other marine animals) is difficult to track and the search and analysis of secondary and primary sources can sometimes take the researcher into difficult paths of interpretation[61].

For the purpose of the current work, we were able to compile and analyse over 50 sources with references to either or both mermaids and manatees in order to get a view of chronological conceptual evolutions on the early modern natural world. These sources, in fact, span from the middle 15th to the 18th century (Fig. 4), including sources for the newly discovered Atlantic Ocean and its marvellous things and products[62].

[61] See for example, the experience detailed by Vaughn Scribner in two blog posts regarding his investigation and search for the origin of a mermaid illustration for early modern America: «Fabricating History: The Curious Case of John Smith, a Green-Haired Mermaid, and Alexandre Dumas» (16/06/2015) and «Fabricating History PART TWO: The Curious Case Continues» (02/07/2015) in <https://earlyamericanists.com>.

[62] A compilation of, probably all, manatees' historical references is given in the website *Bibliography and Index of the Sirenia and Desmostylia* <http://67.59.130.204/biblio/>. [Consulted on 30/11/2016].

They allow an interpretation of the dynamics of knowledge production and circulation about the new (and the old) marine world. Authors that travelled and explored the Atlantic and its shores, have shown an ability to apprehend, perceive and describe the new natural reality, even when it was new and truly exotic. They tend to include all the novelties and give credit to their own experience and even if they were comparing manatees with the siren of the old times, they were sure about its real existence as an animal from the aquatic realm. Humanist authors, or zoologists, from several European regions have, however, dismissed most of the new occurrences of some large marine (and rather exotic) animals in favour of older perceptions of the marine environment and its realities. In their hybrid discourses, mermaids prevailed as contemporary to the discovery of manatees, as it had previously happened in other cultures, such as the Celtic (or classical) mythology, with seals[63].

Nevertheless, descriptions and representations of manatees and mermaids, as marine animals or mythological beings, have been frequently shown together. Several authors from the Renaissance gathered references to these two kinds of beings in only one volume or in subsequent editions, sometimes even within the same chapters. This applies to Rondelet and Gesner, as they include the manatee, and other «strange» marine animals, within the chapter of fish. Neither of them, however, provided an illustration of the described specimen. Within the framework of the European natural history, it was Aldrovandi who, in 1613, assembled the description and illustration of the manatee, an exact copy of the illustration previously published by Clusius. All early modern European descriptions of the manatee, even the latest from Jonston, are based on Fernández de Oviedo's and Clusius' knowledge of the Caribbean and on their publications on the subject. For instance, as above mentioned, all the knowledge produced by Father Cristóvão de Lisboa was totally lost for the contemporary authors, as it remained unpublished until the middle 20th century[64]. This author has written extensively about the Brazilian fauna and flora, including an illustration for each species entrance (Fig. 5).

[63] PARSONS, 2004: 73-80.

[64] The same discussion is made considering Father Cristóvão de Lisboa first description of the dolphin of the Amazon river that, as the manatee, was lost for the contemporary natural history editions and knowledge (ROMERO & AGUDO, 1997: 419-426).

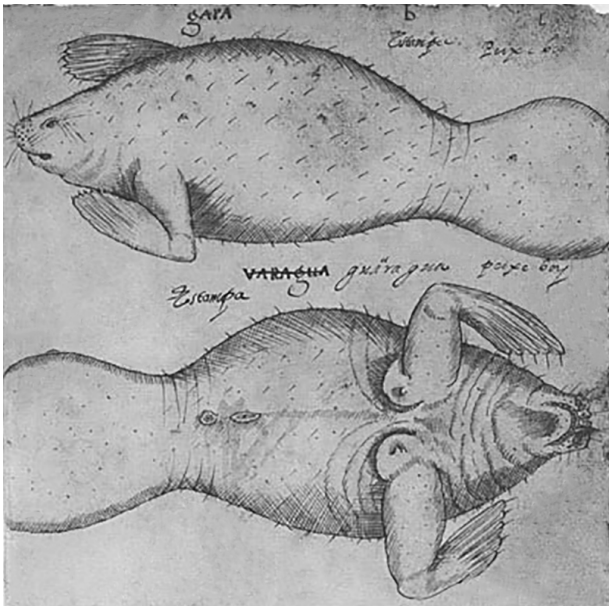

Fig. 5. Father Cristóvão de Lisboa's manatee illustration from the 17th century. Quality and details of this image allow the identification of the specie of manatee and to infer the attention given by the author to subjects and objects of the new and exotic natural realm. and a detailed description

The same applies to the works produced regarding 16th century's West Africa, such as the ones by Cavazzi and Cadornega[65], or the piece referring to the Indian Ocean dugong[66] by Dimas Bosque[67]. Cavazzi, like Dimas Bosque, offered a detailed description of the animal that he had seen with his own eyes, even though he compares it to the mermaid of the Antiquity:

> *There is one [fish] that Europeans call fish-woman and locals name it Ngulu-maza [literally, Kikongo, water pig], beautiful name, but so horrendous.* […] *I think this is the famous triton from fables of mythology, the female may be considered the naiad of the old*[68].

Moreover, as Father Cristóvão de Lisboa or Cadornega, he produced an illustration of the animal. However, this illustration was made when he was back in Europe, not *in situ*, and does not represent the reality of the animal. Even though this illustration is inspired in real observations of African man-

[65] CADORNEGA, António de Oliveira – *História Geral das Guerras Angolanas (1681)*. Lisboa: Agência Geral das Colónias, 1942, Tomo III, p. 115.

[66] Dugongs (*Dugong dugong*) are herbivorous fully aquatic mammals that only live in Indian Ocean coastal waters; their name derives from a Malayan word that stands for mermaid. They have been hunted for thousands of years for its meat and oil and, similarly to the manatees, traditional hunting still has great cultural significance in several countries in its modern range. The dugong's current distribution is fragmented, and many populations are believed to be close to extinction. The IUCN lists the dugong as a species vulnerable to extinction, while the Convention on International Trade in Endangered Species limits or bans the trade of derived products.

[67] WALTER, 1963: 261-271.

[68] CAVAZZI, João António de Montecúccolo – *Descrição histórica dos três reinos do Congo, Matamba e Angola (1687)*. Introd. bibliográfica por F. Leite Faria. Lisboa: Junta de Investigação de Ultramar, 1965, vols. I, II.

atees by the author, the representation he provided clearly mixes the morphology of animals with earlier preconceptions of the mythological mermaid. Cavazzi even stressed being «unable to make myself understood about the appearance of this beast to the one who drew his picture, and I forgot to have it painted in those regions. Hopefully this lack will be corrected by the courtesy and common sense of the reader»[69]. The misunderstanding patent in the illustration given by Cavazzi is picked up by Angelo Piccardo. Both authors, writing about West Africa, show some sense of innovation in describing the natural history of the regions were they have been. Yet, signs of past conceptions tend to prevail[70], even if their intention was to give a panorama of the new fauna and exotic living animals in the new seas. They show a productive tension between scientific and other forms of knowledge.

Aldrovandi was also a focal point interconnecting early descriptions from the Spanish Atlantic (but not the Portuguese) to European traditions of natural history and zoology development, as we are now able to understand through the example here presented. Furthermore, he was quite aware of the fake strange and rare animals he was introducing to his European audience[71]. While trying to encompass all known (and real) nature from his time, this encyclopaedia author was also an enthusiast of the marvellous and greatly exotic specimens that he collected in his cabinet. This resulted in a collection of elements from local and distant environments, known and unknown natures, both real and forged. As a consequence, while he offers a true insight into the manatee from the West Indies, he adds different types or mermaids and tritons as a consequence of his (and others) make-believe abilities. He produces his work within an early modern scientific debate, also patent in the ichthyological texts by Belon and Rondelet, which display epistemological tensions. As they grapple with conflicting testimonials about these particularly strange animals, and try to determine what is credible (or interesting), early modern zoologists generate knowledge that is simultaneously purified and hybrid[72]. On the one hand, we have the new manatee, on the other, the old mermaid. And they co-exist peacefully. Early modern authors presenting hybrid theories in the way they understand nature, mixing mermaids and manatees into one animal, description, illustration or category are, actually, sound examples to feed the thesis discussed by Louisa Mackenzie, supported on Bruno Latour's concept of «modernity»[73]. This preconceived idea of progress towards modernity does not exist in this situation as, probably, in many other cases.

The early modern construction of a natural history of the exotic marine fauna is made through the same regular paths of science development in Europe. Scholarship in the Renaissance was characterised by the activities of humanists – classically trained, bookish scholars concerned with finding the meanings and nuances of ancient Greek and Roman texts on oratory, history and philosophy, using philological and other forms of investigation. Reverence for an ancient past may not look that promising when investigating nature, but these humanist's penchant for describing particular events

[69] CAVAZZI, João António de Montecúccolo – *Descrição histórica dos três reinos do Congo, Matamba e Angola (1687)*…
[70] As other authors, such as Rondelet and Belon, when the creatures description stretches the credulity, it is easier to blame the artist for the taking liberties and looking away from nature, embellishing and exaggerating the illustrations.
[71] SENTER *et al.*, 2013: 531-537.
[72] MACKENZIE, 2014: 329-333.
[73] MACKENZIE, 2014: 329-333.

and details and their enthusiasm for classical models of inquiry were important foundations for the study of natural history[74]. Scholars, humanists and naturalists based in Europe, despite of their degree of information on tropical species, their habits and environments, shared the scene of creating state-of-the-art information that would further on be copied or cited in 18th and 19th century zoology compendia, dictionaries and classification systems. Iberian explorers, missionaries, writers and naturalists based in the overseas, observing exotic nature with their own eyes and transferring their observations to the paper, under the form of prints or manuscripts, were not the main agents in constructing a natural history of exotic marine mammals[75]. The exuberance, novelty and abundance they witnessed was shared through maps, logbooks, letters, manuscripts and printed publications in vernacular languages. It circulated across the Atlantic, moved from hand to hand, author to author, and across different types of receptors and spectators, but it did not make its way into central routes of European natural knowledge production and exchange in the 16th and 17th centuries and beyond.

> *we are not emerging from some obscure past in which natures and cultures were connected, we are not striding towards some future where both will finally and definitively be separated* […] *we have never been modern, or, always been early modern.*
>
> Bruno Latour

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[74] KUSUKAWA, 2011: 189-213.
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A COMPARATIVE APPROACH TO HISTORICAL WHALING TECHNIQUES: TRANSFER OF KNOWLEDGE IN THE 17TH CENTURY FROM THE BISCAY TO BRAZIL*

NINA VIEIRA**

Resumo: No contexto da Expansão portuguesa no Atlântico, a baleação teve um papel importante apesar de ser mencionada pontualmente na historiografia da especialidade. Tal como outros recursos naturais, a baleia, e seus produtos derivados, esteve sujeita às dinâmicas do monopólio régio e não só beneficiou a Coroa Portuguesa e empresários, como potenciou o domínio territorial no Brasil. Técnicas baleeiras bascas foram transferidas da Europa para o Atlântico Sul no início do século XVII e prevaleceram durante três séculos até se tornarem obsoletas face às inovações tecnológicas de outras potências europeias e à redução dos stocks de baleias. Os impactos desta atividade fizeram sentir-se principalmente no aspeto económico, mas também a nível social, cultural e científico.

Palavras-chave: Expansão portuguesa; Baleeira; Transferência de conhecimentos e técnicas.

Abstract: Within the context of the Portuguese Expansion in the Atlantic, whaling played an important role although barely mentioned in the expansion historiography. Like other natural

* This study was supported by the EU Framework Programme H2020 [COST Action IS1403 «Oceans Past Platform» (European Cooperation in Science and Technology)]. This study was also supported by CHAM Strategic Project (FCSH/NOVA-UAc) sponsored by FCT (UID/HIS/04666/2013). NV is supported by a PhD scholarship by FCT (SFRH/BD/104932/2014) and CB is supported by a research contract by FCT (IF/00610/2015).

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resources, whales and their products were exploited under a royal monopoly that not only benefited the Portuguese Crown and entrepreneurs but also strengthened the territorial control in Brazil. Basque whaling techniques were transferred from Europe to the South Atlantic in the beginning of the 17th century and prevailed during three centuries. Then, that practice became obsolete in the face of other European power's technologic innovation and the reduction of whales' stocks. This activity had a major impact in the economic agenda of the expansion but also on social, cultural and scientific fields.

Keywords: Portuguese Expansion; Whaling; Transfer of knowledge and techniques.

A pesca da baleia é um dos feitos do homem mais digno de admiração, ela atraiu os baleeiros ao oceano, educou-os à mais árdua vida de marinheiro, e sobretudo concorreu muito para as grandes viagens e as grandes descobertas.

António Alves Câmara, *Brazilian writer* (1888)

INTRODUCTION

The history of whaling is a classic example of the relation between humans and a given natural element through time and space, from immemorial times to nowadays, and reveals social, cultural and economic aspects along the histories of coastal human communities. Whaling is present in local traditions, toponymy or heraldry in almost all maritime spaces, with manifestations in different artistic forms and immortalised in the literature by Melville[2].

Together with some other important marine species, both through scavenging stranding animals or persecuting them at sea, whaling was the most extensive form of exploitation of a living resource, encompassing bays and gulfs, continental and insular platforms and pelagic waters[3]. The living resources of the sea and the activities associated with them, like fisheries and salt production for instance, were significant activities since the formation of the Portuguese nation. These activities went through several technologic innovations resulting from the movement of the Portuguese seaman to the Atlantic and the incorporation of the technical expertise of the French and Spanish in the exploration of fishing resources overseas since the middle age[4]. In the context of the Portuguese Expansion to the Atlantic, since the beginning of the Discoveries and the trading exploitation of the African coast, that exploration was supported by a genuine scientific curiosity[5]. Thus, a unique and accurate mapping of the sea and description of nature and people was characteristic of the Portu-

[2] MELVILLE, 1851: 639.
[3] REEVES & SMITH, 2006: 82.
[4] See for instance the work of AMORIM, 2009: 245-279.
[5] PLUMB, 1969: 13; LOPES, 2016: XI.

guese seafaring. Nature[6] and its elements were incorporated in the power strategies, as they were soon considered fundamental both to the expansion and maintenance of the new domains and the competition with other powers. The nations involved in this process spared no resources to dominate nature, at first through its recognition and description[7]. Given its immense proportions and significant legendary and symbolic weight, European nations including the Portuguese have always valued the whale and its products[8]. In the outset of the Portuguese expansion, the whale was not an absolute novelty, unlike tropical animals. These were observed for the first time in these new latitudes, mainly from the second half of the 16th century onwards, and were part of the new exotic world. Whales' products were known, appreciated and part of the trade routes that supported the economic ascendancy of the Portuguese-Speaking maritime empire, as we aim to highlight in this paper. In a symbolic duality between the mythical and the utilitarian, the whale accompanied maritime voyages along the Ocean Sea. It was seen as a portent of bad omen and associated with large and dark sea monsters[9], yet also early on documented by Portuguese seamen as a great source of «fish oil»[10]. Since the discovery and colonisation of Brazil, mainly from 1530 onwards, we find several reports and descriptions on the occurrence and utility of whales. In fact, in 1602 an organised whaling activity was established in Brazilian waters[11]. This activity was conducted under a royal monopoly of the Iberian and Portuguese crowns from 1614 to 1801, with implications at distinct levels, mainly due to its economic importance, but also given the context of the globalisation of techniques and ways of understanding and handling marine resources[12].

We use here the issue of whaling in colonial Brazil to discuss the circulation of knowledge and techniques between Europe and South America, focusing on who promoted the activity, how it was performed and the effects it had for peoples (in both sides of the Atlantic) and whales' populations. This work stems from a recent, yet continuous, effort to understand the dynamics of whaling in South Atlantic. And, with it we expect to contribute to the history of the Portuguese Expansion in relation to the oceanic history of other Atlantic nations and geographic regions. Furthermore, we also expect to contribute to the history of the Atlantic regarding the emergent field of Early Modern Marine Environmental History. We will use an integrative approach, thus bringing together the economic, social, cultural and scientific aspects related to the value attributed to the whale and its products. For that purpose, we need to go back in time to the inception of organised whale hunting in Europe and to the Iberian Peninsula where it finds its roots[13].

[6] We are here considering non-human nature in the sense of an ecological system excluding human beings. Assuming that the debate of society-nature coevolution is out of the scope of this paper, for more about this discussion see FISCHER-KOWALSKI & WEISZ, 1999; WINIWATER, 2003; WEISZ & CLARK, 2011.
[7] POLÓNIA *et al.*, 2016: 6.
[8] BRITO & JORDÃO, 2014: 31.
[9] SZABO, 2008.
[10] BRITO, 2009.
[11] ELLIS, 1969: 33; EDMUNSON & HART, 2014: 33.
[12] BRITO *et al.*, 2017.
[13] AGUILAR, 1986: 192.

WHALING IN IBERIA

Recent studies suggest that an early whaling activity occurred in mainland Portugal. These are based on historical sources dating back to the 12th century, in the form of local records and rules related to stranding, whales' scavenging or whaling related activities, which warranted the payment of taxes to the crown since the 13th century. The Portuguese whaling activity does not seem to have emerged chronologically as a geographical spreading from the French and Spanish Basque Country along the coast of the Iberian Peninsula, but rather as an activity contemporary to the early Basque whaling[14]. This type of whaling, characterised by specific features originated in the Gulf of Biscay no later than the 11th century. It is well-documented in the historiography and has been studied in some depth, since hundreds of documents, iconographic sources, as well as objects and structures, have been found along the time and allow to reconstitute this activity[15]. Basque whalers were the first western people to make their livelihood from whaling and to commercialise them in the occidental world, in an organised and intentional manner. They established the characteristics of the industry for the following centuries both locally and through overseas expeditions[16].

In the beginning, the Basques may have herded whales into the shallower bays where they were lanced to death. They spotted the whales from watch towers named *attalaya* and made large campfires with wood and shrub vegetation in order to alert the whalers. The *attalayas* were built on top of the hills around the harbour and the smoke could be seen from a considerable distance. They were chased at sea in small wooden boats called *chalupas*, about 10 to 12 meters long, with a slender and symmetrical shape with low edges, symmetrical stern and bow, with room for a crew of about 8 men: the harpooner in the bow, the helmsmen in the stern, and six rowers. The harassed whales were hit with a powerful hand-thrown harpoon stroke by the harpooner. The *chalupa* could reach 12 knots of speed and, if necessary, its quadrangular sail could be hoisted. After approaching the whale as much as possible, the men in the boats would then enclose it and kill it with lances, in a series of deadly blows. The Basques soon understood the bonding relation between females and calves and they often harpooned the calves in the beginning of the hunting in order to keep the adults close, while trying to help their offspring. Once killed, the whales were brought to land where they were torn to pieces and the fat was melted in large metallic vats and sometimes salted[17]. The main target in the Gulf of Biscay was the North Atlantic Right Whale *Eubalaena glacialis*, also called black whale[18].

The hunting techniques perfected in European waters for centuries were transferred from the Gulf of Biscay to Newfoundland and Labrador. It was their expertise in whaling skills and techniques that allowed the Basques to create a highly successful monopoly of the whaling enterprise there[19]. The first Basque whaling crews operating in Newfoundland and Labrador are reported in 1540 and

[14] BRITO, 2011: 293.
[15] Numerous works exist on this subject, so we just give some examples such as JENKINS, 1921; AGUILAR, 1986; BARTHELMESS, 2009; VALDÉS HANSEN, 2010; LÓPEZ FERNANDÉZ, 2014.
[16] FONTAINE, 2007: 195.
[17] VALDÉS HANSEN, 2010: 123-125.
[18] AGUILAR, 1986: 192.
[19] BARKHAM, 1984: 515.

in 1546 whaling was a regular activity as it is show by remains of ovens and other facilities that were built to process whales[20]. From the end of the 16th century on, Basque whalers' operations started to move further north off the coast of Norway, Spitzbergen and Greenland. Yet, although Basques were involved in whaling since its outset, in the first years of the 17th century other nations also promoted this activity in their home waters, namely Normans, Flemings, Danes and Norwegians[21], and the same is also true for the English and Dutch, who often recruited experienced Basque crews[22] (Fig. 1).

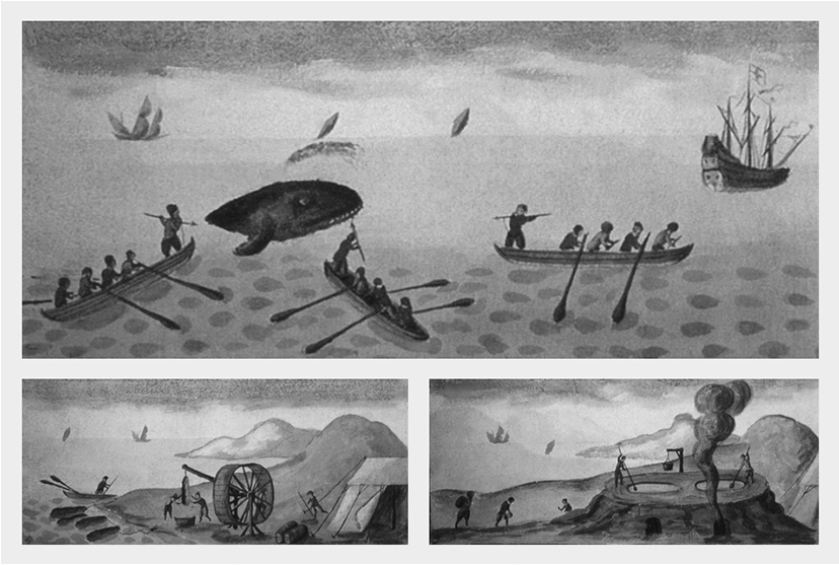

Fig. 1. Hunting, dismantling and production of whale oil, using Basque crews at the service of English whalers in Spitzbergen in 1613.
Watercolours of Robert Fotherby. American Antiquarian Society, Worcester, Massachusetts

NATIVE AMERICAN USES OF WHALES

We could expect to happen with the animals, in particular marine mammals, the same occurred with the new flora, which was introduced by the native populations of the New World to the Europeans. Along with its uses and properties, for instance for medicinal purposes, this allowed for the colonial empiricism to meet the native knowledge[23]. In fact, manatees (Order *Sirenia*) – a tropical aquatic mammal – were hunted by native people of Brazil and nearby regions as Venezuela, for food and therapeutic uses, and were soon valued by Europeans for their meat, oil and hide[24].

Regarding whales, the *Historia Natural y Moral de las Indias* by the Jesuit Joseph de Acosta entails a very detailed description of how native American people hunted whales in Florida. In his third book, Chapter 15. *De diversos pescados y modos de pescar de los indios*, Acosta wrote:

[20] BARKHAM, 1984: 518; LÓPEZ FERNÁNDEZ, 2014: 20.
[21] AGUILAR, 1986: 197.
[22] AGUILAR, 1986: 197; CAZEILS, 2000: 52.
[23] FURTADO, 2008: 128.
[24] VIEIRA & BRITO, 2017.

But the combat which the Indians have with Whales is yet more admirable, wherein appears the power and greatness of the Creator to give so base a Nation, as be the Indians, the industry and courage to encounter the most fierce and deformed beast in the world, and not only to fight him, but also to vanquish him, and to triumph over him. […] *The manner the Indians of Florida use (as some expert men have told me) to take these whales (whereof there is great store) is, they put themselves into a canoe, which is like a bark of a tree, and in swimming approach near the whales side; then with great dexterity they leap to his neck, and there they ride as on horseback, expecting his time, then he thrusts a sharp and strong stake, which he carries with him, into the whales nostril, for so they call the hole or vent by which they breathe; presently he beats it in with another stake as forcibly as he can; in the mean space the whale does furiously beat the sea, and raises mountains of water, running into the deep with great violence, and presently rises again, not knowing what to do for pain; the Indian still sits firm, and to give him full payment for his trouble, he beats another stake into the other vent or nostril so as he stops him quite, and takes away his breathing; then he betakes him to his canoe, which he holds tied with a cord to the whales side, and goes to land, having first tied his cord to the whale, the which he lets run with the whale, who leaps from place to place whilst he finds water enough; being troubled with pain, in the end he comes near the land, and remains on ground by the hugeness of his body, unable anymore to move; then a great number of Indians come unto the conquered beast to gather his spoils, they kill him, and cut his flesh in pieces, this do they dry and beat into powder, using it for meat, it does last them long*[25].

To seduce both erudite European readers and the general public, Acosta puts together a philosophic and scientific content, including naturalistic aspects, where the innovation lies in the way information is organised rather than in the content itself[26]. In the case of the native hunting of whales, the author did not observe the scene but he considers it a recurrent act and worthwhile mentioning – not forgetting his attempts to refer both elements from the natural and the moral history. Of course we

[25] Translation adapted by the author from ACOSTA, Joseph de – *The Natural and Moral History of the Indies*. Reprinted from the English translated edition of Edward Grimston, 1604, and edited, with notes and an introduction by MARKHAM, Clements R., *ed*. – *The Natural History*. London: Hakluyt Society, 1888, vol. I. Books I, II, III and IV, p. 148-149.
«Pero más maravillosa es la pelea que tienen los indios com las ballenas, que cierto es una grandeza del Hacedor de todo dar a gente tan flaca como indios habilidade y osadía para tomarse com las más fiera y disforme bestia de cuantas hay en el universo, y no sólo pelear pero vencer y triunfar tan gallardamente. […] El estilo que tienen (según me refirieron personas expertas) los indios de la Florida – donde hay gran cantidad de ballenas – es meterse en una canoa ou barquilla – que es como una artesa – y bogando llégase al costado de la ballena, y com gran ligereza salta y sube sobre su cerviz, y allí Caballero – aguardando tiempo – mete un palo agudo y recio que trae consigo por la una ventana de la nariz de la ballena – llamo nariz aquella fístula por donde respiran las ballenas –, luego le golpea com outro palo muy bien y le hace entrar bien profundo. Brama la ballena y da golpes en la mar y levanta montes de agua, y húndese dentro com furia, y torna a saltar no sabendo qué haceres de rabia. Estáse quedo el índio y muy caballero; y la enmienda que hace del mal hecho es hincarle outro palo semejante en la otra ventana y golpearle, de modo que le tapa del todo y le quita la respiración. Y com esto se vuelve a su canoa, que tiene asida al lado de la ballena com una cuerda; pero deja primero bien atada su cuerda a la ballena y, haciéndose a un lado com su canoa, va así dando cuerda a la ballena. La cual, mientras está en mucha agua, da vueltas a una parte y a otra como loca de enojo, y al fin se va acercando a tierra: donde com la enormidad de su cuerpo presto encalla sin poder ir ni volver. Aquí acuden gran copia de indios al vencido para coger sus despojos: en efecto la acaban de matar y la parten y hacen trozos, y de su carne – harto perversa – secándola y moliéndola hacen ciertos polvos que usan para su comida, y les dura largo tiempo» (ACOSTA, Joseph de – *Historia Natural y Moral de las Indias (1590)*. Edición critica de Fermín de Pino-Diáz. Madrid: CSIC, 2008, p. 79. [Colección de acá y allá, fuentes etnográficas, n.º 2]).
[26] ACOSTA, Joseph de – *Historia Natural y Moral de las Indias (1590)*… p. XXVII.

cannot assure if, in fact, that was the way they killed whales but we may assume, with some level of certainty, that whales were caught in Central America by the native people in the 16th century (Fig. 2).

Within the concept of «taxonomy of world whaling», among the eleven whaling eras proposed by Reeves and Smith[27], relatively few operations have been identified as arising from local initiative and invention in tropical latitudes, and only two operations in the Indo-Pacific were included. For instance, the whaling tradition in the Indonesian islands of Lembata and Solor preceded the arrival of American and English whalers by at least two centuries and persists nowadays[28]. It is characterised by the use of open boats powered by hand or sail, and hand-delivered weapons such as harpoons, large hooks and blowhole plugs, and processing of the animal on shore[29], similar to what Acosta described. For Brazil, despite the non-sustained hypothesis that the indigenous people of Ceará hunted sperm whales[30], we did not find so far any indications of an aboriginal-whaling type occurring in pre-colonial context.

Fig. 2. Whaling scene illustrated in *Indias Ocidentalis* xxx. XI of Theodoro de Bry, 1560

FIRST PERCEPTIONS TOWARDS WHALES IN BRAZIL

As stated before, the whale was not *per se* a novelty in the Europeans' eyes. The great novelty should have been the diversity of species and its abundance as reported, among others, by the Jesuit priest Joseph de Anchieta on his *Informação da Província do Brasil para nosso padre* from 1558. He wrote that «Among these fish there are many of price and royal, such as whales, so many and so big

[27] REEVES & SMITH, 2003: 89.
[28] REEVES, 2002: 87.
[29] REEVES & SMITH, 2003: 86.
[30] PAIVA, 1969: 95-98.

that it is to see. Here in Bahia from the windows of the cubicles we see them jumping and along the coast there are many»[31]. The construction of the Jesuit College at *Baía de Todos os Santos* allowed for several observations of these animals in the past, boasting an abundance hard to believe today. They could be seen without difficulty by most observers who contemplated their unique size and exuberant behaviour, making it «very dangerous to sail in small boast along this coast, because besides other dangers, the whales capsize many, if hearing their sound, thus soar as they were horses when hearing drums, and lunge like lions, many of them wash ashore and of them is made much oil» as Fernão Cardim wrote in his *Tratados da terra e gente do Brasil*[32].

We can move from one description to another, analysing a variety of meanings and considering the uses and values attributed to whales and their products, as we find in Chapter CXXV of the *Tratado Descriptivo do Brasil* from 1587 of Gabriel Soares de Sousa:

> *And while the whales are in Bahia, run the fish from the middle from the shoals and reconceives where they [whales] cannot be, which sometimes for following [the fishes] wash ashore, as happen in the river Pirajá in the year of 1580* […] *the male was without comparison bigger, which we cannot measure, because at that time was already unclothed of meat, that was taken to oil* […] *the female had a huge mouth in which I saw a black man inside between one chin and the other, cutting with an axe the bottom lip with both hands, without touching the upper lip which whale was pregnant, and it was took from the inside a son as big as a thirty palms keel boat; and was made from both so many oil that supplied the land for two years*[33].

This document describes in detail the whales entering the sea of Bahia, at the Bahia Recôncavo, their size, other particularities and their potential benefits. This work bears a particular interest because it is, so far, the first indication about Basque expertise being brought to Bahia as mentioned in Chapter CXC:

> *and because the ships cannot be pitched without mixing with grease resin, in Bahia a lot is made from sharks, lixa and other fishes, with which the engines are illuminated and the ships from the land are pitched,*

[31] Translation by the author: «Entre estes pescados ha muitos peixes de preço e reais, como baleias, tantas e tão grandes que é para ver. Aqui na Baía das janelas dos cubículos as vemos andar saltando e por toda a costa ha muitas» (ANCHIETA, Joseph de – *Informação da Província do Brasil para nosso padre (1558)*. In *Cartas, Informações, Fragmentos Históricos e Sermões do Padre Joseph de Anchieta, S. J. (1554-1594)*. Rio de Janeiro: Civilização Brasileira, S. A, 1993, p. 429. Publicações da Academia Brasileira, II-Historia, Cartas Jesuiticas III).

[32] Translation by the author: «muito perigoso navegar em barcos pequenos por esta costa, porque alem de outros perigos, as balêas sossobrão muitos, se ouvem tanger, assi se alvoração como se forão cavallos quando ouvem tambor, e arremetem como leões, dão muitas á costa e dellas se fazem muito azeite» (CARDIM, Fernão – *Tratados da terra e gente do Brasil (1540?-1625)*. Introd. Rodolfo Garcia. Belo Horizonte: Ed. Itatiaia; São Paulo: Ed. da Universidade de São Paulo, 1980, p. 47).

[33] Translation by the author: «E em quanto as balêas andam na Bahia, foge o peixe do meio d'ella para os baixos e reconcavos onde ellas não pódem andar, as quaes ás vezes pelo irem seguindo dão em secco, como aconteceu no rio de Pirajá o anno de 1580 […] o macho era sem comparação maior, o que se não pôde medir, por a este tempo estar já despido da carne, que lhe tinham levado para azeite […] a femea tinha a boca tamanha que vi estar um negro mettido entre um queixo e outro, cortando com um machado no beiço debaixo com ambas as mãos, sem tocar no beiço de cima a qual balêa estava prenhe, e tiraram-lhe de dentro um filho tamanho como um barco de trinta palmos de quilha; e se fez em ambas de duas tanto azeite que fartaram a terra d'elle dois anos» (SOUSA, Gabriel Soares de – *Tratado Descriptivo do Brasil (1587)*. Edição de Francisco Adolpho de Varnhagen. 2.ª ed. Rio de Janeiro: Typhographia de João Ignacio da Silva, 1879, p. 254).

and which is enough to many ships, the more that if to Bahia went Biscayans or other men who know how to kill whales, in any other part there are so many as here, where they live six months a year and more, and from which so much grease will be made that there will be no ships than can bring it to Spain[34].

The need for foreign experts to hunt whales may lead us to think that the Portuguese fisherman were few or ineffective in this practice[35]. Yet, we may also assume that by the late 16th century a stranding whale constituted a resource useful to know. In fact, Pêro Magalhães de Gândavo, Jean de Léry, Anchieta, Cardim and Sousa were considered by Professor Carlos Almaça as the first contributors to the Natural History in Brazil. Their descriptions were built in abidance of medieval concerns and the interest in the animals relied mainly on their utilitarian character[36]. The complaint about the underutilization of the American nature's richness is recurrent in authors from the 16th to 18th centuries. They called for the need to get to know the territory and its potentialities better and for having men and means to properly explore the resources[37], such as the whales «all over this Bahia, without having people to hunt them», as reported in *Historia do Brazil* of Father Vicente do Salvador[38].

Concerning whaling, a question keep emerging: Did European settlers in Brazil know how to kill whales? Yet, they were aware of whales' by-product profits and also of Biscayan's knowledge of hunt them… It would just take a few years until a commercial whaling activity began.

WHALING SOUTH: FROM IBERIA TO THE SOUTHERN ATLANTIC

As seen above, some slight uncertainties about who were the first whale hunters in the coast of Brazil still prevail, whether native populations or the Portuguese, namely Azoreans[39]. Nevertheless, a century after the arrival of the Portuguese, in 1602, during the Iberian Union, with Felipe III of Spain – Felipe II of Portugal – an organised whale hunting began in Brazil. Directly or indirectly, possibly through the work of Sousa, Felipe III became aware of the abundance of whales in Bahia region[40] and sent a letter to Diogo Botelho, the governor of Brazil between 1602 and 1608, before his departure to Brazil that reads as follows:

I am Informed that in the coast of Brazil whales will be fished as it is made in others it will be great the profit of oil from them because there are many in the seas of that cost for what I commend you that before

[34] Translation by the author: «e porque se não podem brear as náos sem se misturar com a resina graxa, na Bahia se faz muitas de tubarões, lixa e outros peixes, com que se alumiam os engenhos e se bream os barcos que há na terra, e que é bastante para se adubar o breu para muitas náos, quanto mais que se á Bahia forem Biscainhos ou outros homens que saibam armar ás balêas, em nenhuma parte entram tantas como n'ella, onde residem seis mezes do anno e mais, de que se fará tanta graxa que não haja embarcações que a possam trazer á Hespanha» (SOUSA, Gabriel Soares de – *Tratado Descriptivo do Brasil (1587)*… p. 323).
[35] SILVA, 1964: 214.
[36] ALMAÇA, 2002: 89.
[37] SILVA FILHO, 2016: 122.
[38] SALVADOR, Vicente do – *Historia do Brazil (1627)*. Rio de Janeiro: Typ. de G. Leuzinger & Filhos, 1889, p. 170.
[39] Although there is no in-depth study on Azorean people as promoters of whale hunting in Brazil, references to this topic can be found in the works of SILVA, 1964: 214 or RIBEIRO, 1998: 24.
[40] VALDÉS HANSEN, 2016: 730.

living seek for some biscayans that in this fishery have more use because doing so and teaching others it will be achieved a great profit of oil […][41].

Thus, in the same year of 1602, the king assigned to the Biscayan captain Pero de Urecha and his partner Julião Miguel (or Julien Michel) a license for a period of ten years (1602 to 1612). Two or three whaling vessels travelled then from Biscay to Bahia with expert crews of Basque hunters on board, to hunt whales along the Brazilian coast[42] and in Portugal, being this an exceptional concession[43]. In a complex period of confrontations between European powers, and with the fragile Portuguese maritime empire collapsing[44], the description of Francisco Pyrard de Laval (1601-1611) points to a possible close relationship between Julião Miguel and the king himself, who facilitated the operation of a (presumably) French in the waters of Brazil[45].

Nevertheless, the first steps were taken to begin a commercial whaling activity in the South Atlantic, with secular expertise. The Basques established themselves most probably in Itaparica island, as indicated by the 17th century map by João Teixeira Albernaz the Old. There, *Ponta de Biscaya* stood out, among Portuguese and native places' names, disappearing later, after the Portuguese Independence, to be replaced by *Ponta das Baleias*[46]. Despite this exclusive concession granted to the Biscayan partners, one year after their arrival the inhabitants of Bahia started to hunt whales, after observing and learning the whaling practices[47]. And, even prior to 1612, the activity was also performed by the inhabitants of Bahia.

After a short period of free whale hunting, in 1614 the crown established the whaling monopoly, which greatly benefitted the royal finances. It bore an increasing importance in Brazilian revenues, correspondent to the expansion of the activity, what was not ignored by the following governors[48]. From mid-17th century, especially after the Restoration of Independence in 1640, and during more than three centuries, whale hunting in Brazil gained economic importance. The same applies to its by-products that met basic needs of the residents and generated profits for the entrepreneurs who signed exploitation contracts, and for the crown who established a royal monopoly in 1614, which lasted until 1801[49].

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[41] Translation by the author: The Portuguese citation as presented here is found in the work of ELLIS, 1969: 33-34. «Eu sou Informado que na costa do Brazil se pescará baleas como se faz em outras sera grande o proveito de azeite delas por aver muitas nos mares daquela costa pelo que vos Encomendo que antes partais procureis levar alguns biscainhos que nesta pescaria tem mais uso porque fazendo a elles E ensinando outros se venha a conseguir Este tamaño proveito do azeite […]».

[42] SALVADOR, Vicente do – *Historia do Brazil (1627)*… p. 170-172; ELLIS, 1969: 33; EDMUNSON & HART, 2014: 33.

[43] VALDÉS HANSEN, 2016: 730.

[44] COSTA, 2014: 182-183.

[45] LAVAL, Francisco Pyrard de – *Viagem de Francisco Pyrard, de Laval, contendo a noticia de sua navegação ás Indias Orientais, ilhas de Maldiva, Moluco, e ao Brazil, e os diferentes casos, que lhe aconteceram na mesma viagem nos dez anos que andou nestes paizes (1601-1611)*. Versão portuguesa correcta e acrescentada com algumas notas por Joaquim Heliodoro da Cunha Rivara. Nova Goa: Imprensa Nacional, 1858, p. 276; PAZ, 2015: 31.

[46] VALDÉS HANSEN, 2016: 731.

[47] ELLIS, 1969: 36.

[48] JOHNSON & SILVA, 1992: 187.

[49] EDMUNSON & HART, 2014: 36-37.

Aiming to reach a brief description to facilitate the comparison between the techniques used in the «original» place of the activity (the Gulf of Biscay) and the «new» place (Brazil) we divided the activity into Observation, Catching and Processing.

Regarding the animals' observation and targeting, the major and primarily persecuted species in Brazil were probably the Southern Right Whale *Eubalaena australis*[50]. This baleen whale is one the three right whales species, whose common name is said to come from English whalers who designated this as the «right» (i.e. correct) whale to hunt due to its habits. Right whales appeared near the shore, swam slowly enough to be caught, floated when dead and yielded large amounts of oil and baleen[51]. Southern right whales appeared in the Southern Ocean ranging from Argentina, Brazil, South Africa, east Africa, Mozambique, western and southern Australia, New Zealand and Chile. This species migrates annually between high-latitude feeding grounds and low-latitude calving and breeding grounds. Calving areas include shallow waters and bays coinciding with the historical descriptions of the hunting season between June and September according to Myriam Ellis[52] or August to November, according to the recent work of Váldes Hansen[53] when a huge amount of whales occupied the bay and surrounding sea[54]. Probably, the same reason explains the lack of reference to a high point on land to spot whales, like the *atta-layas* in Biscay, or to any type of warning, the whales being very likely easy to spot from the shore (Fig. 3).

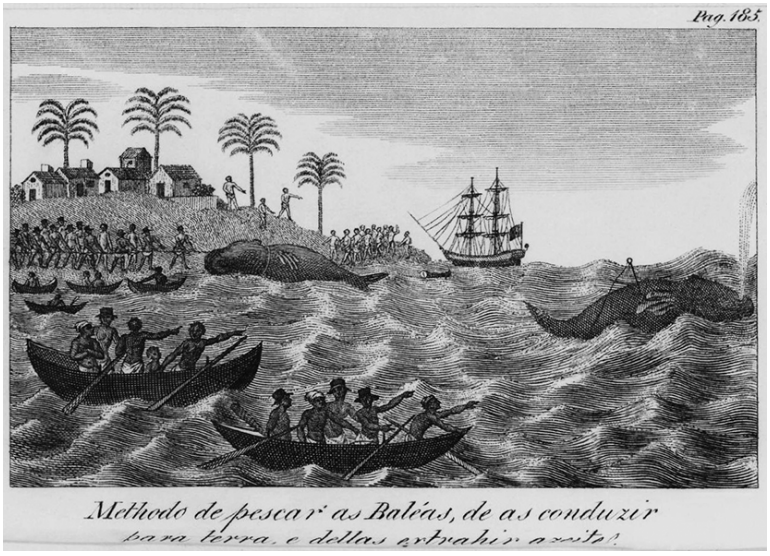

Fig. 3. Whaling scene entitled *Way of fishing whales, to drive them to land and from them extracting the oil* from *Historia de Brazil*… of Alphonse de Beauchamp (1767-1832), Tomo VIII. Lisbon: Na Impressão de J. B. Morando, 1820
Cortesy of John Carter Brown Library at the Brown University (http://jcb.lunaimaging.com/luna/servlet/s/194e8c)

[50] EDMUNSON & HART, 2014: 34.
[51] KENNEY, 2009: 962-972.
[52] ELLIS, 1969: 34.
[53] VALDÉS HANSEN, 2016: 731.
[54] SALVADOR, Vicente do – *História do Brazil (1627)*… p. 170-172.

The catch occurred after a religious ceremony to bless the whaling ships and usually three boats went to sea to chase whales. The *chalupas* were now *baleeiras*[55] with the same features and quadrangular sail. With a length of 10 to 12 meters, sometimes longer, reaching 16 or 18 meters, the *saveiro* was a boat adapted to this specific type of persecution. Like in the Biscayan technique, the whalers at first looked for the calf, which was the first to be harpooned and immediately put alongside the boat. Once this was done, it was easier to capture the adult. A rowing boat with the harpooner standing in the bow approached the whale and several strikes of harpoons and spears weakened the animal, while the second and third boat helped to achieve the killing and towed the dead whale ashore. A white flag was lifted to warn the workers and the population on land that the whale had been killed. The boats used were identical to those of the Biscayans. This was, of course, a very difficult and dangerous activity, that held on to traditional and poorly developed methods over a long period of time (Fig. 4).

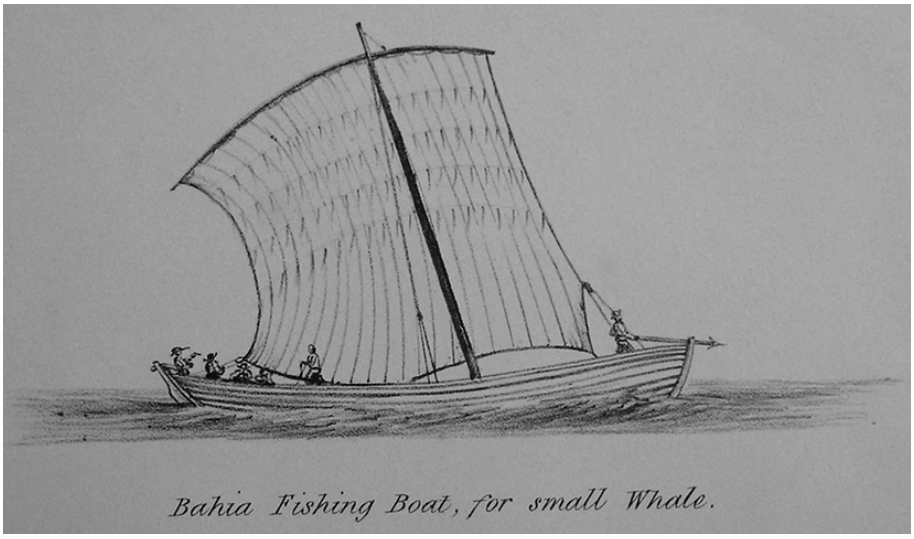

Fig. 4. Bahia fishing boat. Klaus Barthlemess Whaling Collection

About the dismantling of the animals, in the first period, from 1602 to 1612, within the contract with the Biscayans experts, the whale was dismantled and the blubber was melted into oil in temporary bases on land. After that, *armações* – permanent locations equipped with all the necessary appliances for the whale hunt, dismantling and oil processing – were usually set at the entrance of bays and straits, protected from the strong wave action and southern winds (Fig. 5). These also provided sheltered places for breeding whales, facilitating the catch. The first *armações* were set at the entrance of the Bahia Reconcavo and later the activity expanded further south, to Rio de Janeiro, São Paulo and Santa Catarina[56].

[55] From the Portuguese word for whale: *baleia*.
[56] ELLIS, 1969: 46.

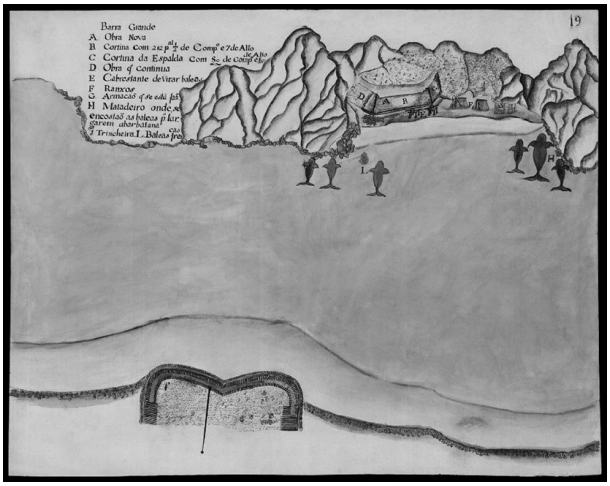

Fig. 5. Whaling Illustration of a whaling *armação* in Mourão, Luís Antônio de Sousa Botelho (1775)
Cartas Topograficas do Continente do Sul e Parte Meridional da America Portugueza: com as batalhas que o Illmo. e Exmo. Conde de bobadella ganhou aos indios das missoens do Paraguay.
Planta n.º 19: Obras Novas de Fortalezas na Barra de Santos
Biblioteca Digital Luso-Brasileira http://bdlb.bn.br/ accessed on 30.07.2015

The various usages of the whales' by-products ranged from food to building houses. Yet, the oil was certainly the most important product extracted from the whale blubber melting. It lightened the houses, sugar mills, fishing vessels during night fisheries and villages. It was also used as a substance to heal rheumatism and other diseases. Whale oil was also the most relevant ingredient used as a binder for construction. From the bones, they built fences for backyards, decoration objects and seats, regularly sold in the markets of *Salvador da Baía*. They were also used as support pieces in fountains and lagoons where women washed clothes. The meat was a minor ordinary product, mostly used to feed the slaves, sold to the women that salted and dried it on the street or distributed to the poor people. In Bahia, a popular believe said that if the whale entrepreneur favoured the poor with humanity and Cristian charity, when dismantling the animal, the yearly hunting would be of great profit, turning into a failure otherwise[57]. On the other side, whale oil profits were used in the reconstruction of Brazilian forts and acquisition of guns and munitions in 1668[58]. Moreover, the whale oil was used to repair the ships of *Carreira da Índia*, and when the whaling season did not succeed as expected, it had an impact on maritime issues and businesses[59].

With ups and downs related to the success of the hunting and trading of each contracted season, the whaling monopoly in Brazil prevailed until 1801. The profits of this enterprise had an impact on the 16th and 17th Portuguese centuries overseas and the colonisation of Bahia, not only fostering

[57] ELLIS, 1969: 41-42; CASTELUCCI JUNIOR, 2008: 184.
[58] SERRÃO, 2004: 58.
[59] LAPA, 1968: 71

richness and capital in the territory but also being a factor for the development of that Captaincy and, subsequently, of Brazil[60].

FINAL REMARKS – WHALING EVOLUTION AND EARLY MANAGEMENT CONCERNS

By the late 18th century, the whaling enterprise in Brazil was living profitable times, displaying a considerable expansion along the coast and the entrepreneurs' families, who held whaling contracts with the Crown, strongly benefitted from Marquis of Pombal's reforms[61]. At the same time, more precisely in 1779, the Royal Academy of Sciences was created in Lisbon. One of its goals was the promotion of the empirical knowledge with public profit and social utility[62]. Within the economic and scientific political agenda, A merica was considered the most important source of power, given its commercial and maritime expansion. Still, the authors of some works published in the Academy were not completely aware of the industrial progress happening in Europe[63], in a time where the Iberian crowns were losing territory for the recent French, Dutch and British empires[64]. In fact, at the end of the 18th century, other European nations were using the so-called «Brazil Banks» to catch whales[65]. Together with the old practices of an indiscriminate hunt, the killing of calves and females are pointed as one of the major reasons for the decline of the activity's success and profit. Some of these concerns are reported in *Memorias Economicas* of the Royal Academy of Sciences by Manoel Ferreira da Camara[66] and José Bonifácio de Andrada e Silva[67] where a very current terminology is used. For instance, José Bonifácio de Andrada e Silva in his *Memória sobre a pesca da baleia e extração do seu azeite*… shows the first signs of concern with this activity's sustainability. He draws attention to the killing of the calves, stating that 1) the future generation is being diminished, 2) a small whale is not as profitable as an adult, 3) even 2 years-old whales yield just half of the amount of oil, and 4) female whales in the breeding season are skinny and their amount of oil is lower. Silva had State functions and was part of an erudite elite that played a role in the Independence of Brazil. This Memory is particularly relevant as it is marked by a vision of the world founded on the economy of nature, the defence of economic progress and the application of scientific knowledge to the production techniques and the critique of the destructive exploitation of natural resources. Nevertheless, the focus of his thoughts was not the overexploitation of whales but rather the bad and rudimentary way in which they were being exploited, preventing them to create more richness in the future[68]. It is also important to highlight that when discussing the relation between whale mothers and calves,

[60] SILVA, 1964: 224; COMERLATO, 2010: 1136.
[61] BOXER, 1969: 192.
[62] DOMINGUES, 2012: 144.
[63] BOXER, 1969: 196.
[64] DOMINGUES, 2012: 146.
[65] EDMUNSON & HART, 2014: 50
[66] CAMARA, 1789: 344-346.
[67] SILVA, 1790: 395-402.
[68] PÁDUA, 2000: 123.

Silva abandons the objective character of his text, adopting a literary tone, describing whales as having feelings and motivations like humans. This narrative is in line with the questioning of animals' rights and the intrinsic value of nature of the 18th and 19th centuries[69]. Despite the focus on the economic value of the whales, these reports give interesting insights to rebuild a trajectory of change towards whales use and the beginning of «conservation» or management concerns, a subject that we aim to further investigate.

The Portuguese whaling is still a barely explored topic, punctually referred throughout the Portuguese and international historiography and lacking a dedicated work revealing its main contours. In our opinion, greater attention should be paid to this thematic than hitherto. The whale exploitation in Brazil was subject to the economic dynamics of the royal monopolies established in the colonial context, alike tobacco, *pau-brasil* and, later, gold and diamonds. The circumstantial and instructive character of Basque whaling in the most important Portuguese colony was actually brief, yet transcendent in time[70]. In fact, there are more similarities than differences between the Basque techniques introduced in the early 17th century and the whaling techniques that were built upon those in Brazil, which did not change much along the centuries[71]. Except for the search for whales that, as written above, was made from a lookout or *atallaya* in Biscaya, for which we haven't found, so far, any correspondent reference in Brazil, the boat type, the tools, the approach to the animal, the dismantling process, were in everything very similar, and prevailed at least since the 19th century[72].

Reminding the whaling eras established by Reeves and Smith, «Basque Shore» whaling generally involves lookouts on cliffs or other high-elevation position and is characterised by a pursuit of the whales in small open boats, and attack with hand harpoons and lances. Despite the difference, the authors affirm that «shore whaling in Brazil was inaugurated by Basques in 1603» and they «assigned this and ensuing Brazilian primitive shore enterprises to a single operation that extended temporally far beyond the end of the Basque Shore era», being the Brazilian operation the major one outside the North Atlantic[73].

Regarding the target species, again a similarity seems to exist. As previously said Basque whalers were experts in hunting Right Whales, although the North Atlantic species, and in Brazil the main target was presumably the Southern Right Whale which is, with minor exceptions, identical in appearance and behaviour to the northern species[74].

The Portuguese played an important role as promoters of whale hunting in Brazil and other Atlantic regions, and not so much in the innovation of whaling techniques[75]. Perhaps we must bear

[69] PÁDUA, 2000: 124.
[70] VÁLDES HANSEN, 2016: 737.
[71] EDMUNSON & HART, 2014: 60.
[72] As described, for instance, by the French merchant Louis François de Tollenare in 1817, who followed at sea the hunting of a whale in Bahia. See TOLLENARE, 1956: 291-294 and EDMUNSON & HART, 2014: 54-55.
[73] REEVES & SMITH, 2003: 7.
[74] REEVES *et al.*, 2008: 194-195. Note from the authors: Humpback Whale (*Megaptera novaeangliae*) and Sperm Whale (*Physeter macrocephalus*) were also hunted, refereed in some works on this thematic, nevertheless, a profound review and analysis about the targeted species in the coast of Brazil is being conducted by our team and will be presented in the future.
[75] BRITO *et al.*, 2017.

in mind that the Portuguese sent to the new territories were mostly farmers[76] and not so much adventurous sea people. Maybe that explains somehow the recurrent presence of the word «teach» in historical sources related to the Basque expertise.

Whaling is the core of our work, where coherence emerges from a maritime activity common to the Atlantic space[77], with knowledge and techniques being transferred from one region to another, establishing convergent developments in the use of whales overseas and connecting different worlds around a similar marine resource. The increasing intimacy with the marine environment, especially in the early modern era, promoted not only commercial opportunities, curiosity about nature and new cultural forms, but has also changed and impacted ecosystems. And while the economic implications of ecological constraints can sometimes be tracked relatively clearly, reconstructing subtle cultural shifts triggered by changes in the sea requires careful interdisciplinary study of maritime communities and marine environments[78].

It is broadly accepted that the Portuguese expansion greatly contributed to the human understanding of global navigation and geography, but also of pharmacology, botany and medicine[79]. Science, besides being a source of knowledge, was also an instrument of human control over nature and a way for the State to control natural resources, where science and technique allowed to transform and boost the New World[80]. Whaling in colonial Brazil had a major importance on the economic level to the Portuguese crown and entrepreneurs, but not only that. It had a social impact, whereas the hardest, more difficult and stinking task of dismantling a whale was performed by slaves who received the most undervalued and cheapest whale product, the meat. Furthermore, it is important to stress the cultural value of whaling, as it is a paradigmatic case of knowledge transfer from Europe to the New World, in a place where the hunting of whales was not part of the local culture. Knowledge was assimilated, adapted and constructed over more than three centuries, and is now part of the collective memory and represented in artistic forms as music, paintings and literature[81]. Finally, the scientific input that the knowledge of the whale anatomy and behaviour allowed the most curious and concerned ones, for understanding these giant animals and change their perceptions towards these symbols of evil and bad omen. These were the perceptions that built the knowledge about a marine mammal that was a monster in the ocean and a valuable royal resource at land, or in the words of Rocha Pitta «a useful monster of the sea»[82].

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[76] BOXER, 1969: 29.
[77] MORGAN & GREENE, 2009.
[78] BOLSTER, 2008: 46.
[79] WALKER, 2009: 247.
[80] DOMINGUES, 2012: 147.
[81] See for instance the poem of ITAPARICA, Manuel de Santa Maria – *Descrição da Ilha de Itaparica (1704-1768)*. In BRAYNER, Sônia, *org.* – *A Poesia no Brasil 1*. Rio de Janeiro: Civilização Brasileira, 1981, p. 48-62.
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FROM THE NEW WORLD TO BARCELONA: AMERICAN FLORA IN THE SALVADOR'S CABINET

JULIANNA MORCELLI OLIVEROS*

Resumo: A expansão geográfica vivenciada pela Europa a partir do século XVI não se limitou ao avanço das fronteiras territoriais. O surgimento do Novo Mundo trouxe à tona toda uma infinidade de novidades naturais, que contribuíram para o desenvolvimento de diversas áreas do saber. Coletar, intercambiar correspondências e materiais de estudo, entre outras práticas serviram para produzir e colocar em circulação novos conhecimentos, novos produtos e usos das espécies naturais americanas. Estes intercâmbios foram viabilizados pela densa rede de comunicação científica intensificada no século XVII, por naturalistas de toda a Europa. Barcelona conheceu estas novidades, em especial, pela atividade da família de boticários e colecionadores Salvador.

Palavras-chave: República das Letras; Barcelona; família Salvador; plantas americanas.

Abstract: Europe's 16th century geographical expansion was not limited to territorial borders. The emergence of the New World brought to the forefront a myriad of natural novelties that contributed to the development of several areas of knowledge. Practices including collecting, correspondence, and the study of materials produced and put into circulation new products, knowledge, and uses of American natural species. The dense network of scientific communi-

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cation that made this exchange possible intensified, incorporating naturalists from all over Europe by the 17th century. Barcelona came to know these innovations in part through the Salvador family of apothecaries and collectors.

Keywords: Republic of Letters; Barcelona; Salvador family; American plants.

The period between the 17th and 18th centuries of the modern era in Europe was marked by novelties, news of which buzzed throughout the old continent. As long-distance navigation expanded the limits defined by cartography, intense cultural, economic, and social exchanges created new paradigms. These contribute to the development of several areas of knowledge about Natural Philosophy. By connecting Europeans seafarers, nobles, and clergymen with the peoples of distant places, the *Carreira das Índias* provided a crucial basis for the vibrant culture Europe unleashed from the 16th century onwards.

The natural world narrowed the trade relations of the period. The new territorial possession's fauna and flora were exploited to the limit by the apothecaries and physicians who were sent to the colonies of the tropics to study both the new species and their use in local medicine[1]. Ships that crossed the ocean facilitated the circulation of this new knowledge, influencing the movement of medical and botanical information, as well as of exotic species and products themselves. Therefore, we can say that these commercial networks shaped the way practitioners did science.

From the Renaissance to the Enlightenment, a new «fashion» prevailed in cultured circles throughout Europe. Collecting became both a hobby and a way of life for those intent on achieving a certain social standing. Everything considered curious or wonderful was worthy of being collected. What was a passion for some, became a potential tool for scholars and humanists, who saw in these spaces a possibility of accumulating knowledge about the natural world and, thus, unveiling the mechanisms that allowed humans dominate the nature.

Geographical expansion led to further deviation in collecting's purpose. Initiated by the Iberian Peninsula, this expansion was promptly followed by almost all the European maritime powers who endeavoured to discover and explore their new possessions and, consequently, to control both transoceanic and internal commercial routes.

At the same time that the so-called «first globalized age» approached distant places – creating new commodities and enriching the old continent's naturalistic collections with new botanical specimens – the more distant the dream of control over nature became.

Knowing and understanding the natural world posed perhaps the greatest challenge for scholars of the period. This task required varied studies and practices in order to accumulate as much information as possible about each species. Naturalists acquired this much-needed information by comparing observations made by all those dedicated to describing and classifying such species.

[1] MARGÓCSY, 2014.

For political and geographic reasons, the first experts to gain access to these products were those that had some ties to the new colonies and, crucial for transportation logistics, territories located near the sea. In order for the news of these objects to spread throughout the European territory, including more peripheral places, experts relied on a network for dissemination, information, and exchange of flora and fauna. The European scientific culture – which became known as the Republic of Letters – was then identified by a series of unique cultural practices. Social conventions allowed members to establish and maintain communication in a network in which both ideas and materials, including gifts, specimens, books and instruments circulated.

In this chapter, I situate the city of Barcelona and some of its most important actors in the scientific communication network, with the aim of overcoming the old dichotomy between center and periphery, demonstrating how knowledge is produced and circulated not only in cities with political courts, universities, botanic gardens and scientific societies, as well as – in an essential way for the maintenance of the network – in cities in different relative positions, spaces of action also of naturalists, collectors and natural philosophers with a remarkable scientific activity. The capital of Catalonia had a family of naturalists who for almost two hundred years had been committed to maintaining this important network of dissemination and scientific exchange. Through the Salvador's scientific activity, it is possible to highlight the substantial practices that should be performed so that they also had access to the novelties in natural history. Through the species of American plants from the Catalan apothecaries' collection – whether in the books from the private library, as seeds grown in the family garden, dried plants in their herbarium, or mentioned in the epistolary correspondence that they maintained with the most prestigious experts of the day – it is possible to verify that, even while «distant» from the intellectual centers, the apothecaries of the Salvador family were not only informed by innovations in natural history, but also active contributors to the advancement of scientific knowledge.

FROM THE PERIPHERY TO THE GREAT CENTERS OR FROM THE GREAT CENTERS TO THE PERIPHERY: INTEGRATING BARCELONA AND THE SALVADOR FAMILY INTO THE INTERNATIONAL SCIENTIFIC ROUTE

A family of apothecaries, collectors, and natural philosophers in Barcelona active from the beginning of the 17th century to the mid-19th century, the Salvador family provides an important example of how residents in a peripheral city could develop innovations that arrived in the urban centers in this period.

The first member of this line of professionals was Joan Salvador i Boscá (1598-1681), who coming from Calella arrived in Barcelona in 1616 to work with the promising but demanding craft of the apothecary. The story of the Salvador family began when Joan used a classic strategy to improve his social standing: he married the daughter of a master and, thus, acquired a reputable position within the Boticarios Guild[2]. Six years after his arrival in the city, in 1622, Joan married Victoria Pedrol, daugh-

[2] About the Apothecaries's Guild and the professional activity of this metier in Barcelona, see CAMARASA, 2008.

ter of Gabriel Pedrol, giving him both the title of master apothecary and also the inheritance of his father-in-law's business, that is, a pharmacy located on Ample Street. This was a remarkable location, privileged by a proximity to the sea which granted the pharmacy strategic access to news that arrived with the boats on the edge of Barcelona[3].

But what interests us here in particular is that, in addition to the economic strategies involved in this business, Joan was responsible for starting a cultural practice, very characteristic of his time: the configuration of a library and establishment of a scientific network that allowed him to lay the foundations of the collections of books, natural and artificial objects, and exotic products that would have become the Salvador family's hallmark for nearly two centuries.

Guided by his interest in plants, Joan established intense exchanges of correspondence and information with the period's leading authorities, such as Jacques Barrelier (1606-1673). Although Joan set the precedent, acquiring important texts for the library and establishing key relationships inside and outside Barcelona, his son Jaume Salvador i Pedrol (1649-1740) intensified these practices and became one of his family's most illustrious members.

When we speak of Jaume's expansive career, we can not ignore his professional training. Unlike his father, Jaume studied in Montpellier, Toulouse, and Marseille. Besides providing him better training than he could find in Barcelona, access to these important centers offered him an excellent opportunity to develop contact with the most important naturalists in natural history of the moment. Thus, Jaume established relationships especially with specialists in botany, such as John Ray (1627-1705), Pierre Magnol (1638-1717) and Joseph Pitton de Tournefort (1656-1708)[4].

Decades later, Jaume's eldest son, Joan Salvador i Riera (1683-1726), took up the family business. In addition to studying in Montpellier, as his father had, Joan also studied in Paris and travelled to Italy, where he learned about important scientific practices such as herborization, collecting objects, epistolary exchanges, among others. He established a network of relationships that linked Barcelona with London, Leiden, Paris, Montpelier, Madrid, Lisbon, Florence and Rome.

Throughout his career, the young apothecary also acquired numerous and relevant works of botany, chemistry, and medicine. His relationship with Herrmann Boerhaave (1668-1738), Professor of Medicine and head of the University of Leyden Botanical Garden and one of the time's leading natural philosophers, had a decisive influence on Joan's professional life. In addition to Boerhaave, Charles Plumier (1646-1704), one of the first to publish relevant floristics data about tropical America[5], also had a profound impact Joan's scientific interests. Joan's early death led his brother Josep Salvador i Riera (1690-1761) to continue the family business. In addition to maintaining important epistolary relationships, Josep was also responsible for systematizing and organizing the family's museum and library.

From the exchanges and achievements made by these four members of three generations of the same family we might say that the Botanical Garden created by Jaume in Sant Joan Despí, was the

[3] PARDO-TOMÁS, 2008: 51.
[4] For more biographical data of the Salvador's apothecaries family, see POURRET, 1796; BOLÒS, 1959.
[5] PLUMIER, 1703.

first private place in Spain where common plants from gardens all over Europe were grown. Among these European plants were exotic species from the New World, which were acquired by the Salvador family's international and local commercial agents and correspondents, including contacts from Cadiz, Seville, Valencia and Lisbon. In addition to the garden, over almost two centuries the family developed a library that reflects the birth and development of modern western science. The many books, seeds, roots, oils, flowers, fruits, and curious objects acquired by the family transformed the Salvador's collection into a Cabinet of Curiosities[6].

Preserving these Cabinets of Curiosities, very common between the 16th and 18th centuries, has not been an easy task. Most of them either have been lost to time or were broken up into smaller parts, severed from their former whole, and spread among different collections throughout the world[7]. Unlike the destiny of most of their fellows, much of the Salvador's collection still remains to this day, conserved by the Institut Botànic de Barcelona.

In order to understand the role played by these Barcelonan apothecaries and their position in the dense network of early modern scientific communication, this chapter analyses different types of writing produced at the Cabinet, a space for the production and circulation of knowledge about nature. As we have seen, European scientific culture was identified by a series of original and cultural practices. In addition to the characteristics indicated above, two fundamental practices that ensured communication of scientific networks deserve mention: books and letters[8].

READ IN BOOKS, PLANTED IN THE GARDEN: THE LIBRARY AND HERBARIUM AS SPACES FOR THE PRODUCTION OF NATURAL KNOWLEDGE

One of the essential issues when working with a library constituted for more than two centuries is that the acquisition of books was not limited to the latest bibliographical novelties. The collection is formed by both newly-written treatises as well as by older works. In the library like the curiosity cabinet, collecting had epistemological implications. We cannot forget that, during this period, students of natural history first turned to antiquity.

Besides being a continuous source of information on what was published about the topic of interest, the library was an essential tool for the identification, ordering, and classification of objects obtained both in travel and exchange with remote contacts. It provided the Salvador with an essential mechanism for contrasting their own observations of nature with what the classics had noted before them.

The apothecaries of the Salvador family assembled one of the largest libraries of the city in laic hands, complete with more than a thousand titles. Most of these texts focused on topics directly linked to the family occupation: natural history, pharmacopoeias, and medical matters[9].

[6] About the Cabinets of Curiosities, see IMPEY & MACGREGOR, 1985; POMIAN, 1987; SCHNAPPER, 1988; OLMI, 1982; OLMI, 1983; OLMI, 1992; OLMI, 1993; FINDLEN, 1994; DASTON & PARK, 1998; SMITH, 2008; BLEICHMAR & MANCALL, 2011.
[7] PARDO-TOMÁS, 2014: 34.
[8] PARDO-TOMÁS, 2010.
[9] For more information about the Salvador's library, see PARDO-TOMÁS, 2010.

Among the classics, we find the works of Theophrastus, author of one of the treatises essential to understanding how Europeans recovered techniques for studying, describing, and ordering flora. *The Treatise of Dioscorides*[10] – a Greek surgeon work worked in service of Roman armies – described drugs of animal, mineral and, mainly, vegetable origin. And last but not least, we find Pliny's *Compendium of Natural History*[11], a work referenced by European scholars of nature throughout the centuries.

Although the classics were important references for 17th and early 18th century naturalists, they lived in a period marked by profound transformations in all areas of knowledge. The Salvador family's private library, reflects these changes, and developed alongside the practice of botany itself. In the collection, works that heralded the discipline's rebirth are well-represented. These texts include several Renaissance works.

When studying the Salvador family, we have to place their interest in botanical works within the context of Spanish – and, more generally, European – scientific activity from the late Renaissance to the Enlightenment. Like many other European collectors of that period, the Salvador were interested in the exotic plants native to the Americas, as we can see through several works that approach the theme at the Cabinet's library[12].

The library had important titles concerning American flora. For example, we find the work of Nicolás Monardes (1508-1588) *Primera y segunda y tercera partes de la historia medicinal de las cosas que se traen de nuestras Indias Occidentales…*[13], published in Seville in 1574. From the same period, we also find the notorious work of Charles L'Écluse (1526-1609), *Rariorum aliquot stirpium per Hispanias observatorum historia*[14], published in Antwerp in 1576.

In addition, we find the treatise of André Thevet (1516-1590) *Les Singularitez de la France Antarctique*[15], published in 1558, in which the Franciscan friar reports on Portuguese America (that is, Brazil) describes the new territory, its fauna, and its flora. Like many chroniclers, travellers, and missionaries contemporary to Thevet, his work presents the natural colonial world to European readers at a time when Europe was still assimilating the newly discovered curiosities. Another example is *Historia generalis plantarum*[16], published in 1586 by Jacques Dalechamps (1513-1588), a compilation of all the botanical knowledge of his time. The work is decorated with almost 3,000 engravings, some of which are of American species such as avocado and graviola, with drawings from Clusius and Oviedo, respectively[17].

Throughout the 17th century, exploratory voyages to the colonies intensified, increasing the botanical discoveries. Scholars updated their studies and scientific works to incorporate these new specimens. Works of the British John Ray (with his catalogues of plants) and Hans Sloane[18] (with his travel

[10] DIOSCORIDES, 1547: 14/III/24.
[11] PLÍNIO SEGUNDO, 1524: B/III/12.
[12] For more information about scientific activity and Spanish collectors see REY BUENO & LÓPEZ PÉREZ, 2011.
[13] MONARDES, 1574: 13/IV/13.
[14] L'ÉCLUSE, 1576: 13/III/15.
[15] THEVET, 1558: 14/IV/17.
[16] DALECHAMPS, 1586-1587: 14/VI/11.
[17] The drawings cited appear on pages 1828 and 1835 respectively.
[18] RAY, 1693: 12/VI/4.

relationships) particularly stand out in this period[19]. Towards the end of the 17th century, almost two centuries after European's first contact with the American continent, it is not uncommon to find detailed publications about a single species. For example, in the library we find the work of Abraham Munting (1626-1683), *Aloidarium sive alöes mucronato folio americanae majoris, aliarumque ejusdem speciei historia: in qua floridi illius temporis, loci, naturae, culturae, necnon qualitatum ratio paucis enarratur*[20], from 1680, which deals almost exclusively with the American aloe, a species native to the arid areas of tropical America.

In the Salvador library, a group of works dedicated to certain species, such as cocoa and chocolate, deserves special attention. These are almost always associated with other so-called colonial beverages like coffee and tea – and an important additive: sugar[21]. At the library, we find the interesting work of Philippe Sylvestre Dufour (1622-1687), *Novi tractatus de potu caphé, chinensium thé et de chocolata*[22], from 1699. In it, Dufour dedicates four chapters to the American fruit, where he makes an analysis of the ingredient, ways to consume it, and its effects. Following the same style, we also find *Histoire naturelle du cacao et du sucre*[23], published in 1720, by Quélus, which features recipes using cacao. These not only advise the reader how to use the fruit, but also its by-products besides chocolate, such as butter and cocoa oil. This especifical book about an American fruit, cacao, shows that its use was already adapted to a newly created «European standard». Here the Salvador library bears witness to how the American fruit was transformed from something new into a staple of European daily life.

Through these examples, we can see how this family of apothecaries from Barcelona kept up-to-date with the news. The same cabinet that housed the collection of books was a space devoted to the circulation of knowledge about New World species.

The Salvador's interest in American nature is confirmed by the herbarium that the family created. Making a herbarium was itself a scientific practice closely related to both the culture of gardens and voyages of exploration, but also to European overseas activity and the colonial trade[24]. Maritime expeditions returned with true botanical treasures, from agricultural crops and new drugs, to spices brought from Asia, East Indies, and the New World. Europeans based in the old world then incorporated these specimens into their botanical gardens.

Known at the time as *hortus medicus* and *hortus academicus*, while these gardens' initial purpose was to assist in the teaching of medical matters, they eventually became sites for the botanical study of new, exotic plant species encountered through European geographic expansion[25]. While Cabinets of Curiosities enjoyed their heyday, the number of scientific publications increased significantly, new

[19] For more information about the scientific activity of Hans Sloane, see WALKER *et al.*, 2012. Reference work: SLOANE, 1696: 14/III/8.
[20] MUNTING, 1680: 12/IV/13.
[21] LEMPS, 1998.
[22] DUFOUR, 1699: A/I/4.
[23] QUÉLUS, 1720: 14/III/13.
[24] About the culture of gardens in Spain, especially in Barcelona, see GARCIA ESPUCHE, 2008. On exploration voyages, European expansion and colonial trade, see COOK, 2007; SCHIEBINGER & SWAN, 2005.
[25] CHABRÁN, 2011.

institutions that aimed at the promoting scientific knowledge emerged and consolidated. The Royal Society, founded in 1660 in London, as well as the Académie des Sciences, founded six years later in Paris became the most important of such institutions. In this period, the private gardens of apothecaries and rich collectors all over Europe also played an important role in pushing the boundaries of botanical knowledge[26].The garden was another essential complement of the Salvador Cabinet. On the one hand, seed was sown from the exchange with other naturalists and, on the other hand, native species were grown to select the seeds with which to properly correspond to the said exchange. Exotic flora were acclimatized found in gardens of naturalists who possessed enough time and fortune to devote themselves to their botanical pursuits. These gardens, in turn, became a particularly rich space for the production of knowledge about these exotic species. There, naturalists could experiment with crosses of species and varieties, observe growth and reproduction in conditions far more controlled than in an open field. Therefore, the little that we know about the garden that the Salvador created and maintained in their property in Sant Joan Despí is very significant.

The Botanical Garden of Sant Joan Despí was the first space where species now common to the region of Catalonia were grown. We know this mainly thanks to the herbarium, because in several folds we find this origin explicitly described[27]. However, for seasonal or geographic reasons, it was impossible to acquire live plants to be studied. To circumvent this problem, and also to facilitate their circulation, the use of herbarization has become commonplace.

The Salvador's Herbarium is one of the oldest and best documented in Spain. It is formed, mainly, by plants collected in trips, acquired through the Salvador's correspondence, and planted in the Garden of Sant Joan Despí by Jaume and his two sons, Joan and Josep. The vast majority of plants were derived from Catalonia, and in Europe in general. But, to a lesser extent, we can also find exotic species from Africa, Asia and, of course, from America.

Some of the species cited in the works present in the library were cultivated by the family, but the result was not always satisfactory, due to numerous variants. We know of these attempts because IBB counts preserved the herbarium, along with valuable notes made by the members of the Salvador family themselves. For example, Joan Salvador cultivated the *Mimosa americana*, but he could not make it bear fruit; it could not thrive in the low temperatures and died during the winter[28].

In addition to mimosa, several other American species were grown in the garden of Sant Joan Despí and documented in the herbarium's family. Among them, we can highlight the passion flower, as well as tomatoes, vanilla, and some species of acacia trees and pumpkins[29]. Many of these species came to Barcelona through exchanges with naturalist who were members of the major scientific societies and involved with the most prestigious botanical gardens of time. For example, James Petiver of

[26] MATAS, 2008: 65-69.
For more information about botanical gardens and its relation with a new science devoted to discovering and describing plants, see OGILVIE, 2006.
[27] IBÁÑEZ CORTINA & MONTSERRAT, 2008: 122-123.
[28] PARDO-TOMÁS, 2014: 89.
[29] IBÁÑEZ CORTINA & MONTSERRAT, 2008: 131-134.

the Chelsea Physic Garden facilitated the acquisition of plants from India, South Africa, and North America, while Tournefort from the Jardin des Plantes, in Paris, sent seeds and herbal plants from tropical America[30].

Relationships were essential for this network of scientific dissemination network to thrive. Through exchanges of seeds, dried plants, roots, and fruits, as well as books, naturalists from secondary routes, such as Barcelona, were granted access to news that came to the capitals that dominated the colonial trade. In a double-lane way, this system also favoured naturalists from places integrated into the main interoceanic routes who were knowledgeable about the flora of more distant regions, though from their own continent[31].

The gardens and herbaria, together with the technical information from books specialized in natural history, are indicators that the Salvador's interest went beyond the theoretical exercise of observation, and took shape in the curiosity with which they follow each stage in an unknown plant's cycle. «Mastering» the plant was important for practical as well as epistemological reasons; they needed to understand the plant's cycle to create a stock for future exchanges and thus maintain their position in the scientific network.

Thus, through Salvador's contacts we can reconstruct the network of information and relationships established by the this family of apothecaries.

LETTERS FOR MATERIALS: THE INTERNATIONALIZATION OF NATURE AND NATURALISTS

Analyzing the handwritten documentation produced in a Natural History cabinet is essential to understand the protocols adopted by its owners to insert and keep themselves in this network. Like the library's contents provided a window into the Salvador's interest in American flora, the correspondence exchanged between our apothecary family and other European naturalists serves as a guide to understanding the relationship between Catalan naturalists and the Republic of Letters. Through these correspondence, we can see their interests, what paths they travelled, and what goals they set out to achieve in reference to American botanical specimens.

The collection of correspondence preserved by the Botanical Institute of Barcelona, is historically invaluable. The epistolary relations of the family, initiated by grandfather Joan with Jacques Barrelier in the 1620s, gradually intensified over the following generations, and reached its apex under the older grandson, Joan, during the period 1706-1726.

From Ample Street, letters came from all corners of the old continent. Correspondence flooded in from England, Austria, France, Portugal, Italy, the Netherlands, as well as from various places in Spain itself. Perhaps the Republic of Letters' main characteristic is that it made knowledge accessible to all parts of Europe, regardless of the participants' geographic location. Thus, in these manuscripts we find the materials with which to reconstruct the scientific activity of the Salvadors, showing how

[30] IBÁÑEZ CORTINA & MONTSERRAT, 2008: 126.
[31] IBÁÑEZ CORTINA *et al.*, 2006.

their connection to the networks of epistolary communication, and scientific production and dissemination developed during the 18th century[32].

As mentioned above, the correspondences of Joan Salvador i Riera are by far the most extensive and interesting in the collection. His letters allow us not only to reconstruct his scientific trajectory, but also to envisage the friendly, personal and professional relationships he established with numerous naturalists of his time, from which he acquired many objects, specimens, and books that enriched the family collection.

In his day, the Catalan apothecary and naturalist was in contact with several notable naturalists. Among them, the friendship and bond he developed with James Petiver (1663-1718) was perhaps the most fruitful for young Joan. James Petiver was a noted English apothecary and member of the Royal Society who enjoyed considerable prestige among naturalists of the time. Disciple and friend of John Ray, he was for many years responsible for Chelsea Physic Garden and, throughout his life, developed his own important naturalistic collection.

Joan Salvador initiated his correspondence with the English naturalist in December 1706. The young apothecary reached out a few months after his return to Barcelona after he concluded his studies in Montpellier with Pierre Magnol and in Paris with Tournefort, and after having travelled through France and Italy for more than two years.

A portion of Salvador and Petiver's correspondence, which lasted from from 1706 to 1714, coincided with the years of the Spanish War of Succession[33]. During this period, another important figure approached Joan, and that figure became a fundamental part of his relationship with Petiver. As a Doctor of the British army, the Dutchman John Lecaan had arrived in Barcelona to stay in the city under the service of court of the archduke Carlos. Guided by his interests in natural history, Lecaan likely visited the apothecary Salvador to participate in some of the reunions and gatherings of local and foreign apothecaries, doctors and surgeons promoted by the family[34]. In addition to having initiated the relations of Joan Salvador with Boerhaave, Lecaan acted as mediator between Joan's correspondence with James Petiver. He was responsible for the interchanges of plant species among them, as Petiver mentioned in one of his letters to Joan «The Doctor. Lecaan will indicate how to send me his letters without obstacles or will take care of them himself»[35].

Interest in American plants was recurrent among naturalists of the 18th century and it provided a common interest among these three naturalists of different nationalities. In his book[36], Lecaan discusses *ipecacuanha*, a plant native to America and widely used, especially in France, as part of a cure for dysentery discovered by Helvetius[37] and discussed by Willem Piso[38].

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[32] PARDO-TOMÁS, 2010.
[33] About correspondence exchanged between Joan Salvador i Riera and James Petiver during the Spanish War of Succession, see CAMARASA & IBÁÑEZ CORTINA, 2007; IBÁÑEZ CORTINA, 2012.
[34] MARTÍ ESCAYOL, 2001.
[35] PETIVER, James – *Letter addressed to Joan Salvador i Riera sent from London* on April 21, 1708. Botanical Institute of Barcelona.
[36] LECAAN, 1708: 13/IV/3.
[37] The work in which Adrian Helvetius indicates *ipecacuanha* is also in the Salvador Library, under register 2/II/23.
[38] MARTÍ ESCAYOL, 2001: 181-182.

Lecaan's compatriot and fellow practitioner, Piso, was one of the leading physicians and herbarium creators of the modern era. As doctor of the Dutch colony in the Brazilian northeast, Piso also wrote the first natural history book aboutfrom Brazil – *Naturalis brasiliae* – a compendium of tropical medicine written in the period when a part of Brazil was under the dominion of Maurício de Nassau.

Obviously, Lecaan's interest in the American botanical species was distinct from those of of Petiver and Joan Salvador. While Lecaan was interested in medical botany framed in the military sphere[39], James Petiver had an interest in both collecting and commerce, and successfully established himself as one of the most influential commodity intermediaries of the 18th century. Petiver relied on two main types of supply: exchange with participants in the Republic of Letters throughout Europe and with travellers in commercial enterprises[40]. Thus, with the suppliers' cooperation, Petiver gained access to many plants, seeds, roots, and other materials that his contacts sent from the American colonies; the London apothecary then disseminated and sent them along to contacts connected through the intensive and extensive communication network.

Merchandise exchange lay at the heart of relations between Petiver and Joan Salvador, as it also did in almost all their other correspondence. Petiver sent exotic species acquired by his contacts in the colonies of the New World, and received in return several specimens from Catalonia, especially from the Balearics, from Joan Salvador. For example, in 1712 a letter sent to Joan Salvador, James Petiver wrote:

> *I wanted to take the opportunity to send you a consignment, as I promised in exchange for yours. It would have been more abundant had it not been for the sudden departure of Mr Naper, the illustrious surgeon. Nevertheless, you will find about forty American plants, most of them from Virginia, the rest from Jamaica. I would rather have sent better specimens but coarse and ignorant hands collected them because there are very few in those places that know anything about botany and even fewer who like to collect plants or that even have any idea why this is done. I have added to these around fifty English sedges and rushes and similar herbs regardless of the fact of their similarity in appearance or their being the same sent by you from Port Mahon, from where not long ago I received two volumes from someone else and daily expect other volumes). Although I do not have too many, I will naturally send you duplicates of those roots I sent you that are at least rare and no-one else has. As for the content of this consignment, you can just imagine the wonderful specimens from Asia, Africa and America that nobody else but myself can send you that you will receive in the next consignments. In exchange, I hope that, in the future, you do not fail to take advantage of any opportunity to obtain for me collections of animals, vegetables and fossils from these parts of the two Indies with which the Spaniards commerce, especially Peru and Mexico, this latter*

[39] According to Maria Antònia Martí Escayol (MARTÍ ESCAYOL, 2001), in the 17th century the great shipping companies employed medical personnel, both in their ships and in their possessions of the East and West Indies. These doctors were important points for the development of the medicine, since they informed about great amount of illnesses and remedies unknown until then. These plants have aroused the interest of physicians and naturalists and were an essential point for the development of medical matter and for natural history. On the other hand, according to political interpretation, natural history will become a political element of maximum strategic importance. Through the knowledge of the plants one could know other cultures, something that made them more dominated.

[40] DELBOURGO, 2012.

> *place which Hernández and others have illustrated. In the meantime, I would be very grateful for anything that you may find wherever you go in your country, as I was not so long ago with the Squilla lata rondeletti and the crab that you sent me* […][41].

Exotic materials – especially from America – exchanged between London and Barcelona were not limited to animal and botanical specimens. Petiver was also a major publisher and seller of books and studies recently published on the natural history; many of his publications now remain in the private library of Salvador. In a letter dated April 1715, Petiver said to send Joan his *American Pterigraphia:*

> *These will be sent with my next shipment, as well as my American Pterigraphia, which contains the complete figures of about 200 rare American ferns, most extracted from the Histoire des Fouguières, by Plumier, to which I have added several marine productions and some animals* […] *I am now recording 50 plants from Peru and Chile copied from Feuille's drawings. I need a lot to know what transport facilities for Madrid are within your reach so that with the shipments that I will send you I will have the chance to get together sent by Mr. Riqueur, the king's apothecary, Dr. Burlett, his first doctor and others, of whom I have Received some seeds by way of my lord Lexington* […] *I am very happy with the prospects of the group of plants, animals and curious fossils that you will find in your travels in the Pyrenees and Montserrat and I will give you a great satisfaction for the ones that I will receive from you and, with your permission, you stamp all things [which] are new or proper to those mountains*[42].

The exchange of correspondence and materials between the English naturalist and Joan Salvador lasted until 1718, when James Petiver died[43]. Although this relationship proved to be very advantageous for Joan's international reputation as a respected scientist, some of the network's contacts were most relevant to the pursuit of American plants. For this reason, I highlight the correspondence between acquaintances in Lisbon during the trip that Joan made with the brothers Jussieu[44] between 1716 and 1717. The series of letters that Joan received from Pau Martí, a Catalan merchant based in Lisbon, are particularly interesting. Pau Martí provided Joan Salvador with exotic products, mainly from America, that arrived at the port of Lisbon. The twelve conserved letters date from the period between October 1719 and August 1722[45]. Many of these letters revolve around Joan's requests for American products, which confirms his interest in these species.

The library of the Botanical Institute of Barcelona holds only correspondences sent addressed to Joan Salvador from Pau Martí. Essentially, these are answers to the requests made by Joan in letters

[41] PETIVER, James – *Letter addressed to Joan Salvador i Riera sent from London on October 14, 1712*. British Library. All letters sent by Petiver are in English. The transcript of the handwritten documentation can be found at CAMARASA & IBÁÑEZ CORTINA, 2007.
[42] PETIVER, James – *Letter addressed to Joan Salvador i Riera sent from London on April 25, 1715.*
[43] CAMARASA & IBÁÑEZ CORTINA, 2012.
[44] On the trip made by Joan Salvador i Riera in the company of the brothers Antoine and Bernard de Jussieu see FOLCH I GUILLÉN, 1972.
[45] This series is not published. The originals are in the Salvador Library, at the Botanic Institute of Barcelona. Josep Maria Camarasa, an expert on the manuscript collection of the collection, kindly gave his personal transcriptions of the correspondences mentioned here. All the originals are written in Catalan. The translation into English is mine.

sent to his correspondent in Portugal. From the content of the first letter that came to Barcelona, it is possible to understand that Joan had requested some American species from his compatriot, established in Lisbon:

> *I asked Bartholomeu Bis, who is in the Mines of Senhor Conde, to look for all the varieties of stones, woods, herbs, roots and animals found in that medicinal land. And let him send me what he finds, but with the letters I now receive from him, he does not speak of anything*[46].

Here we see that Pau Martí tells Joan Salvador that he commissioned Bartholomeu Bis, who was in Minas, to send him all the «stones, woods, herbs, roots and animals» he could find in those territories. However, Bartholomeu had not commented on the subject in any previous letter; Martí concluded that either Bartholomeu was looking carefully, he is not the one in charge of looking for such items. In the following letter, Martí wrote that he was grateful for Joan's return and mentioned that the letter that he had sent to him to forward to the Count of Minas Gerais had gone last week. If he wanted to send any more, Martí continued, he would have time, because there would be no other ships to Brazil before March 15. Martí also informed Joan that he was waiting for a fleet to arrive from Bahia and hoped that the letter with answer from Bartholomeu Bis on the ordering of medicines would be coming with it:

> *It was a while since I received your letter of November 25 last year and the occupations prevented me from responding, which I do now, saying that the letter to D. Pedro that your Majesty sent, went with another one in one Ship that left last week. And you also have time to send me more, because I do not think the Rio fleet will leave before March 15* […] *I'm waiting for the Bahia fleet and with it the letters of Bartholomeu Bis das Minas, to see the Who will respond to the medicines I have ordered*[47].

In a letter dated September 17, 1720, Pau Martí recounted the development of a disease that afflicted him and, curiously enough, stated that even though he could hardly eat, «I drank chocolate with some toasted bread»[48]. Although this is the only mention of chocolate in the correspondences between him and Joan, it confirms the hypothesis that we explored when considering the library's books on the subject. At this time in the first decades of the 18th century, the main product derived from the

[46] Translation by the author. Original quote: «Jo tinch encomanat à Barthomeu Bis que està en las Minas del S^{r} Compte, quem procuri totas las castas de pedras, Maderas, Erbas, arrels, y animals que se trobin en aquella terra medecinals, Y que me envihi lo ques trobia; pero com ab las cartas que ara rebo de éll nom parla de res» (MARTÍ, Pau – *Letter addressed to Joan Salvador i Riera sent from Lisbon on October 31, 1719*).

[47] Translation by the author. Original quote: «Amich y S^{r} meu. A son temps rebi la carta VM^{e} de 25 de 9^{bre} del any passat, y las ocupacions me han detingut fins ara la resposta, que la dono dient, que la carta p^{a} lo Compte D. Pedro que VM^{e} ha enviat, ja va ab altra mia ab un vaixell solt q^{e} isqué la Semana passada: y te temps pera enviarne mes, perque crech no sen anirá la flota del Rio ans de 15 de mars vinent […] Estic esperant la flota de Bahia, Y ab ella cartas de Bar^{me} Bis de las Minas pera veure lo quem respondrá sobre los medecinals que li encomaní» (MARTÍ, Pau – *Letter addressed to Joan Salvador i Riera sent from Lisbon on January 9, 1720*).

[48] MARTÍ, Pau – *Letter addressed to Joan Salvador i Riera sent from Lisbon on September 17, 1720.*

American cocoa was becoming popular throughout the European continent, especially in the kingdoms that had some kind of relation with the tropical colonies.

The Salvador family's relationship with chocolate went above and beyond simply reading the works on the cocoa and chocolate in their library; they participated in the trade of chocolate. Currently, we do not yet have enough evidence to conclude whether the Salvadors were directly involved with the exchange, whether they were authorized merchants, or whether they were dealers, or even smugglers of the new drug. Furthermore, it is not yet possible to say what piqued the Barcelonan apothecaries' interest in the product or who initiated this business opportunity. The only documents that deal with the subject – besides the library's contents – are three letters sent by Pierre Barrère to Josep Salvador i Riera in 1747, many years after Joan received Pau Martí's letter.

In the Salvador Library, besides the three letters already mentioned, there are 21 letters from Pierre Barrère to Josep Salvador, which deal with different subjects. According to the documentation, Pierre Barrère's connection with the Salvador family initially began through the Jussieu brothers[49] who sent a book to Joan by way of Barrère.

Following the protocol of exchange – as happened with Petiver and other correspondents –, when one ordered a product, one followed the order with some «reward» to prove seriousness, fidelity, and service, as we can see in this first letter in which Barrère requests chocolate. He wrote to Josep:

> *I refer you, sir and dear friend, two copies of my Ornithology that I beg you to accept. The gentlemen who went to Toulouse a few months ago left here without me seeing them. I would have taken this opportunity to make you the shipment you want and I have sent you for the esteem I have you. It's all I can do right now, I'll keep in mind to send you my little work on the stones that are printed and I recorded this moment in Paris. I would be grateful if you could provide six pounds of soft, vanilla-free chocolate. It's for my use. Please, you should give it to somebody as it is* […]*, if necessary I would give him essences, as long as he gave me this faithfully*[50].

Through this letter, we can conclude that the French naturalist greatly appreciated chocolate, given the quantity ordered of the product. The six pounds mentioned here would be the equivalent of two and a half pounds today. As chocolate was still an expensive product at this point, the request was by no means modest. In exchange, Barrère offered some essences, which were also very valuable products at the time. According to Josep Maria Camarasa and Jean Jacques Amigó[51], although it is difficult to confirm since there is no data, no direct evidence, it is quite possible that Barrère had acquired his taste for chocolate during his three-year sojourn in Guyana[52].

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[49] For more information about the Salvador family relationship with the Jussieu brothers, see CAMARASA, 1995.

[50] BARRÈRE, Pierre – *Letter addressed to Josep Salvador i Riera sent from Perpignan on June 14, 1746*. All original letters are written in French and are in the Salvador library of the Botanic Institute of Barcelona (CAMARASA & AMIGÓ, 1993: 69-102). The authors fully transcribe all the originals of Pere Barrère in Catalan. The English translation of all the quotations is mine. Original text in CAMARASA & AMIGÓ, 1993.

[51] CAMARASA & AMIGÓ, 1993.

[52] The french doctor reports his experience in: *Essai sur l'histoire naturelle de la France equinoxiale ou D'Enombrement des plantes, des animaux & des minéraux, qui se trouvent dans l'isle de Cayenne, les isles de Remire, sur les côtes de la mer & dans le continent de la Guyane*… published in 1741. The volume is in the library Salvador under registration, 14/IV/12.

During this same time, the new drug became highly fashionable in Europe. In precisely the same years as the epistolary correspondence between Barrère and Josep Salvador, Barcelonan drugmakers began to produce quality chocolate from the cacao of Caracas and the Venezuelan East[53].

In this letter, we also find a handwritten note by Josep Salvador, reading: «On July 24 I sent him 2 pounds of chocolate». This confirms that Josep both filled his correspondent's request and that the chocolate of Barcelona passed through the Salvador family pharmacy. In the same note, Josep wrote that, in addition to the two pounds requested, he had sent four pounds in a subsequent shipment later in the same month.

The chocolate trade between the two was not interrupted, as we see in the following letter:

> *Finally, dear friend of mine, I receive from Paris, or my work of figurative stones, which ten have honors to present, I would like you to satisfy him. I make an honorable mention of you whom I love and will love my whole life like all of us. This year that we have just started, I hope you all very happy. If I could get some of the best chocolate without vanilla it would fill me of satisfaction. The coachman who will give you my book, which is a man of all confidence, will take care of good taste*[54].

On the back of this letter, we can also find the order note sent by Josep: «I sent him 2 pounds of chocolate»[55]. In the same month, Josep received another letter from Barrère, thanking for the chocolate sent. It reads,

> *I have received, sir and dear friend, two pounds of chocolate from the same coachman who had given him my little work on the stones, which I hope will not displease you. I also received, when the Marques de la Mina passed, four pounds of chocolate that I have distributed first and for which I thank you. But you will give me the pleasure of seeking me a few more pounds. I can not refuse them to some people whom I have amateur with this* […][56].

This letter confirms what we have already said before. However, consumers within the Spanish kingdoms were starting to appreciate it as a rare novelty. Likewise, we see a connection between Barcelona and chocolate; those who made it camit was much appreciated as a rare oddity and that, concretely, those who made it or came from Barcelona resulted in a delicacy appreciated by the connoisseurs of the high society from Perpignan[57].

Further requests and sending of chocolate between Pierre Barrère and Josep Salvador appear in two more letters. One from May of 1747, that says «I would be very grateful if I would procure some pounds of chocolate without vanilla»[58]. In the last letter, from August 1747, Barrère says he sold two copies of his last published work for 8 pounds and asks Josep to buy in chocolate the whole amount:

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[53] MIRÓ ALAIX, 2010. For more information on the history of chocolate in Catalonia, see MARTÍ ESCAYOL, 2004.
[54] BARRÈRE, Pierre – *Letter addressed to Josep Salvador i Riera sent from Perpignan on January 2, 1747.*
[55] CAMARASA & AMIGÓ, 1993: 85.
[56] BARRÈRE, Pierre – *Letter addressed to Josep Salvador i Riera sent from Perpignan on January 31, 1747.*
[57] CAMARASA & AMIGÓ, 1993: 86.
[58] BARRÈRE, Pierre – *Letter addressed to Josep Salvador i Riera sent from Perpignan on May 14, 1747.*

> *I have delivered, sir and dear friend, R. P. Agustín, two bound copies of my Observationssur le pierres figurées, etc. They have not been found in Lyon or in Montpellier and I have made them come from France and I have reconnected them to Perpigny. The purchase, the port and the binding of all two I raise all eight pounds. I beg you to buy me good chocolate for that sum and I want to send it through some comfort*[59].

At this time, Pierre Barrère was already sick. Unfortunately, we do not know if he had stopped consuming chocolate by medical prescription or if it was already possible to buy chocolate in that French region at this point, since in the many other preserved letters the subject was no longer approached. In addition to chocolate, we can note that Barrère consistently requests that the order not carry vanilla, another indication that the Salvador also had access to this American product.

Being a spice, it would follow among the hundreds of vials of medical material in the family pharmacy, there was some vanilla. The same understanding applies to chocolate, a drug with numerous medicinal qualities, which initially fell to apothecaries' responsibility. What matters here, and what I aim to show throughout these pages, is the moment when these products were being handled, marketed, exchanged, and studied by the apothecaries of Barcelona.

Not surprisingly, the Salvador possessed exotic objects and products in their pharmacy and cabinet, as these were common in the collections of the 16th, 17th, and 18th centuries. What merits our attention is how the apothecaries updated their understanding of these products, specifically in the context of how their practices developed outside the cultural and scientific axis of the period.

Access to these novelties can only be understood if we take into account what the Republic of Letters was, and what practices its members employed to establish and maintain communication among them. Through the exchange of correspondence, books, and botanical species, naturalists from peripheral regions, such as the Salvador family, inserted themselves into and remained a part of in this dense network, bringing together local knowledge and promoting the globalization of nature.

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PART III

COLONIAL MEDICAL PRACTICES AND THE TRANSFERENCE OF KNOWLEDGE

THE EASTERN PORTUGUESE EMPIRE: FRONTIERS AND CONTACT ZONES IN KNOWLEDGE PRODUCTION CONTEXTS

FABIANO BRACHT*

Resumo: Ao longo da Era Moderna os universos coloniais portugueses fizeram parte de intensas dinâmicas de construção, extensão, e reconfiguração de conhecimento científico. Nesses espaços, ocorreram diversos e complexos processos de composição sincrética de saberes, ao mesmo tempo profundamente relacionados com as muitas especificidades e idiossincrasias locais e estreitamente conectados aos canais de circulação de conhecimento estabelecidos pelas instituições imperiais. Estes eram diretamente influenciados pelo universo macro das configurações estruturais, conjunturais, políticas, econômicas e sociais. Sobre isso trata essa tese, cujo objetivo é contribuir para o estudo da História das Ciências – especialmente Medicina, Farmácia e Filosofia Natural – no complexo do Império Português no século XVIII. Neste capítulo discutirei, em termos teóricos, os aspectos relativos à constituição das articulações de longa duração entre as diversas componentes humanas do Império. Procurarei definir a forma como compreendo a permeabilidade das fronteiras culturais estabelecidas dentro do complexo imperial.

Palavras-chave: História das Ciências; Goa; Índia Portuguesa; História da Farmácia; História da Medicina.

Abstract: The 18th century Portuguese colonial spaces can be understood as places of intense and dynamic processes of construction, extension, and reconfiguration of scientific knowledge. Within these spaces, multiple sets of complex processes of syncretic production of knowledge

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occurred, which were at the same time profoundly related to the many local specificities and idiosyncrasies and strictly connected to the circulatory channels stablished by the Imperial institutions, and these were directly influenced by the macro universe of the structural, conjunctural, political, social and economic factors. This is the main subject of this thesis, whose objective is to contribute to the field of the History of Sciences – especially for the History of Medicine, Pharmacy and Natural Philosophy – in the complex of the 18th century Portuguese Empire. This chapter intends to discuss, in theoretical terms, some aspects related to the effects of the long-term historical processes between the diverse human components of the Empire. I will try to define, in a more comprehensive way, the permeability of the cultural frontiers stablished in the imperial complex.

Keywords: History of Sciences; Goa; Portuguese India; History of Pharmacy; History of Medicine.

INTRODUCTION – KNOWLEDGE PRODUCTION CONTEXTS AND THE INTERSECTIONS OF LONG-TERM PROCESSES

In 18th-century Portuguese India, the historical processes underlying the development and production of medical, pharmaceutical and natural philosophical knowledge and texts should be analysed on the basis of long-term perspectives, of permanencies and continuities. Such an analysis should take into account their structural, political, economic and social environments, without which it would be contextually alienated and open to interpretative gaps. In this chapter, I intend to follow one of many possibilities for a wide-ranging examination of the phenomena, from the broadest perspective possible. The aim is to show where some permanencies and continuities can be identified, which I feel are important to this narrative.

The approach proposed should encompass the majority of the elements which I intend to address in this chapter, at varying degrees depending on their specificity. The idea is to provide a contextual outline which can cover several dimensions of a specific process, in order to obtain a broader understanding of knowledge production in Portuguese India. Historical circumstances at the turn of the 18th century were connected to several processes that, although different, had considerable influence on the sciences, particularly on Natural Philosophy and its major branches, Medicine and Pharmacy. The permanencies and continuities, identifiable during colonial expansion, endowed the social dynamics of Portuguese India with special features. In this study, I intend to show that a number of elements must be taken into account, such as the state's policies for the colonies, the action of religious orders, the conflicts of ethnic and religious origin, and the political and social environments, both Asian and European. Contrary to an analysis centred on advances and discoveries, the aim is to locate the individuals in their relationship with contexts and environments. Although geographically situated, this approach assumes that no place of knowledge production, whether a city, state, hospital, pharmacy, office or laboratory, is in itself a hermetically closed environment, isolated from its social milieu[1]. A History of the Sciences in Portuguese India should con-

[1] LINDEMANN, 2002.

tain, or rather, has to contain elements from a Social, Political and Economic History of Portuguese India and – why not? – of the Empire itself.

INTERSECTIONS AND PERMANENCIES

The arrival of the Portuguese and other Europeans in India was not, obviously, an isolated event. Some of the most defining configurations of the establishment and consolidation of Portuguese presence in Asia can be related to, for example, the characteristics developed during the early times of maritime expansion. In relation to the History of Sciences, this same perspective should be considered valid. Maritime expansion is an extensively studied field. The amount and range of excellent studies is so monumental that any disclaimer I may make about having no intention of covering them all is almost superfluous.

The sequence of events which historians tend to group under the narrative of maritime expansion is related to many different yet correlated circumstances. Generally speaking, fundamental importance can be given to three factors which, interconnected, drove the Europeans beyond the boundaries of their continent, towards faraway oceans and lands, known or unknown, deserted or inhabited. Trade, faith and war, on equal scales of importance, were the engines of expansion.

Over the second half of the 20th century, historians were absorbed by the tendency to begin their narrative on expansion, in search of answers which could allay the desire for comprehensive explanations, such as, for example, centuries-old processes dating back to the Christian *Reconquista* (Reconquering) of the Iberian Peninsula. This tendency eventually eclipsed the classical narrative, which said the expansion was owed to the alleged adventurous spirit of the first explorers. According to John K. Thornton, from the 1940s and the works of historians such as Duarte Leite (1864-1950) and Vitorino Magalhães Godinho (1918-2011), new perspectives of analysis became hegemonic in relation to the studies of this process[2].

Part of the historians whose work was, in various forms, tributary to this tendency, contended there were close connections not only between the Iberian *Reconquista* and maritime expansion, but also between its multiple facets and some of the most important features of the expansionist process[3]. To the meaning of the *Reconquista*, in the territorial sense, another was added, of a religious order, a war that could be undertaken by any Christian in any place. The Christians who resisted the Muslim advance, to the North of the Cantabrian Range and back turned to the Atlantic, regarded themselves as legitimate heirs of the ancient Visigoth kings, and this undoubtedly applied to their dominant classes. From this perspective, the war waged against the Moors was considered as the legitimate retaking of lost ancient lands.

Towards the end of the 12th century, Aragon, Castile and Portugal, kingdoms formed over centuries of erratic wars, had consolidated the idea that they had the right to the lands immediately south

[2] THORNTON, 2010: 166.
[3] BOXER, 2011; THOMAZ, 1994: 207; BETHENCOURT & CURTO, 2010; FARINHA, 1998: 118-136.

of their territories. Ultimately, this idea would come to include what is today Morocco, as well as other areas of Northern Africa[4]. If from the religious prism the *Reconquista* was legitimised and, from the perspective of faith, knew no bounds, its territory was undefined and could be under continuous expansion[5].

It would be naive to think the borders of the two sides at war, both territorial and cultural, were hermetic systems, closed off to mutual influence. A number of movable *contact zones*[6] were established, in constant displacement as winds of fortune shifted in the *middle grounds*[7]. Taking into consideration the specific features of each time and place, my hypothesis is that there is the continuous creation of different *frontier*[8] complexes during the process of expansion and the consolidation of colonial domains. This undoubtedly applies to the Iberian Peninsula. In terms of knowledge, for example, exchanges did not merely take place, but were often actively encouraged by intellectual authorities linked to works of medicine, pharmacy, alchemy, engineering, agriculture, philosophy, mathematics and astronomy[9]. The Christian and Muslim systems of knowledge shared common roots sustained by ancient works of Greek and Latin philosophy. In a wider sense, the two cultural complexes, including the conventionally called popular culture, fed off each other constantly and reciprocally. In terms of written traditions, the translation and interpretation of these works was one of the most important activities among scholars on both sides. It was, for example, based on Arabic translations of Greek texts that were initially not available to the western Christians, that many elements of what later formed the core of humanist Aristotelianism were incorporated by European

[4] In 1291, the kingdoms of Aragon and Castile established an agreement, which delimited the areas in Northern Africa to which they could extend their intentions of conquest. In fact, after the conquest of Algarve by the Portuguese in 1249, even though the Kingdom of Granada remained as the last Muslim bastion in the Iberian Peninsula, those were lands to be claimed by Castile or Aragon. In this perspective, an almost natural path had opened up for Portugal, the North of Africa was a continuation of Algarve. The west, in Arabic, *al Garb*, extended thus, like Portugal, overseas, on the shores of the Atlantic (FARINHA, 1998: 118; DISNEY, 2010: 101-127; THORNTON, 2010; THOMAZ, 1994).

[5] MARQUES, 1998: 11-139; CLIFF, 2011: 23-87.

[6] The concept of contact zone is here based on the definition of Mary Louise Pratt: «space of colonial encounters, the space in which peoples geographically and historically separated come into contact with each other and establish ongoing relations, usually involving conditions of coercion, radical inequality, and intractable conflict» (PRATT, 1992: 6).

[7] In 2001, in the commemorative issue of the first edition of his book, *The Middle Ground: Indians, Empires and Republics in the Great Lakes Region, 1650-1815*, White elaborated more precisely on the «topos» he called the «middle ground» of intercultural relations. Accordingly, this metaphorical space, in which intercultural exchanges took place, would be the place of confrontation between «imperial or state regimes and non-state forms of social organization, a rough balance of power, a mutual need or desire for what the other possesses, and an inability of one side to commandeer enough force to compel the other to do what it desired». Hence, there are continuous processes of exchanges, appropriations and redefinitions, profoundly influenced by degrees of imbalance between the forces at the frontier complex. There is an understanding of development, in which it is clear that «force and violence are hardly foreign to the process of creating and maintaining a middle ground, but the critical element is mediation» (WHITE, 2001: 8). However, mediation should not be understood as a type of isonomy of the relations between both sides, but rather that there is, as an interpretative possibility, some degree of reasonability in assuming that the coloniser cannot take all the spoils, much as the colonised will resist, surrendering as little as possible (WHITE, 2001).

[8] The term «frontier» is frequently used by historians and its use can be very specific. For example, in Peter Burke's definition, a frontier is not necessarily a place, as it can be the boundary of a cultural encounter in which both sides are clearly defined, but at the same time, endowed with a selective permeability, whose nature is shaped by specific factors and historical dimension (BURKE, 2008).

[9] GRANT, 2002: 239.

universities[10]. At each time and place in which a *frontier* was established, there would be shifts in the balance of power between the two sides in contact. The specific dynamics of the conflicts, of the tensions and clashes, would vary according to that balance.

Trade exchanges would also take place, although frequently shrouded in an atmosphere of bellicosity. Merchants were often important agents in the production of knowledge[11]. The patterns that were later established during the expansion may, indeed, be derived from this form of trade, in which the boundaries between trade and military action were not clearly defined, a factor that would later contribute to the relative superiority of the Europeans with regard to their Indian Ocean counterparts[12]. The war was waged both in the name of faith and in the name of business. Despite restrictive dispositions, expounded in the *Holy Canons*[13], trade exchanges between Christians and Muslims were frequent, in times of war and peace, despite fluidity by which the parameters were understood on both sides. Although human beings and precious metals were the most sought-after «merchandise», the roster of goods exchanged was considerably varied, including a rather dynamic exchange of medicinal drugs, under the generic term of spices, some coming from the distant Far East by way of the many land routes of the time[14]. Knowledge of these drugs circulated to the same proportion[15].

We can also assume that the use and understanding drugs changed, and were substantially redefined, at each stage of their trajectory[16]. At several levels, from merchants, apothecaries and pharmacists, to other types of activities, the drug trade was undoubtedly an important and lucrative business. The processes of redefinition and change expanded at the same rate as the geographical range of the frontier complexes. As each turn, new environmental and climatic conditions, as well as variations in human behaviours, conferred peculiar characteristics on the processes of circulation. However, one aspect suffered little change: the disposition of the Europeans to take up arms (although they did not hold the exclusive on this).

The medical issue played a fundamental strategic role in the process of overseas expansion. At least from the beginning of the 16th century, despite difficulties in terms of logistics and human resources, warehouses had been established throughout the Atlantic and Indian routes to supply ships with provisions and remedies[17]. In fact, from the end of the 15th century to the last decades of the 18th, every Portuguese fort had an infirmary, often no more than a ramshackle facility built next to the main building, which was complacently called a hospital[18]. Throughout this network, on account of a multitude of factors, there was a lack of physicians, surgeons and apothecaries, as well as medications

[10] GRANT, 2002: 239.
[11] RAJ, 2010.
[12] BERNSTEIN, 2009.
[13] MARQUES, 1998: 26.
[14] MARQUES, 1998: 27-28; BERNSTEIN, 2009.
[15] DIAS, 1999: 90-103.
[16] In line with James Secord, who contends that the circulation of knowledge possesses, in itself, transformative properties (SECORD, 2004: 654-672).
[17] MENEZES, 1987: 9-23.
[18] MENEZES, 1987: 5.

supplied by the kingdom[19]. We can assume that, throughout the period of the Portuguese discoveries, expansion and colonisation, a medical practice applied to the tropics was developed by individuals who often did not have the required academic training, but were motivated by an acute sense of investigation of an empirical nature[20].

In line with other European powers, the Portuguese crown gradually assumed more responsibilities in the provision of charity and assistance and sought to have greater control over strategic questions related to caring for the sick. It should, however, be noted that this did by any means imply estrangement from the Church and religious orders. On the contrary, a path had been opened to new ties between the State – or Crown – and the Church[21]. This relationship was to play a decisive role in the development of Medicine and Pharmacy, as well as other sciences, in the colonial world over the 16th, 17th and 18th centuries.

THE EXPANSION OF THE *FRONTIER* IN THE EAST

War, faith and trade were the winds that filled the ships' sails, now beyond the Cape of Good Hope, to the Indian Ocean dominated by the monsoons[22]. In the words of Charles Ralph Boxer, on what the Indian historian, Kavalam Madhava Panikkar (1894-1963), called the *Vasco da Gama Epoch in Asian History, 1498-1945*:

> *nothing is more remarkable than the way in which the Portuguese managed to secure and retain for virtually the whole of the sixteenth century a dominant position in the maritime trade of the Indian Ocean and an important share of seaborne trade to the east of the Straits of Malacca*[23].

Indeed, India or the East meant to the Portuguese all that lay between the eastern African coast and Japan[24]. The term East Indies covered the entire region surrounding the Indian Ocean, through which ships sailed according to the ebb and flow of the monsoons. From the perspective of the Europeans, the East Indies ranged from the myriad of ports and states of the Indian subcontinent, to the kingdoms and sultanates of the islands of the Malay Archipelago[25]. Other outposts should also be considered, mostly under the rule of Arab governors or merchants, located between the Strait of Hormuz and the eastern coast of Africa[26]. The region was populated by a large number of trade communities. Their ports, some autonomous, some governed by distant empires, bustled with the daily activity of Asian, African and European traders. Some were important centres of production,

[19] MENEZES, 1987: 5.
[20] COSTA & LEITÃO, 2009: 35-56; ALMEIDA, 2009: 78-92.
[21] ABREU, 2004; ABREU, 2007: 9-13; ABREU & SHEARD, 2013; ABREU & SHEARD, 2016: 19-39.
[22] BOXER, 2011.
[23] BOXER, 2011: 55.
[24] THOMAZ, 1994: 207; BOXER, 2011: 55.
[25] BETHENCOURT & CURTO, 2010.
[26] PEARSON, 2010: 93-114.

although many were only marketplaces or outposts[27]. The definition by Luís Filipe Reis Thomaz of the State of India illustrates clearly this idea:

> *In the 16th century, the State of India did not refer to a well-defined geographical space, but rather a number of territories, establishments, goods, peoples and interests, administered, managed or governed by the Portuguese Crown in the Indian Ocean and neighbouring seas, and in coastal territories from the Cape of Good Hope to Japan*[28].

These regions were densely populated, packed with large markets and filled with people from many different places. Generally speaking, these populations were not greatly affected by the diseases introduced from Europe. The contrast with the situation experienced in the New World is striking[29]. The difficulties the European communities faced in the Indian subcontinent and surrounding areas are clearly expressed in the words of Felipe Fernández-Armesto, who said that, during the 16th century and most of the 17th, the Europeans «merely scratched the surface of the Asian continent»[30].

Regardless of where they settled, transposing the European way of life to the tropics was a constant challenge[31], a problem the Portuguese were particularly sensitive to. With an Overseas Empire established on three continents, they came into contact with the biotic diversities of the tropics on both sides of the Atlantic and throughout virtually the entire Indian Ocean seaboard. Those who departed the extreme west of Europe in search of riches or to propagate the faith, were often confronted with ailments they or their physicians, surgeons or pharmacists, when available, had very little knowledge of[32].

From the eastern coast of Africa to the Strait of Malacca, Muslims, Swahilis, Persians, Indians and Malays dominated the areas of trade and counted on well-established communities in practically all the major ports. The Tamil, largely Buddhist, from what is today Sri Lanka, and Hindus from several places, also had an important presence. The Chinese had considerably retracted their expansionist movement, which had been extremely active the century before. The Malabar Coast was dominated by a number of small Hindu potentates, the most important of which Calicut, which lacking the capacity, or perhaps the will, to overthrow its closest rivals. By European standards, trade among almost all the agents of the complex stage of the Indian Ocean took place pacifically. The Portuguese immediately understood that if they intended to remove the primacy of trade in the Indian Ocean from the Muslims, they would have to do so by force[33].

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[27] PEARSON, 2010: 93-114.
[28] Original quote: «O Estado da Índia designava, no século XVI, não um espaço geograficamente bem definido, mas um conjunto de territórios, estabelecimentos, bens, pessoas e interesses administrados, geridos ou tutelados pela coroa portuguesa no Oceano Índico e mares adjacentes, e nos territórios ribeirinhos, do Cabo da Boa Esperança ao Japão» (THOMAZ, 1994: 207).
[29] DIAMOND, 2008; CROSBY, 2011.
[30] FERNÁNDEZ-ARMESTO, 2010: 491-524.
[31] CROSBY, 2011.
[32] DEBUS, 2002: 45-47.
[33] PEARSON, 1976; PEARSON, 1998; PEARSON, 2005; PEARSON, 2010: 93-114; BOXER, 2011: 55-61.

They did so with remarkable success, partially by reason of their technological superiority, namely in terms of naval power, but also because they were better armed. The Portuguese ships were, indeed, floating fortresses in comparison to their South Asian counterparts[34]. It is also true that they arrived in the East at a propitious moment. Apart from not having the naval power to confront the Portuguese, the region's most powerful states were also deeply involved in their own affairs and rivalries. Generally speaking, three factors favoured the consolidation of Portuguese power in the Indian Ocean: the lack of a coordinated strategy of resistance able to unite local forces; the aforementioned naval superiority; and tolerance, essentially pragmatic, on the part of local governors[35]. On this relatively condescending attitude, A. J. R. Russell-Wood wrote, referring to the differences in patterns of settlement in the Portuguese Empire:

> *In terms of settlement, there was a crucial difference between Portuguese Asia and America. In the former, the Portuguese were tolerated by indigenous leaders and Portuguese policy and action could not take place isolated from indigenous concerns and prevailing circumstances. The Portuguese presence would be tolerated or terminated according to the whims of local leaders. In some cases, the Portuguese were only able to establish a basis for colonisation because factionalism and dissidence among local rulers stopped them from forming a united front against the intruders. At other times, the Portuguese exploited local rivalries, such as those between the sultans of Mombasa and Malindi, or between the king of Calicut and the rajah of Cochin*[36].

Far from meaning only the need to employ a degree of diplomatic pragmatism, this situation raised a number of specificities related to the establishment of the Portuguese in Asia. It was decisive, although not the only factor, in determining the fragmentary, frequently fragile, position of the Portuguese, who only managed to dominate a small portion of the territory, despite having built almost a hundred forts. Around 1580, the State of India counted on an extensive network of fortified posts, from Nagasaki to the Cape of Good Hope, but in terms of contiguous territories, only Goa, the Northern Province and substantial parts of Ceylon[37]. Although important, other settlements, like Malacca and Macau, were limited to the control the Portuguese were able to exert over the inland or neighbouring territories.

The peculiar features of the Asian territories raised other challenges to the colonial powers. An age-old, dense trade network operated in the Indian subcontinent and other parts of Asia, which

[34] DORÉ, 2008: 91-116.
[35] RUSSELL-WOOD, 2010: 171-206.
[36] «No que diz respeito à colonização houve uma diferença crucial entre a Ásia e a América portuguesas. Na primeira, os portugueses foram tolerados pelos líderes indígenas, e as políticas e ações portuguesas não podiam ocorrer isoladas das considerações indígenas e das circunstâncias prevalecentes. A presença portuguesa podia ser tolerada ou terminada em função dos caprichos dos líderes locais. Nalguns casos, os Portugueses só conseguiram estabelecer uma base para colonização porque o facciosismo e as dissidências entre os governantes locais os impediam de formar uma frente unida contra os intrusos. Noutras alturas, os Portugueses exploraram as rivalidades locais, como as que houve entre os sultões de Mombaça e Melinde, ou entre o rei de Calecute e o rajá de Cochim» (RUSSEL-WOOD, 2010: 176-177).
[37] RUSSEL-WOOD, 2010: 171-206.

relied on many trade communities. Although Arabic was an important language, the number of languages spoken and accepted in trade exchanges was as broad as the variety of ethnic groups involved. There were also huge, institutionally sophisticated states, as well as a large amount of local powers whose forms of governance were not very complex. These states, big or small, were home to countless centuries-old religions, creeds, and cults, endowed with written canons and sacerdotal classes firmly enrooted in the regional structures of power. There were also many centres of production and dissemination of technological innovation, within extensively stratified societies, organised into complex, long-established labour relations and a myriad of embedded ethnic distinctions, divisions and hierarchies[38].

Consequently, the Portuguese authorities were confronted with the need to establish the most varied negotiation strategies, which were never able to achieve the same level of unilaterality as in the Americas, where states and local rulers did not exist. The pressure to take into account the customs of the native inhabitants was also substantially lower in the Americas than in Asia[39]. These strategies usually meant almost as many compromises as impositions. A good example is the manner in which the peace treaty that put an end to hostilities was negotiated between the Portuguese and the governor of Calicut, ratified by King Manuel I in 1513. Although the treaty completely submitted the Zamorin to Portuguese authority, the Indian sovereign was to continue to receive a variety of *tensas*, ritual presents and funds, which often exceeded the usual customs tariffs[40]. Thus, the *frontiers* resulting from the *contact zones* of Portuguese settlement in Asia differed substantially from that of Brazil, where the ability to resist of the indigenous populations was considerable different.

The impact of this circumstance can be seen in the way in which contacts were made, for example, between the western medical practices and those of Asia upon the arrival of the Portuguese. If the peoples of the Brazilian coast did not have written medical traditions or institutionalised elites with a monopoly over the arts of healing, they existed in Asia in abundance and variety, in a large majority of the places the Europeans wanted to settle[41]. This does not mean the South American coastal peoples did not possess complex systems of understanding of illnesses and cures. It means that in Asia, the social structures detaining such knowledge were often incomparably more resistant to external pressures[42].

Over the course of their long involvement with the tropics, the Portuguese gained a wealth of knowledge, of both illnesses and medications. Such knowledge, indispensable to the expansionist enterprise, ranged from detailed descriptions of many different ailments in each tropical environment, to colleting large amounts and varieties of plants, animals, minerals and other elements which offered a wide range of options to fight diseases, known or unknown[43]. This investigative drive was a fundamental part of the expansion. Far from being a privilege of learned men, it was also shown

[38] RUSSEL-WOOD, 2010: 176; PEARSON, 2005; PEARSON, 2010.
[39] RUSSELL-WOOD, 2010: 177.
[40] BETHENCOURT, 2010: 213.
[41] PEARSON, 1987: 20-41.
[42] BRACHT, 2013.
[43] FRADA, 1989: 63-73.

by individuals of various social standings and duties. There is news of a report written in 1507, mentioned by João José Cúcio Frada[44], in which a pilot of Cabral's fleet made some observations as to effect of fresh food on mitigating the symptoms of scurvy. Other authors highlighted the role played by individuals, versed or not in the arts of Medicine or Natural Philosophy, who contributed decisively to the development of European *Materia Medica* in the 16th and 17th centuries[45].

On the cusp of the Modern Age, one of the main goals of Natural Philosophy in the innumerable descriptions of animals and plants in Africa, Asia or the New World was the identification of elements of the natural world as possible panaceas[46]. The flora and fauna of the New World were practically all unknown to the Europeans, as well as their applicability to Medicine. The same cannot be said of the plants and animals of Asia[47]. The use of Asian spices in fighting diseases and other medical purposes was widely disseminated. The theories, practices and traditions historians usually group under the term *Galenism*, which strongly influenced medicine until at last the end of the 18th century, understood the healing predicates of medications based on their organoleptic features, namely, flavour and smell[48]. Hence, the four primary tastes were related to the four pairs of fundamental qualities of humoral theory, i.e., hot and dry, dry and cold, cold and moist, and moist and hot[49]. Accordingly, the strong smell and taste of spices not only contributed to their classification as medication but also corroborated their presumed efficiency[50]. European contacts in the East Indies did not by any means remain restricted to spices, in natural-philosophical terms. In the first decades of the 16th century, many individuals were dedicated to more than understanding the medical applications of Asian plants, animals and minerals within the Galenic structure. Despite language barriers, these individuals also wanted to learn about the medical knowledge that had been produced in the East for centuries. In Asia, encounters took place between the limits of the Hippocratic-Galenic theory and the practices and theories of oriental medicine[51].

DYNAMICS OF DIALOGUE AND CONFLICT IN THE ENCOUNTER OF TWO WORLDS

In Asia as in Europe philosophical-natural traditions existed, and often coexisted, based on collections of written canons. There was also a wide and complex variety of characters who practiced some type of healing art of a popular nature. These ranged from the village healer, who had empirical knowledge accumulated over generations, to the highly qualified professional herbalists. Many centuries before the conquest of Goa by Afonso de Albuquerque (1510), India had developed extensive

[44] FRADA, 1989: 63-73.
[45] GOUVEIA, 1985; FRADA, 1989; DEBUS, 2002; DIAS, 2005: 5-39.
[46] CARNEIRO, 1994: 47-65; DEBUS, 2002: 45-54.
[47] GOUVEIA, 1985; FRADA, 1989; DIAS, 1999: 90-103; DEBUS, 2002: 49-50.
[48] DIAS, 1999: 93; DIAS, 2005: 13.
[49] DIAS, 1999: 93.
[50] DIAS, 1999: 93.
[51] DEBUS, 2002: 48-49.

systems of knowledge on illnesses and their cures. In Macau in China, a diversity of complex systems in medicine and pharmacy flourished, both erudite and popular[52]. India was home to several different systems, which were permeable to each other and to many external influences, especially the Hindu tradition of *Ayurveda* medicine and the Muslim systems, the latter relatively closer to western tradition.

A more detailed examination may reveal that Muslim medicine was also highly nuanced, but, generally speaking, we can say their normative systems tended to derive from two major traditions, the Graeco-Arabic and the Indo-Persian, or *Unani*[53]. Both traditions shared many of their principles. The Graeco-Arabic system was widely known to the Europeans. In *Unani* medicine, its practitioners were known as *hakim*[54]. Despite many similarities to Arabic medicine, few references were made to *Unani* physicians in hospitals, authorities or religious orders. We know that, in India, the Muslims were largely neglected in favour of the Hindus by the crown, and even those were considered secondary in relation to the local Christian populations[55].

Similarly to Europe, although those learned traditions counted on a large number of practitioners, the care of the sick was made largely by individuals who had never attended institutions which could award qualifications or the equivalent. Popular medicine, the knowledge of men and women of the most varied origins, formed the basis for much of the medicine practiced throughout Asia. In India, specialised healers were very popular, professionals who usually had no type of higher instruction and who offered their services as fairs and markets[56]. However, the boundary between popular and erudite knowledge, as was the case in Europe at the time, was not clearly defined. Both areas tended to sustain each other, whenever necessary or convenient. Even religion was not in itself a barrier. Dialogue among practitioners of several traditions was common, within the same geographical space[57].

Without disregarding their respective place, what we can consider the Hindu equivalent to academic learning in Christian and Islamic universities is an epistemological collection taught at higher education schools called *Agraharams*. There, the principles of the sacred texts, the *Vedas*, were taught, amongst which *Ayurveda* medicine, whose origin is attributed to the god, *Brahma*, the source of all knowledge[58]. In fact, *Ayurveda* is a chapter of *Atharvaveda*[59], one of the four Vedic books. Many other medical books were in use in India when the Portuguese arrived, including the *Bhava Prakash*, written in the 16th century by a Brahmin called *Bhava Mishra*[60].

Ayurveda medicine, practiced mainly by the Brahmin caste, was not comprised of only one canonical body taught at specific institutions according to strict rules. It was much more a range of interpretative traditions and religious precepts which, in practice, counted on a large capacity and free-

[52] HINRICHS, 1999: 287-325; NEEDHAM, 2000: 38-66; HSIA, 2009.
[53] PEARSON, 2001a: 100-113; PEARSON, 1996: 20-41.
[54] GRACIAS, 1994.
[55] LOPES & MATOS, 2006: 15-70.
[56] PEARSON, 2001a: 100-113.
[57] PEARSON, 2001a: 100-113.
[58] FIGUEIREDO, 1967: 51-60.
[59] In *Atharvaveda*, medicine possesses a supernatural character. It is assumed that illnesses are caused by malignant entities, which could be cured by sacred formulas and procedures (FIGUEIREDO, 1967: 51-60; BASHAM, 1976: 18-43).
[60] FIGUEIREDO, 1967.

dom to accumulate and produce empirical knowledge. More than at the *Agraharams*, its teaching was done at home, passed down from generation to generation[61]. Much of the learning was done by trial and error[62]. Generally, the children accompanied their fathers in the profession, and when they died, their inheritance would be their private collection of books, texts and remedies. Partially due to being able to easily incorporate empirical knowledge, the physicians, called *Vaidya*, retained a vast amount of knowledge on the healing properties of local plants, animals and minerals. Immediately after their arrival in India, the Portuguese started calling these physicians, mainly from the Brahmin caste, *Panditos* (*Pundits*). *Pundit* is Sanskrit, although found in many of the Indian subcontinent's languages, and meant initially a wise, educated or learned man, or even philosopher[63]. The term was usually used for those with higher education, a majority from the Brahmin caste, who were connected to the practice of *Ayurveda* medicine and to knowledge of medicinal drugs. In Portuguese writings from the 16th century, the term *Pundit* refers almost exclusively to *Vaidya* physicians, who practiced medicine of a distinctly popular nature, having amassed empirical knowledge over thousands of years of medical practice, but which was also influenced by ancestral principles of the *Ayurveda*[64] and Islamic systems.

The first Portuguese authorities in India rapidly understood the *Pundits* were better informed than their European counterparts on the arts of treating tropical diseases[65]. There is ample evidence of the influence of *Ayurveda* in the way European physicians absorbed and learned about the remedies and illnesses of the Indian subcontinent[66].

Partially due to difficulties in answering to the need for physicians and medications that could effectively treat diseases in the East Indies, many physicians, apothecaries, surgeons, herbalists, and natural philosophers, contributed greatly with what they learnt from Indian medicine, to the development of knowledge on plants, animals and diseases. This essentially took place in two ways. The first, and most frequent, occurred through the many Indian *Vaidya*, herbalists and apothecaries who worked for hospitals and the Portuguese authorities[67]. The information was largely absorbed by watching the daily practices of these healers. The second, less frequent but equally important, arose from dialogue and the exchange of information among the European agents and the Indian physicians. Many Portuguese physicians, apothecaries and even merchants established an extensive network of contacts, through which they received, perhaps involving payment, information on the healing properties of local drugs[68]. We can assume such networks were not built without considerable amounts of energy, dialogue, negotiation and effort, on both parts.

The Europeans who were able to establish these networks entered an extremely restricted universe. Permission to do so must have meant exchange of services, favours or even payments in money.

[61] FIGUEIREDO, 1967.
[62] GRACIAS, 1994: 153.
[63] DALGADO, 1919: 155-157.
[64] DALGADO, 1919: 155-157.
[65] PEARSON, 2001b: 401-419.
[66] WALKER, 2002: 74-104.
[67] WALKER, 2002: 74-104.
[68] PEARSON, 1996: 20-41.

In a manuscript of over 100 pages and 82 medical prescriptions used at the Royal Hospital in 1696, there is information that there were «just in this town of Goa over eighty masters or pundits»[69]. According to the author, João dos Reis, they were not inclined to share their prescriptions and knowledge[70]. A dynamic of conflict can be apprehended from Reis' manuscript. The chapter called *Uso e prática dos Panditos do Oriente* (Use and Practice of the Pundits of the East)[71] is a description of their methods, in which the author describes some aspects of the nature of the daily relationships between the Europeans and Indians at the Royal Hospital.

> *they say they went to get some news of the simples on which they give very little news, because they do not give version of anything at all, no matter how easy, because if asked about the version of the doctor, which they gave on bleeding or another medication, they answered that it seems they could not give us the version, by which I understood that they did not study the craft and that they only take advantage of the manuscripts which are handed from one to the other*[72].

Perhaps João dos Reis, of whom we know very little, had difficulties in establishing a network of his own to access to Indian medications and prescriptions.

The Royal Hospital of Goa, established by the Crown in the 16th century, was initially run by the Brotherhood of the *Misericórdia* and then by the Society of Jesus at the end of the 16th century[73]. The managerial positions, both administrative and medical, were mostly occupied by Portuguese until the mid-18th century. Many natives worked at the hospital but usually in subaltern positions[74]. Notwithstanding, the services of Indian physicians and healers were often requested, even within the hospital[75]. In João dos Reis' manuscript, there is mention of the patients clandestinely receiving treatment from the *Pundits* who worked at the hospital in exchange for payment.

The hospital and the practice of medicine were in themselves *frontiers, contact zones* and, as such, the stage to conflicts among colonisers and native populations. According to Michael N. Pearson, when talking of the field of medicine, the only area in which the Portuguese had a clear advantage, when comparing their practices with those in India, was in the attention the state paid to the care of the sick[76]. Consequently, when implementing the models of healthcare they knew, the colonial authorities often sought to weaken or even supress the social importance of the local physicians and healers.

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[69] BNP – *COD 2102*.
[70] BNP – *COD 2102*.
[71] BNP – *COD 2102*.
[72] Original quote: «dizem elles forão buscar algũa noticia dos simples de que dão mui (muj) pouca noticia porque não dão versão de couza algũa por fácil que seja porque (se) preguntava pela versão do douto, que davão sobre sangria ou outro medicamento respondião que asim parecer se não nos podem dar versão, pelo que entendi que não forão a estudar este oficio e que só se aproveitão dos manuscritos que ficão de uns a outros» (BNP – *COD 2102*, fl. 5).
[73] BASTOS, 2010b: 188.
[74] BASTOS, 2010a: 61-79.
[75] PEARSON, 2001b: 401-419.
[76] PEARSON, 2001b: 401-419.

An order to expel all the Hindu physicians was actually issued in 1563. Although never enforced, there are no records it was ever repealed, which undoubtedly meant it became an efficient tool of pressure and coercion. A prohibition was issued in 1574, forbidding Hindu physicians from being carried on palanquins or from riding horses in the streets of Goa, under penalty of fines or confiscation of the animal. In 1618, the Goa Senate authorised the *Vaidya* physicians to practice medicine, as long as they were duly examined and authorised by the Physician General[77]. However, the permits were issued to no more than thirty individuals, with large numbers on waiting lists. Legally, this determination was not altered until the end of the 18th century. It is thus reasonable to assume that among the eighty *Pundits* working in Goa around 1700, the majority did not have the licence to practice as physicians. Tensions flared regarding the demand for credibility or even clientele. Apparently, having a licence from the Physician General did not give the Portuguese physicians any advantage. As noted by João dos Reis, the *Pundits* at the Royal Hospital:

> *they lernt like others in this town, how any Novice, is known as a practitioner, without a hint of beard, and he is already a master with another two apprentices behind him and in less than a year, they already heal and already sign prescriptions and they give him more credit than the Portuguese physician* […][78].

The daily conflicts, although often mediated by the colonial power in favour of the Europeans, did not necessarily bring any advantages to those under the protection of the authorities. Disputes flared almost daily, causing considerable unrest, and the accusations usually tended to discredit the opponents' abilities:

> *It is those pundits, very ambitious and mordant* […] *but others, however, are more cowardly and untrustworthy, such that each of them holds themselves in the highest esteem, which just goes to prove they do not understand much of other uses and practices, but who bring ridiculous things of little importance and, thus, I will leave them in silence* […] *(the Pundits) easily give them to the patient who asks*[79].

However, this did not prevent appropriations and reconfigurations from being produced within the sphere of dispute. Daily life at the Royal Hospital, described in João dos Reis' manuscript, provides valuable insights on this matter. Among the 82 prescriptions described, forty are composed of at least one type of herb or ingredient named in the language of Goa. Of these, nineteen are broths based

[77] PEARSON, 2001b: 401-419.

[78] Original quote: «aprenderão como outros nesta cidade como praticantes por que vai qualquer Mestrinho, sem ponta de Barba, e já he Mestre com dois outrez aprendizes detraz de Si e em menos de hum anno já curão, e já ass. Místicas E dão a eles mais Credito que ao medico portuguez» (BNP – *COD 2102*, fl. 6).

[79] Original quote: «São os taez panditos muy ambiçiozos, e mordazes […] pera outros porem mais covardez e pozilanimos, de sorte que cada qual se tem por iminente na faculdade o que só mostrão em provarem que não entendem muitos outros uzos e praticas trazem porem couzas Rediculas e de pouco momento e por iço as deixo em silençio […] (os Panditos) facilmente as concedem ao doente que pede» (BNP – *COD 2102*, fl. 6).

on one of the most important components of *Ayurveda* therapy, rice. To treat fever and an illness called *mordexim* (identified as cholera by some authors, among whom Michael N. Pearson), the most common remedy was a broth of rice, meat and chicken fat. This remedy was described in the 16th century by Portuguese chroniclers and physicians, called *Kanjii*, or *Canji*[80]. João dos Reis dedicated an entire chapter to this remedy, its preparation, variations and uses. Divided into two parts, the first is a brief dissertation on rice, its virtues and uses in the East, and the second focuses on the preparation of the remedies themselves, starting with the topic, «Canja, what is it and how is it used in this India»[81]. The *Canjas*, he says, are «the main diet in this Hospital of Goa». The variations presented were all duly classified according to the Galenic theory, reconfigured and revalidated as remedies by certified physicians, who were more trustworthy, according to the author, than the *«mordant» pundits.*

PHYSICIANS, APOTHECARIES, MERCHANTS AND MISSIONARIES

This process, inferred here from the reading of João dos Reis's manuscript, written at the turn of the 18th century, can be understood as one among many, within the long-term confluences that shaped the development of *frontier complexes*, taking place long before the Europeans arrived in Asia. Hundreds of individuals were involved, acting within, on the fringes or even outside the structures established by the official policies of expansion. Many left written legacies of this process, veritable reports of the *contact zones*. Amongst these, some stand out for the importance, excellence or range of their works, like Simão Álvares and Tomé Pires, both apothecaries, who travelled to India in 1509 and 1511 respectively[82]. Intended as detailed reports on the places where spices came from to be sent to King Manuel I (1469-1521), Tomé Pires provided information on the medicinal properties of many of the drugs he described[83]. Years later, in 1547, Simão Álvares wrote his *Informação de Todas as Drogas que vão para o Reino* (Information about All the Drugs that Go to the Kingdom), more extensive and complete than the work of Pires[84]. The manner and purpose with which Pires and Álvares wrote their works are sufficient to confirm the ordered and methodical way, according to historians dedicated to the theme, in which Portuguese expansion took place in the tropics[85]. Subsequently, some similar works defined the medicinal use of oriental drugs, not only in Portugal, but throughout Europe and, later, in the American colonies.

One of the most important contributions to *Materia Medica* in the 16th and 17th centuries also came from Portuguese settlement in Asia. The work, *Coloquios dos Simples, e Drogas e Cousas Mediçinais da India* (Conversations on the Simples, Drugs and Materia Medica of India), by Garcia de Orta (1501-1568), was published and printed for the first time in Goa in 1563[86]. Orta's work influenced

[80] PEARSON, 2001b: 401-419.
[81] BNP – *COD 2102*, fl. 6.
[82] FRADA, 1989: 69; FERRÃO, 1993; FERRÃO & LIBERATO, 2001: 91-192; DIAS, 2005: 29.
[83] GOUVEIA, 1985: 7; DIAS, 2005: 29.
[84] GOUVEIA, 1985: 7; DIAS, 2005: 29.
[85] DEAN, 1991: 216-228; FERRÃO, 1993.
[86] GOUVEIA, 1985: 20; FERRÃO & LIBERATO, 2001: 92-93; DIAS, 2005: 30.

physicians, apothecaries, surgeons, and natural philosophers throughout Europe. It became one of the most celebrated works of the Renaissance, due to the thorough and detailed manner in which a vast and rich world of oriental drugs was described, researched and analysed[87]. Originally published in Portuguese, Orta's work was translated, summarised, and adapted numerous times until the end of the 17th century. Its importance is not restricted to its standing as one of the most complete treatises on the healing powers of oriental drugs. It may be considered a forerunner of European medicine adapted to the tropics, in other words, knowledge produced from contacts between the reigning medical fields in Europe, associated to thorough investigation and assimilation of a vast amount of autochthon knowledge. We know Orta maintained close contact with Indian physicians and herbalists for many years, from whom he received the wealth of information contained in his *Conversations*[88]. Much of the discussions in Europe in the following two centuries on the oriental medicinal drugs were undoubtedly centred on information filtered by Garcia de Orta's collaborators.

Profoundly influenced by Garcia de Orta, Cristóvão da Costa (1515-1594) also contributed decisively to the body of work on the healing powers of Indian drugs and remedies[89]. Costa, who met Orta while in India, wrote upon his return to Europe the work, *Tractado de las Drogas y Medicinas de las Índias Orientales* (Treatise of the Drugs and Medicines of the East Indies), in Castilian, published in Burgos in 1578. Costa confirmed many of Orta's positions, incorporating excerpts from his texts and added a number of illustrations[90].

In terms of knowledge of medicine and oriental drugs or any other natural-philosophical aspect, the complex of the East Indies constituted a frontier area of immense permeability, a stage to the encounter of two distinct universes, Asia and Europe. There were cases of natives who opted for the paths of western Natural Philosophy, adding epistemological elements of both European and Eastern origin[91]. Many of these individuals were *Topazes*[92], such as Manuel Godinho de Erédia (who was in fact Malay), who wrote a herbarium at the beginning of the 17th century. It contained illustrations of a range of Asian plants, as well as precise descriptions of their medical applications[93]. Among the *Topazes*, many were bilingual or polyglots. They knew Portuguese and one or more Eastern languages. In Erédia's herbarium, the plants are named in Konkani, the native language of Goa[94].

These encounters between East and West did not involve only India and Europe. To varying degrees, all the regions contacted by the Portuguese during the expansion participated in this system of exchange. Cultural experiences, knowledge and material products circulated within it. This process was mainly represented by the systematic, organised and methodical transplant of plants across the

[87] GOUVEIA, 1985: 20-21.
[88] GOUVEIA, 1985: 21-24.
[89] FRADA, 1989: 70; FERRÃO & LIBERATO, 2001: 92-93.
[90] DIAS, 2005: 30.
[91] THOMAZ, 1994: 9-22.
[92] «Topaz» is the term used in the 16th and 17th centuries to call the «mestizo» resulting from the crossing of the Portuguese and the people of Goa (THOMAZ, 1994: 13).
[93] FERRÃO & LIBERATO, 2001: 96-156.
[94] THOMAZ, 1994.

many tropical domains of the Empire as it expanded[95]. A good example can be found in the many plants originating in Portuguese America which illustrate Erédia's «oriental» herbarium[96]. To some extent, the history of Medicine and Natural Philosophy – particularly its Botanic branch – resulting from these encounters is also the history of an anthropogenic process of the natural world. Indeed, it was the medicinal value of certain plants that motivated their transplant and acclimatisation among Asia, America, Europe and Africa[97].

The difficulties the establishment and development of the colonies had to face and the conditions related to tropical climates and their illnesses, changed very little in the transition from the 17th to 18th century. On the contrary, in Asia, America and Africa, the participants of the colonising processes and imperial authorities suffered significant losses, among settlers, soldiers, sailors, workers and slaves, between 1700 and 1800. In a recent article, Timothy D. Walker stated that the percentages of losses due to factors including tropical diseases were still considerable high in the last few decades before 1800[98].

At the beginning of the 18th century, the difficulties in treating illnesses, both on board the ships of the India run and in Goa, can be illustrated by the correspondence exchanged between the King and his direct representative in India. In March 1700, King Pedro II (1648-1706) wrote two despatches to the Viceroy, António Luís Gonçalves da Câmara Coutinho (1638-1702). The first ordered that the ships of the run should always have two clerics of the Order of St. John of God on board, accompanied by four nurses, to care for the sick during sea voyages[99]. The second despatch, more urgent in tone, asked the Viceroy for information on the Royal Hospital of Goa, the problems of its administration and the lack of nurses[100]. The logistics operation related to healthcare, during voyages and in the colonies, must have certainly consumed a considerable amount of human and financial resources. Among the many affairs of the Empire, this problem was invariably the order of the day.

In economic terms, the issue of healthcare was undoubtedly crucial, especially considering that, for these and other reasons, the mortality of workers and slaves persisted at very high rates throughout the 18th century[101]. A sense of urgency gradually grew with regard to the needs of the Empire, to make the most appropriate use of the available resources in its many domains. Consequently, measures were taken by the Crown. A piece of information may corroborate this idea. From 1777 onward, the Overseas Council started to commission native physicians and natural philosophers, who were sent to many parts of the Empire, to catalogue and investigate the medicinal potential of plants and other items[102]. At the same time, under official incentive, the contingents of physicians, nurses and apothecaries, natives from the colonies, especially Goa, increased rapidly. Following a similar trend

[95] FERRÃO, 1993.
[96] FERRÃO & LIBERATO, 2001.
[97] FERRÃO, 1993.
[98] WALKER, 2013: 1-29.
[99] BNA – *COD 51-VII-24*.
[100] BNA – *COD 51-VII-24*.
[101] WALKER, 2013.
[102] WALKER, 2013; WALKER, 2009: 247-270.

in public administration, military posts and even religious orders were occupied by the children of Catholic Goan families, who assumed several positions in the institutions charged with healthcare and the production of medications[103]. In fact, at the end of the 18th century, even the position of Physician General of the State of India, invariably a royal privilege since the 16th century, was occupied by Ignácio Caetano Afonso, a Brahmin *Vaidya*, who had never studied at a European institution[104]. Many works were produced over this time, many of which never published, but which are important resources for an understanding of the History of Medicine in the Asian settlements.

The circulation of written texts was quite intense in almost all the regions the Portuguese came into contact with. At the dawn of the Early Modern Age, there was an increase in the demand for exotic medicinal drugs in Europe. It is not surprising, then, that a large number of merchants conducted business in Asia, interested in entering a market which offered considerably attractive profits. The merchants were often themselves physicians or apothecaries, or the contrary, once in Asia, physicians and apothecaries became merchants. Regardless, the search for information was equally high and the interest in translations of oriental medical texts garnered considerable efforts.

RELIGIOUS ORDERS AND THE DEVELOPMENT OF A EUROPEAN MEDICINE APPLIED TO THE TROPICS

As we have seen earlier, information, whether written or not, could only be obtained through considerable doses of negotiation and the establishment of solid personal relationships, patronage and/or trust[105]. Apart from the prospect of profit, many Europeans believed the Asian diseases were different and the treatments employed by their physicians were perhaps not the most appropriate. Around 1620, the Malay-Portuguese, Manuel Godinho de Erédia, wrote in his *Advertencia ao Pyo Leitor* (Notice to the Pious Reader) of his *Suma das Plantas da Índia intra Gangez* (Summary of the Trees and Plants of India intra Ganges):

> *The Philosophers will try to discover the virtues of all the plants of the world; but they will only achieve the virtues of those described from Europe and some foreign ones from Africa and Asia which Dioscorides mentions, as of remote plants. And now with experience, we declare other plants and trees of India intra Ganges or Hindustan in this summary for the universal good. And if there is any inadvertence in this work, it will not be for that reason that all will not appreciate this service, as it is for the curious to take advantage of this work, and especially to help the sick with the miraculous and medicinal virtues of these roots*[106].

[103] LOPES & MATOS, 2006: 41-43.
[104] WALKER, 2002: 74-104.
[105] RAJ, 2013: 337-347.
[106] Original quote: «Os Philosophos intentarão escodrinhar as virtudes de todas as plantas do mundo; e somentes alcançarão as virtudes daquelas do descrito de Europa e algumas extrangeiras de Africa e Asia de que faz menção Dioscorydes como de plantas remotas. E agora com a experiencia declaramos outras plantas e arvores da India intra Gangez ou Indostan nesta summa pera bem universal. E havendo alguma inadvertência na obra, nem por isso deixem de agradecer este serviço, pois he pera os coriosos se aproveitarem deste trabalho, e mormente os enfermos se ajudarem das virtudes miraculosas e medicinaes destas rayses». The text by Manuel Godinho de Erédia can be found in facsimile edition and also transcribed in EVERAERT *et al.*, 2001.

Knowledge of the medicinal virtues of drugs from outside of Europe expanded rapidly, to the same extent as the geographical horizons were expanded by the navigations. Practical and everyday problems had to be resolved constantly. This may have been one of the factors which led individuals, from authorities to merchants and soldiers, to seek the treatment of local *specialists*. Although quite frequent, these contacts were regularly the source of conflict[107]. During Portuguese rule in Goa, as we have seen in João dos Reis' manuscript, these interactions often led to tension and friction. The existence of elites who ensured the defence of local canons, solidly rooted in written traditions, may perhaps be one of the most striking differences between the circumstances the Portuguese encountered in Asia and that of other regions of world, especially the coast of South America. Among other aspects, the attempts to convert the locals to Christianity are a good example of this difference.

In historiographic terms, only from the 1530s is it safe to talk of a strategy of conversion of the native populations to Christianity[108]. There was a strong Muslim presence in the Indian Ocean, of many ethnic origins and different cultures. At least in the first three decades of the 16th century, this encouraged a spirit of crusade in almost all the Portuguese military actions of that period. Changes came about following the decisive influence of the Counter-Reformation movement, when the emphasis shifted to evangelisation as the highest purpose of Christian mission, encouraged furthermore by the papacy. Additionally, from the mid-14th century, the «Padroado Régio» (Royal Patronage) was instated in Portugal, which more easily explains the almost symbiotic convergence between the colonising interests of the Crown and systematic attempts to convert the Asian peoples to Christianity[109]. The religious orders played a central role in the processes of evangelisation. The first to establish on the eastern coast of Africa, in India and Southern Asia were the Franciscan monks, followed closely by the Dominicans. The Jesuits came on scene a little later, only in the 1540s. The latter, though, by reason of their impressive organisational ability and available resources, came to occupy dominant positions in practically every region of Portuguese presence, regardless of how small[110]. The first decades were stage to several episodes of mass conversion of Hindus to Christianity, particularly in Goa and further south, on the Malabar Coast, even though not much prior indoctrination had taken place[111]. However, a wide range of other strategies was employed. Some were dedicated to the conversion of the most humble, especially the mendicant orders, like the Franciscans on the *Coast of «Pescaria»*[112], as well as efforts to seduce the local dominant classes, an enterprise in which the Jesuits were particularly successful[113]. Nevertheless, even at the height of Portuguese power in Asia (approximately from 1550 to 1620), although the native Christian communities became quite numerous, they were low in number when compared to those professing the local faith[114].

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[107] PEARSON, 2001a: 100-113.
[108] SÁ, 2010: 265-292.
[109] SÁ, 2010: 265-292.
[110] SÁ, 2010: 265-292.
[111] XAVIER, 2008: 118-133.
[112] Corresponding to the southern part of the Coromandel Coast.
[113] SÁ, 2010: 265-292.
[114] BOXER, 2011: 89-91.

Evangelising efforts also increased as transformations were taking place in Portugal from the beginning of the 16th century, and more particularly during the reign of King João III (1521-1557). The connection between the two processes was convincingly illustrated by Ângela Barreto Xavier. According to the author, at the end of his reign, King João III initiated a number of profound political and social reforms, both within the kingdom and in the colonies. To some extent, the reforms in the colonies tended to converge on standardising and transforming certain aspects of the life of the local populations, so they would more closely resemble that of the kingdom, in organisational, legal and religious terms[115]. This principle may also be applied to the analysis of the standardisation operated on the medicine practiced in the settlements in this same period. In Asia, two processes started to develop at the same pace. The first involved the gradual legal subordination of local practitioners to rules which gave primacy to European physicians and their knowledge within the colonial structure[116]. The second was the systematic inclusion of medical practice and other related healthcare activities within the conversion strategies of the religious orders, especially the Society of Jesus[117]. Throughout the 16th century and at the beginning of the 17th, this process is evident in practically all the Portuguese settlements in Asia. Over the 17th and 18th centuries, the consolidation of this action concentrated increasingly on Goa, and from there, spread to other areas of the Indian Ocean. Part of the explanation resides in the retraction of Portuguese maritime power and the concurrent consolidation of Goa as a regional political force.

At the beginning of the 18th century, the times in which the State of India played a fundamental role in the control of Asian trade were long gone. However, Goa managed not only to survive but to maintain its standing as a political and military power. Even though it was no longer the protagonist, it was still a force to be reckoned with. It had suffered significant retraction in the range of its influence and military power, but this did not mean that the individuals it was connected to, as well as its activities, did not continue to thrive. Stuart B. Schwartz, on the decline of the State of India's political, economic and military power, reminds us of what is, in my opinion, essential. Despite the enormous losses:

> *this does not mean private traders did not continue to thrive, nor that the thousands of Portuguese mercenaries, merchants and missionaries from Macau to Siam and Abyssinia had lost importance in the local societies*[118].

Here, mention must be made of a factor that is primordial to this text. Mercenaries, merchants and missionaries should be understood as an extremely wide spectrum of agents. In the case of the missionaries, particularly the Jesuits, many were from other European nations and many others were Portuguese. However, in relation to other orders, from the second half of the 17th century, a growing

[115] XAVIER, 2008: 41-43.
[116] PEARSON, 2001b: 401-419.
[117] XAVIER, 2008: 242-269.
[118] Original quote: «isso não quer dizer que os comerciantes privados não tenham continuado a prosperar, nem que os milhares de mercenários, mercadores e missionários portugueses existentes de Macau ao Sião e a Abissínia tenham perdido importância nas sociedades locais» (SCHWARTZ, 2010: 21-51).

number were native clerics, a majority of them Goan, descendants from both Portuguese and Indian families. This was largely due to the establishment of congregations and brotherhoods, still at the end of the 17th century, whose members were mostly native[119]. These missionaries, together with merchants, interpreters, apothecaries, and other individuals, many native to Asia, contributed to the huge network of social relations which involved, to lesser or greater extent, Portuguese agents or speakers of Portuguese.

Portuguese persisted as a type of *lingua franca* in trade, diplomacy and other activities, until at least the beginning of the 19th century[120]. A similar development occurred in Natural Philosophy, as in Pharmacy and Medicine. A good example was the preparation of the *Hortus Indicus Malabaricus*[121], a work by the administrator of the Dutch colony of Batavia, Hendrik Adriaan Van Reede tot Drakenstein (1636-1691), published in Amsterdam between 1678 and 1693. It contains descriptions of 720 medicinal plants from South and South East Asia and was compiled based on the collection of information and cooperation from a large network of local collaborators. Among these, the Portuguese-Indian interpreter, Emanuel Carneiro, translated to Portuguese a majority of the information, originally in many local languages and dialects. From the Portuguese, the descriptions were translated to Latin, the language in which the work was published[122].

The *Hortus Indicus Malabaricus* was not the first or last work on the botany and medicinal properties of Asian plants to be compiled in this manner. There had been great interest in the theme since the 16th century. The collaborative manner, depending on intense negotiation and intercultural exchange of knowledge and information, with which van Reede's work was produced was the rule, rather than the exception. To produce knowledge on plants, animals, minerals, drugs, illnesses, geography, languages, or other matters, the Europeans had to negotiate with the local agents, in varying degrees depending on the specific space and spheres of power. Often, the knowledge acquired from this process was initially passed through the filter of local discernment, which would determine what was worthwhile or even what the Europeans were allowed to understand[123].

During the 18th century, for a number of reasons, Lisbon operated changes in the imperial administrative structure. This strongly influenced two aspects of the history of knowledge production in the colonial world. First, although quite erratically, periods of greater or lesser incentive would alternate, amplifying the promotion of scientific activities, largely motivated by the need to restructure the economic viability of the colonies. These promotion policies became considerably more systematic, a longstanding aspiration on the part of the intellectual metropolitan elite, particularly at the end of the reign of King João V (1706-1750)[124]. Another dimension to this process was the grow-

[119] LOPES, 2006: 134-135.
[120] AVELAR, 2012.
[121] REEDE TOT DRAKESTEIN, Hendrik van – *Hortus Indicus Malabaricus: continens regni Malabarici apud Indos cereberrimi onmis generis plantas rariores, Latinas, Malabaricis, Arabicis, Brachmanum charactareibus hominibusque expressas*. Amstelaedami: sumptibus Johannis van Someren, et Joannis van Dyck, MBG – QK349.7.R4. Available at <http://botanicus.org/title/b11939795>.
[122] RAJ, 2010: 27-47.
[123] RAJ, 2010.
[124] FURTADO, 2012; DOMINGUES, 2001: 823-838.

ing integration of the local populations, as beneficiaries of these chains of incentive. Even though by reason of structural rigidity in the Empire's racial relations, it was the whites born in the kingdom or the colonies who benefited more from these promotion policies, there were cases of mestizos and, in India, of natives who participated actively in this new dynamic[125]. These transformations, which intensified under the rule of the Marquis of Pombal (between 1750 and 1777), encompassed several aspects of colonial life, provoking changes at educational, military, scientific, administrative, economic and religious level[126].

FINAL CONSIDERATIONS

This chapter intended to understand the connections between certain long-term processes in the construction of the Portuguese colonial empire, regarding their relations with the history of knowledge production in the fields of Medicine and Natural Philosophy. In the 18th century, the History of Sciences in the Eastern Empire is embedded in the wider context of the Portuguese Overseas Empire, which, in its turn, is part of the process of European maritime expansion and the consolidation of colonial empires in the Early Modern Age. These connections should not, of course, be ignored. The process is marked by a wide range of features, some intrinsic to overseas expansion itself, among which two in particular are of fundamental importance. The first derives from the biogeographical complexity of the empires that spread between the Atlantic and the Indian Ocean in countless morphoclimatic domains[127]. The second is related to the need which should guide any historian who ventures on the paths leading to the History of the Portuguese Empire: the approach must be as wide in range as possible. In other words, it should be understood as a complex of interconnected and intersected components[128]. From the beginning, dating back to the 15th century, the Empire was built as a complex system of frontiers, which expanded at the same rate as the reach of its caravels.

Insofar as a human culture cannot be disassociated from its environment, the dynamics of frontier permeability is strongly influenced by the relative variability of the physical environment in which they take place[129]. In the specific case of the Portuguese empire, this variability was particularly large, due to its geographical and, consequently, climatic and biotic range. It encompassed an immense system of exchanges, in which natural and cultural elements went beyond the barriers imposed by distances which became increasingly shorter, as the trade routes opened during the first decades of expansion were consolidated.

Finally, during the Early Modern age, among the factors that influenced the production of Natural Philosophical knowledge, and of its related branches, such as Medicine and Pharmacy, few were more important than the large variability with which intercultural relations[130] were established

[125] LOPES & MATOS, 2006.
[126] PATACA, 2006; BRIGOLA, 2009; LOPES & MATOS, 2006: 15-70.
[127] CROSBY, 2011; DIAMOND, 2008.
[128] BETHENCOURT & CURTO, 2010.
[129] SANTOS *et al.*, 2013: 59-76.
[130] RAJ, 2010: 10-11.

within the expansion of the colonial empires[131]. These relations cannot be disassociated from their related conflicts, and their results, in terms of strategies of domination, resistances, appropriations, redefinitions, reconfigurations and struggles, need to be seen as roads with many directions. In terms of the circulation of knowledge, the colonial spaces can be defined as frontier regions, moveable, dynamic and mutable, but still, frontiers, with established boundaries which were, at times, difficult to overcome.

ACKNOWLEDGMENTS

This research was funded by the *Coordenação de Aperfeiçoamento de Pessoal de Nível Superior* (CAPES – BRAZIL).
Acknowledgement to the CITCEM – Assignment co-financed by the European Regional Development Fund (ERDF) through the COMPETE 2020 – Operational Programme Competitiveness and Internationalization (POCI) and national funds by the FCT under the POCI-01-0145-FEDER-007460 project, for financing the translation.

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CIRCULATION OF KNOWLEDGE BETWEEN PORTUGAL AND BRAZIL IN THE 18TH CENTURY. THE CASE STUDY OF THERMAL BATHING

MONIQUE PALMA*

Resumo: A circulação de conhecimentos medico-cirúrgicos foi um campo explorado no século XVIII. Físicos, cirurgiões e boticários foram fundamentais neste processo de transmissão de saberes. O registro feito por esses agentes da saúde em seus tratados e manuais medico-cirúrgicos nos permite inquerir como esses conhecimentos foram validados. No período setecentista tanto em Portugal como no Brasil, os banhos em águas naturalmente quentes foram considerados um método de cura para diversas mazelas. Em regiões específicas de ambos territórios, os banhos ou a ingestão das águas termais, foram indicados para a restauração da saúde. Porém convem indagar como essa prática foi transmitida dentro da metrópole e da colônia e como e se houve comunicação entre elas. Para isso, utilizaremos algumas fontes como primordiais, sendo oriundas de Portugal: o *Aquilégio Medicinal* (1726), de Francisco da Fonseca Henriques, o *Methodo Pratico para se tomarem os banhos das Caldas do Geres e de outras quaesquer Caldas do Reino, adquerido pela experiencia de vinte, e tantos annos, que os tomou, e vio tomar a muitos doentes de vários achaques* (1763), de António Martins Beleza, e a *Provisão real a regular os banhos de rio como forma de remédio para os oficiais militares doentes, à semelhança do que*

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aconteceu com os banhos das Caldas (1744) de autoria anônima. Provinientes do Brasil: *Prodigiosa lagoa descuberta nas Congonhas das Minas do Sabará que tem curado a várias pessoas dos achaques, que nesta Relação se expõem* (1749) de João Cardoso de Miranda, e *Breve Transumpto das Notícias da Lagoa grande, virtudes experimentadas em diversos achaques, e cautelas necessárias para o uso dos seus banhos, publicado para consolação e regime dos enfermos, que no presente estio se houverem de transferir àqueles banhos* (1749), de Antonio Cialli. Estas fontes compõe um cenário multifacetado de agentes da saúde, e representam os dois territórios aqui em discussão. Com o enfoque teórico em história das ciências verificaremos como e se houve circulação de saber no que tange a prática dos banhos que era tida como uma forma de tratamento médico-cirúrgico no século XVIII.

Palavras-chave: História das ciências; História da medicina; Circulação de conhecimento; Banhos termais; Século XVIII.

Abstract: The circulation of medical and surgical knowledge between Portugal and Brazil in the 18th century is a field of studies already significantly examined by both the Portuguese and the Brazilian historiography. Physicians, surgeons and apothecaries were fundamental elements in this process of knowledge transmission. Still requiring further scrutiny is the way by which knowledge was validated and put into practice, in Portugal and Europe. The contents of text books as well as medical and surgical books are the usual way to inquire how that knowledge was validated and incorporated. This paper will try a different approach. In 18th century Portugal and Brazil, bathing in warm waters was considered a method for healing different ilnesses. In specific regions of both territories, baths or ingestion of thermal waters was prescribed for the restoration of good health. However, it is still unclear how this practice had been transmitted within the metropole (Portugal) and the colony (Brazil), and also how the channels of transmission of that kind of information worked. In order to take a closer look at this topic, this paper will focus on some sources from Portugal and Brazil. For Portugal we will take into account the *Medical Reservoir* (1726), written by Francisco da Fonseca Henriques, the *Practical Method to take the baths of Caldas do Geres and other Waters of the Kingdom, acquired by his own experience of twenty years that he took them, and saw many patients of several infirmities taking them* (1763), written by António Martins Beleza, and the *Royal Provision regulating the river baths as a form of remedy for the sick military officers, similar to what happened to the baths of Caldas* (1744), by anonymous author. For Brazil we will use the *Prodigious lagoon discovery in Congonhas of Minas of Sabará, which has cured many people of infirmities, which are exposed in this Relation* (1749) by João Cardoso de Miranda, and *Brief reproduction of the news of Lagoa grande, its virtues tested in different infirmities, and necessary precautions for the use of baths, published for consolation and regime of the sick, which in this present summer are to be transferred to those baths* (1749), written by Antonio Cialli. The paper will try to explain

the circulation of knowledge applied to the practice of thermal bathing as medical and surgical treatment in the 18th century.

Keywords: History of science; History of medicine; Knowledge circulation; Thermal bathing; 18th century.

INTRODUCTION

Bathing in thermal waters as a therapeutic method was a medical procedure used well before the 18th century. In the 16th century, the Portuguese physician Amato Lusitano devoted part of his work to the virtues of bathing in grouts and rivers in Portugal[1]. It was a therapeutic method which became official in medicine during the 19th century[2]. The reasons claimed by the supporters of the practice among 18th-century health practitioners ranged from faith, to health care, by promoting the method as a painless and non-invasive treatment.

In the 18th century, medicine underwent changes that deserve a brief contextualization before coming back to thermal baths as a therapeutical treatment. 18th-century medicine was influenced by various theoretical tendencies, as Hippocratic-Galenic principles, iatrochemistry and iatromechanics or iatrophysics[3]. Medicine was also influenced by practical experiences both in European territories and the overseas colonies. The scientific spirit arising from the Enlightenment intensified studies about the natural world and all components and constituents of the environment[4]. Within this context, Portugal emerges as a case-study, often described as prone to stimulate the circulation of agents and consequently of knowledge between worlds.

As shown by the literature, there is a considerable diversity of agents linked to this field[5]. Among these practitioners, there was an established hierarchy regarding their official status and their appraisal by the institutions. Within this hierarchy the physicians occupied the top, followed by the surgeons, then the apothecaries and last the barber-surgeons[6]. In the metropolis, and even more so in the colonies, this hierarchy was not clearly perceived as such by those who needed and received health care[7]. Day-to-day conditions in colonial spaces, namely in Brazil, made those at the bottom of the scale the most appreciated and frequently the only ones available to a great deal of the patients. What was more, they would often operate alongside a diversity of other non-European agents, including the

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[1] CUNHA, 1999: 9.

[2] QUINTELA, 2004a; QUINTELA, 2004b.
For more information about the studies on thermal bathing in Portugal and Brazil in the 19th century, we should introduce the project of Professor Cristiana Bastos: *A Água como Agente Terapêutico: Práticas Termais em Portugal e no Brasil*, FCT (POCTI/ANT/41192/2001) and QUINTELA, M. M. (2004a) – *Cura termal: entre as práticas "populares" e os saberes "científicos"*, also QUINTELA, M. M. (2004b) – *Saberes e práticas termais: uma perspectiva comparada em Portugal (Termas de S. Pedro do Sul) e no Brasil (Caldas da Imperatriz)*.

[3] EDLER, 2006; ALVES, 2014.

[4] HANKINS, 2002: 1.

[5] ABREU, 2010: 97-122; CALAINHO, 2004: 2; LINDEMANN, 2002; MARQUES, 2003: 171-183; SOUSA, 2013: 13-59.

[6] SOUSA, 2013: 13-59.

[7] BYNUM & PORTER, 2002.

medical (sometimes understood as magical) practitioners of the Indians and the African slave population[8]. This kind of transference among the representatives of different cultures in colonial spaces is not, however, our subject. On the opposite, the focus of our research, is to try to approach both the reception and the potential circulation of knowledge between colonial and European territories and vice-versa.

To fully approach this issues, the analysis of the recruitment process, the academic background (or lack of it), as much as the social networks of those agents are paramount, but again, not the focus of this paper. Relations of power, ideological orientations, colonial administration strategies and even personal issues are items also necessary and operative in this process of knowledge production, reception and circulation[9].

Equally important for our debate is the emergence of surgery as a discipline and the increasing of its practitioners into Medicine. Gradually unified with medicine in the second half of the 18th century, surgery and surgeons, both in Portugal and the rest of Europe, were considerably disadvantaged. Being regarded as some kind of mechanics was an obstacle to their promotion and social recognition[10].

As stressed before, if it is true that among the academics, surgery and the surgeons had clearly restricted functionalities, it is also true that for the rest of society, that difference was not very clear. William Bynum and Roy Porter discuss this by stressing that for everyone else in society the hierarchy was not so clear[11]. Furthermore, the fees charged by healers were quite differential, being the ones charged by physicians almost prohibitive to the overall patients[12]. Without official training or recognized accreditation, based on theories and beliefs not officially recognized, other kind of healers completed the medico-surgical scenario. In both territories here in analysis, namely Portugal and Brazil, there were men and women with and without proper licenses exercising health practices[13].

Those unofficial agents are the subject of several critical analyses even in the 18th century, and they constituted a parallel reality in the medico-surgical field. In colonial spaces it is estimated that there was a shortage of physicians and surgeons. However, as the historians Flávio Coelho Edler and Maria Raquel Froés da Fonseca pointed out already, it is pertinent to ask who actually felt the absence of these healers[14]. In Brazil, miscegenation provided Creole agents with different medical approaches. Their assistance was more readily available and they offered treatments that were considered less painful. Timothy D. Walker addresses in his work: *Doctors, Folk Medicine and the Inquisition, a societal preference for alternative medicine in the Portuguese context was paramount*. This perspective is certainly applicable also in Brazil during 18th century[15].

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[8] EDLER & FONSECA, 2006.
[9] RAJ, 2013: 337-347.
[10] ABREU, 2010: 97-122; ABREU, 2007: 761-778; FURTADO, 2005: 88-105; WISSENBACH, 2002: 107-149.
[11] BYNUM & PORTER, 2002.
[12] SANTOS *et al.,* 2013: 253.
[13] WALKER, 2013; MARQUES, 2003; CAPELÃO *et al.*, 2015.
[14] EDLER & FONSECA, 2006; SANTOS *et al.*, 2013.
[15] Timothy Walker argued on the painless treatment in his book: *Doctors, Folk Medicine and the Inquisition: The repression of magical healing in Portugal during the Enlightenment.*

SCRUTINIZING 18TH CENTURY AUTHORS: THEIR SOURCES, CIRCUMSTANCES AND PROPOSALS

Included in this multifaceted context were Francisco da Fonseca Henriques (1665-1731), António Martins Beleza, João Cardoso de Miranda (?-1773) e Antonio Cialli – the authors under scrutiny in this paper. With distinct educational backgrounds and coming from different crafts, they all wrote notes on bathing and the ingestion of water from fonts or rivers, both in Brazil and Portugal, which supposedly possessed miraculous healing potential.

Francisco da Fonseca Henriques was a physician. He was graduated in Medicine at the University of Coimbra and even treated King João V (John the fifth). In 1726, he published *Medical Reservoir that gives news of waters from fonts, rivers, wells, lagoons and cisterns of the Kingdom of Portugal and the Algarve, which either by their medicinal virtues, or other some singularities, are worthy of particular details*[16]. The book was divided into seven chapters. The first lists thirty-one water reservoirs, while the second describes nineteen warm font sand the third two hundred sixteen cold fonts. The fourth chapter covers twenty-one rivers, and the fifth on twenty-eight wells. Of the ponds discussed in chapter six, the author only knew of ten, while the seventh chapter on cisterns only listed seven. Francisco da Fonseca Henriques wrote over three hundred thirty-two possibilities of healing by Portuguese non-salty waters.

The physician demonstrated knowledge of other medicinal waters in other countries, by saying:

> *books like this exist in several nations* […] *for public utility. Through them we know the medicinal waters of Spain, France, England, Germany, Hungary, Transylvania, and more northern regions; of Italian, in Tuscany, in Sicily, in Naples, Asia, Africa, and America*[17].

Plus, the physician points out, in the course of his *Aquilégio Medicinal*, specific cases in France, Scotland, Ireland, Italy and Spain. What motivated Francisco da Fonseca Henriques to explicitly quote only countries from Europe and none from Asia, Africa and America is somehow unclear. This opens up the question of the characteristics and the validation the circulating knowledge between the colonies and the metropolis.

Historiography has been highlighting the importance of artisans and practitioners in the transmission of practical knowledge[18]. Referred sometimes as go-betweens, these men sometimes transcended their functions and contributed to the articulation and the increase of knowledge in their respective home countries[19]. However, historiography also addresses the issue that knowledge and

[16] Translation by the author. Original title: *Aquilégio Medicinal, em que se dá noticia das agoas de Caldas, de Fontes, Rios, Poços, Lagoas, e Cisternas, do Reyno de Portugal, e dos Algarves, que ou pelas virtudes medicinaes, que tem, ou por outra alguma singularidade, são dignas de particular memoria*.

[17] Translation by the author. Original quote: «Obras semelhantes a esta se estamparaõ em varias Nações, decretando-o assim o seu governo, para utilidade do publico; e por ellas sabemos das agoas medicinaes de Hespanha, de França, de Inglaterra, de Germania, de Hungria, de Transivalnia, e das mays Regiões Septentrionaes; de Italia, de Toscana, de Sicilia, de Napoles, de Asia, de Africa, e da America» (HENRIQUES, 1726: 11).

[18] RAJ, 2016; LINDEMANN, 2002; LEITÃO, 2013.

[19] RAJ, 2016: 44.

information coming from the colonies were not always treated with the appreciation as that awarded to knowledge produced in the metropolis[20].

To address this question, we should introduce the surgeon João Cardoso de Miranda, author of the 1749 *Prodigious lagoon discovery in Congonhas of Minas of Sabará, which has cured many people of infirmities, which are exposed in this Relation*[21]. In *Prodigious lagoon*, João Cardoso de Miranda wrote about one hundred seven cases in which the water from the lagoon was effective for curing various kind of diseases. The edition of the source that we use was printed in 1925 with the prologue of the Portuguese physician and historian Augusto da Silva Carvalho. In his introduction to the document Carvalho informs about the itinerary of João Cardoso de Miranda. The surgeon was from the parish of S. Martinho de Cambres in Filgueiras. For three years, he had practiced as a surgeon in the Hospital of Porto. He was examined by others surgeon and then he received his surgery license on May 27, 1722. In 1719, he undertook a trip to Spain and France, and in 1726 he was already in Bahia-Brazil, where he did not just work as a surgeon, but he also devoted his time to trade.

Augusto da Silva Carvalho, the publisher of the 1925 edition, also claims that the information about the Lagôa Santa of João Cardoso de Miranda as it was known in the metropolis and in the colony, was attributed to the physician Antonio Cialli[22]. We will briefly speak about him. Besides that, Carvalho reported the arduous course of the surgeon João Cardoso de Miranda in order to get another of his works published. That book was the *Surgical and medical Relation in which a new method for curing scurvy infection is declared…* 1747[23].

Exchanges of correspondence show that some contempt was caused by the status of João Cardoso de Miranda as a surgeon and for this reason he should not enter into the debate of subjects that were belonged to the physicians' expertise. That might explain the delay in the publication of the book[24].

Furthermore, Augusto da Silva Carvalho stressed that the waters began to be famous in Lisbon in 1747[25]. He said that it is possible to find news about it in a rare book printed in Paris called: *Observations on the waters of Caldas da Rainha offered to all poor patients who need this miraculous medicine to cure their infirmities. By a curious that twenty years ago lives on benefit of the said waters*[26].

The author reported a case of a paralyzed man who was healed using internally the water of Caldas. He argued: «If a similar case had happened in Lagôa Santa of Brazil, it would already have been printed in Lisbon; and I cannot comprehend the reason why one should despise and disdain the

[20] BURKE, 2016: 5.
[21] Translation by the author. Original title: *Prodigiosa lagoa descuberta nas Congonhas das Minas do Sabará que tem curado a várias pessoas dos achaques, que nesta Relação se expõem*.
[22] CARVALHO, 1925: XIV.
[23] Translation by the author. Original title: *Relação cirurgica, e medica, na qual se trata, e declara especialmente hum novo methodo para curar a infecção escorbutica…*
[24] CARVALHO, 1925: VIII-XXXVIII.
[25] CARVALHO, 1925: XV.
[26] Translation by the author. Original title: *Observaçoens das agoas das Caldas da Rainha offerecidas a todos os enfermos pobres que necessitaõ deste milagroso remedio, para cura de seus achaques. Por hum curiozo, que ha vinte anos, que vive a beneficio das ditas agoas* (CARVALHO, 1925: XIV).

miraculous water of Caldas da Rainha, and order water from Brazil' Lagôa Santa without being sure of its virtues, more than based on one crude information that were printed»[27].

These notes indicate that the circulation of knowledge in the 18th century between Portugal and Brazil ran into several obstacles. Considering that distance and the logistics of circulation could be one such obstacle, we might also wonder about other variables that could affect the acceptance of colonial information and knowledge within 18th-century European society.

Still focused on the use of thermal waters discovered in Brazil and their use as a medicine, this is acknowledged in the *Brief reproduction of the news of Lagoa grande, its virtues tested in different infirmities, and necessary precautions for the use of baths, published for consolation and regime of the sick, which in this present summer are to be transferred to those baths*[28], published in 1749 by the Italian physician Antonio Cialli. In his *Breve Transumpto* the author defends the quality of the Brazilian waters as a therapeutic for several diseases. Antonio Cialli wanted to spread knowledge on this subject. He declares:

> *I confess that the biggest incentive to publish now this brief summary was to tear out the roots of these preconceptions on the ideas not only of the sick persons, but also of the true Teachers that in distant parts cannot judge but on information which prevent them from forming a judgment of the sources which they come from*[29].

It is clear that Cialli was concerned about the way «the true Teachers», i.e. the Europeans, approached and assessed the information coming from those different parts they could not reach. Could this mean that Cialli conceptualized differently the information (coming from different parts) from the knowledge (the one produced by the European academy in the 18th century)? As stressed by Peter Burke in his book *What is the History of knowledge?*, the knowledge coming from the colonies could be «plural», but it could also be not «equal», i.e. not be treated as «equal» knowledge in the European territories[30].

Returning to the sourcees written in Portugal on Portuguese medical waters, we can add António Martins Beleza's 1763 publication *Practical Method to take the baths of Caldas do Geres and other Waters of the Kingdom, acquired by his own experience of twenty years that he took them, and saw many*

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[27] Translation by the author. Original quote: «Se hum cazo semelhante tivesse sucedido na lagoa medicinal do Brazil, andaria já impresso em Lisboa; e naõ poso comprehender o motivo porque se despreza, e se abomina a milagroza água das Caldas da Rainha, e se manda vir agua da lagoa do brazil, sem mais certeza de suas virtudes, que humas informaçoens toscas, que se imprimiraõ» (CARVALHO, 1925: XIV).

[28] Translation by the author. Original title: *Breve Transumpto das Notícias da Lagoa grande, virtudes experimentadas em diversos achaques, e cautelas necessárias para o uso dos seus banhos, publicado para consolação e regime dos enfermos, que no presente estio se houverem de transferir àqueles banhos*.

[29] Translation by the author. Original quote: «Confesso pois que o maior incentivo que me fizese resolver publicar já este breve resumo foy o de destroncar as raizes que estes prejuizos vao formando nas ideas naõ só dos enfermos, mas ainda dos verdadeiros Professores que em partes distantes naõ podendo julgar senao por informaçoens naõ lhe é possível formar juizo das fontes donde dellas emanão» (BPMP – *Manuscritos*, M-VR-70. CIALLI, Antonio (1749) – *Breve Transumpto das Notícias da Lagoa grande, virtudes experimentadas em diversos achaques, e cautelas necessárias para o uso dos seus banhos, publicado para consolação e regime dos enfermos, que no presente estio se houverem de transferir àqueles banhos*).

[30] BURKE, 2016: 15.

patients of several infirmities taking them[31]. The author was not a healer: António Martins Beleza was abbot of S. Pedro Fins de Gominhães in the Archdiocese of Braga. On the cover of his book he said «that he wrote it for the common good: and it discourses on the causes for hypochondriacs flatus, its effects, and palliative care they can have»[32].

Beleza reported the qualities of the waters found in Portugal, and noted that many health carers were unable to obtain satisfactory results, due to not knowing how to prescribe the treatments. And he wrote about the importance of practice, practical knowledge and experience. This is an interesting text which resembles the discourse of some 18th-century surgeons who, pushed to the margins of the system, expressed the need for the recognition of their practice as a key element in medicine[33]. In 18th-century Portugal, nevertheless, in order to be recognised, one still had to go to University and become a physician, as did Manuel Gomes de Lima Bezerra[34] (1727-1806).

The last source we want to list is being held in the Army Archive. Anonymously authored, it is called: *Royal Provision regulating the river baths as a form of remedy for the sick military officers, similar to what happened to the baths of Caldas*[35], published in 1744. The folio manuscript recommends that one should proceed to apply to military officers the remedy of river baths the same way as those of Caldas. This proves the belief in the healing characteristics of those waters, the interest of royal officials in their use, and their recognition as therapeutics by the formal authorities: the Contadoria Geral da Guerra and the Vedoria of Alentejo.

DISCUSSION

Regarding the language used by the authors quoted, we perceive distinctions in the form they report medical waters and water treatment. The authors who wrote on waters in Portugal and Europe were more concerned with where to find the river, font or cistern. Francisco da Fonseca Henriques and António Martins Beleza also reported what might be cured in a specific place. Their authority seems out of question and they just point out the prescriptions to apply as resulting from their observations.

> *Near the Caldas da Rainha, on the farm of Bernardo Freire Andrade, there are other Caldas of the same minerals as that of Rainha, and the same virtues, although less active: There you have the baths covered and you can take them with good comfort. It serves the same infirmities that apply to the other; but as it is milder, it is necessary to take a few more baths than ordinarily taken in the Rainha*[36].

[31] Translation by the author. Original title: *Methodo Pratico para se tomarem os banhos das Caldas do Geres e de outras quaesquer Caldas do Reino, adquerido pela experiencia de vinte, e tantos annos que os tomou, e o vio tomar a muitos doentes de vários achaques.*
[32] Translation by the author. Original quote: «que o compóz para o bem commum: e hum Discurso sobre as cauzas, de que procedem os flatos hypocondriacos, seus efeitos, e cura paliativa, que podem ter».
[33] ABREU, 2010; FURTADO, 2005.
[34] TAVARES, 1988.
[35] Translation by the author. Original title: *Provisão real a regular os banhos de rio como forma de remédio para os oficiais militares doentes, à semelhança do que aconteceu com os banhos das Caldas*.
[36] Translation by the author. Original quote: «Perto das Caldas da Rainha, na quinta de Bernardo Freyre de Andrade, há outras Caldas dos mesmos mineraes que as da Rainha, e com as mesmas virtudes, ainda que menos activas: tem seu banho cuberto em

> *Those suffering from urine suppression shall take a bath in a cool well, and after shall drink hot water. Those suffering from suffocation that prevents the rise, shall take a bath in the well of Bica, and after shall drink warm water, as I passed in both infirmities, within the interval of three hours*[37].

Antonio Cialli and João Cardoso de Miranda, in addition to informing about where to find such waters, were more incisive and wrote as an appeal to attest the veracity of what they wrote. The physician Antonio Cialli, quoted above, made it clear that part of what motivated him to write his *Breve Transumpto* was the hope to dilute ignorance, especially of teachers of the time. And João Cardoso de Miranda reported about one hundred seven cases in which the cure, according to the author, was in fact achieved by the use of water. He exemplifies one by one in an attempt to prove the efficiency of the water, probably also in order to empirically validate his observations and practices.

This also reveals a common approach, which is the geographical characterization of the regions involved. As stressed before, in most their works, the authors were very keen on describing the place and pointing out how to get there. In this case, the physician Antonio Cialli also added a map of the region. The surgeon João Cardoso de Miranda stressed: «In Captaincy of Minas Geraes, Rio das Velhas's county, six miles from Villa do Sabará, going on to the north, in 20.º, and fourty eight minutes from the south, there is a big lagoon of water, that is called vulgarly the Lagôa Grande»[38]. Francisco da Fonseca Henriques, in his turn, wrote: «These Caldas are neighbours of Obidos, fourtheen miles from Lisbon, in a village, that was populated by them, and from them took the name»[39]. The abbot António Martins Beleza followed a similar path, by writing:

> *The Serra of Gerês, also known by Caldas, is placed in Braga city, six miles from Guimarães village: this one is located to the north of the Province of «Entre Douro-e-minho»: it is six miles long and three wide: it starts at Freguezias of Rio Caldo, and Villar of Veiga, and finishes at Tourem, which belongs to the Province of Tras os Montes* […][40].

That treatment was also considered a real luxury when compared to the usual medicines of the time: «The cold waters that have medicinal virtues, besides being good medicine, they are also a muff.

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que se tomaõ com boa comodidade. Servem para os mesmos achaques para que se applicaõ as outras; mas como saõ mays brandas, he necessario tomar mays alguns banhos, do que ordinariamente se tomaão nas da Rainha» (HENRIQUES, 1726: 50).

[37] Translation by the author. Original quote: «O doente de supresssaõ de ourina tome o banho em poço fresco, e depois delle beba da agoa quente. O doente de sofocaçaõ, que impede o sobir, tome banho no poço da Bica, e depois delle beba agoa quente, como eu passeo em ambos os achaques, e naõ como até naõ passarem tres horas» (BELEZA, 1763).

[38] Translation by the author. Original quote: «Na Capitania das Minas Geraes, Comarca do Rio das Velhas, seis leguas da Villa do Sabará, correndo para o Norte, em 20. gráos, e 48 minutos do Sul, ha hum grande lago de agua, chamado vulgarmente a Lagôa Grande» (MIRANDA, João Cardoso de – *Prodigiosa lagoa descuberta nas Congonhas das Minas do Sabará que tem curado a várias pessoas dos achaques, que nesta Relação se expõem (1749)*. Ed. lit. Augusto da Silva Carvalho. Coimbra: Imprensa da Universidade, 1925, p. 5).

[39] Translation by the author. Original quote: «Estas Caldas estaõ vizinhas de Obidos, distantes catorze legoas de lisboa, em huma Villa, que por ellas se povoou, e dellas tomou o nome» (HENRIQUES, 1726: 5).

[40] Translation by the author. Original quote: «A Serra do Gerês, bem sabida pelas Caldas, que nella há, dista da Cidade de Braga, e da Villa de Guimaraens seis legoas: esta cita ao Norte da Provincia de Entre o Douro, e Minho: tem seis legoas de comprido, e tres de largo: principia nas Freguezias de Rio Caldo, e Villar da Veiga, e finaliza na de Tourem, que he da Provincia de Tras os montes» (BELEZA, 1763).

They recreate the soul and heal the body, without experiencing the displeasure of pharmaceutical medicines, from which result more seasickness rather than utility»[41].

One should add that, common to the sources created by the physicians Francisco da Fonseca Henriques and Antonio Cialli, by the abbot António Martins Beleza, and by the surgeon João Cardoso de Miranda, is the association of healing properties of the waters mentioned and the faith. As an example from our sources, Francisco da Fonseca Henriques writes:

> *The large influx of people to these Caldas is helped by a devotion to the Virgin and the Portuguese martyr Saint Euphemia, who the tradition says is the creator of them; understanding that the city of Chalcedon, where the Saint suffered her martyrdom, was in the neighbourhood of Caldas*[42].

And Miranda says:

> *We hope the Divine Mercy will continue to work the wonderful successes that this lagoon has experienced so far in such a variety of complaints and illnesses, so that the name of the Lord be magnified, marvelling the large amount of people which in all Masses thereby celebrated, receive the Holy Communion, showing, by this act of Catholic faith that not only seeks the body for medicine, but also spiritual medicine, in recognition of such a significant benefit*[43].

It is worth remembering that religion is another factor inherent to the medical and surgical knowledge production in the 18th century, becoming even almost a part of the treatment[44]. For the case of bathing, the religion was also an important principle to the process of restauration of health[45].

Obviously, the kingdom of Portugal had great interest in the news that used to come from the colony. However, the difference in the language used by the authors leads us to ask how this knowledge was received, perceived and integrated in the metropolis.

The case study seems to suggest a distinction between the knowledge coming from the colonies, which required more intensive struggle for recognition, and that generated, on similar subjects, in the

[41] Translation by the author. Original quote: «As agoas frias, que tem virtude medicinal, serbem de remedio, e de regalo. He recrear a alma, e curar o corpo, sem experiemntar o desagrado, dos remedios pharmaceuticos, em que esta mays certo o enjoo, que a utilidade» (BELEZA, 1763: 108).

[42] Translation by the author. Original quote: «Ajuda a ser grande o concurso da gente para estas Caldas a devoçaõ da Virgem, E marti Santa Euphenia Portuguesa, a quem a tradiçaõ faz authora dellas; entendendo que a Cidade de Calcedonia, onde a Santa teve seu martirio, era entaõ naquelle sitio visinho das Caldas» (HENRIQUES, 1726: 74).

[43] Translation by the author. Original quote: «Espera-se na Divina Misericordia continue os maravilhosos sucessos, que nesta lagôa se experimentárão até gora em tanta diversidade de queixas, e enfermidades, para que o nome do Senhor fosse engrandecido, admirando-se já a grande quantidade de pessoas, que em todas as Missas, que ali se celebrão, recebem a Sagrada Communhão, mostrando neste catholico acto a fé engrandecida, e que não só buscão o remedio corporal, mas tambem o espiritual, em reconhecimento de hum tão avulltado beneficio» (MIRANDA, João Cardoso de – *Prodigiosa lagoa descuberta*…).

[44] FURTADO, 2005: 97. On this subject there are other works focusing on faith in the field of medicine as a central component, during 18th century. In addition to FURTADO, 2005: 88-105; GÉLIS, 2010: 19-130; ABREU, 2007: 761-778; SÁ, 2009: 325-344.

[45] NOGUEIRA, 2011: 38.

metropolis. This can possibly be explained by the social networks, as well as the relations of power and the hierarchical positions that physicians and surgeons held in a world undergoing rapid changes.

The interest in waters as a healing method was thus remarkable, as pointed out by Júnia Ferreira Furtado, who reminds us, in her work *Useful Water, Miraculous Waters in the Captaincy of Minas Gerais (18th Century)* that the fact was reported in the *Gazeta de Lisboa* when a new font of water was found[46].

As already noted, the waters were used for the treatment of various diseases. The authors mention, among others, muscle and joint pain, ulcers, syphilis, skin diseases, pimples, anthills, liver, chronic enteritis, amenorrhea and dysmenorrhea. Obstruction, abscesses and tumours, hernias, inflammation of eyes and nails, urine retention, leprosy, cancer, asthma, short and tired view, urethritis, craw, haemoptysis, haemorrhage are also mentioned as treated by bathing. Hydrops, scabies, paralysis, hemiplegia, spermatorrhea, dizziness, incontinence of urine, roundworms, otitis, scurvy, bubo, diabetes, forced flexion of the fingers add to the long list already presented[47].

The waters from Brazil and from Portugal were also ascribed high curative potential for skin diseases[48]. What indeed made these waters medicinal were their sulphurous and mineral qualities[49].

This seems to indicate that, even if they still apply the Hippocratic galenic principles to the study of the body and to the relations between health and disease, Francisco da Fonseca Henriques, Antonio Cialli, João Cardoso de Miranda and even the abbot António Martins Beleza resorted to iatrochemistry to analyse the peculiarities of the water. Antonio Cialli at one point quoted and praised Herman Boerhaave himself, by naming him as «The real Hippocrates of our time»[50]. Plus, he seems to follow and obey to, as medical theory for his treatments «the teachings of Boerhaave»[51].

LASTS CONSIDERATIONS

This might mean that in both territories – Portugal and Brazil – the healers were bound to the theories that most influenced the reformulation of 18th-century medical and surgical knowledge. Nevertheless, the information recorded by the authors shows also that the transmission of knowledge was articulated in accordance with and dependent on the hierarchy that each author occupied and the place from which he wrote.

So, even recognising that knowledge circulated between Brazil and Portugal, there is still a significant way to go in order to understand if and to what extent there was metropolitan prejudice against incorporating the knowledge that came from the colony. If there was such resistance, it would have to be clarified if it had to do with the locality, the place where that knowledge came from, and/or with the profile and the status of the emitting agent.

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[46] FURTADO, 2014.
[47] BELEZA, 1763; BPMP – *Manuscritos*, M-VR-70…; HENRIQUES, 1726; MIRANDA, 1749.
[48] BELEZA, 1763; BPMP – *Manuscritos*, M-VR-70…; HENRIQUES, 1726: 7; MIRANDA, 1749: 12.
[49] BELEZA, 1763; BPMP – *Manuscritos*, M-VR-70…; HENRIQUES, 1726; MIRANDA, 1749.
[50] BPMP – *Manuscritos*, M-VR-70…
[51] BPMP – *Manuscritos*, M-VR-70…

Notwithstanding the fluxes of knowledge, in this particular case, Portuguese sources do not mention those from Brazil, and similarly, there are sources from Brazil which make no mention of information from Portugal. Even if the sources were not directly connected, at least by direct quotation, they are obviously related with respect to the methods used to obtain a cure.

The history of medicine and circulation of knowledge between Portugal and Brazil requires intense further analysis, even if one would limit it, initially, to the medical and surgical fields. The sources originating from the colony certainly reached the kingdom. They were published there, even if not without resistance. On the other hand, there is no indication that publications from the kingdom, at least those on the baths and the ingestion of water that we referred to in this paper, were circulating in the colonies. However, the knowledge contained in them was spread through the medical practitioners, so it seems reasonable to believe that such a circulation occurred as well.

The Portuguese surgeon João Cardoso de Miranda and the Italian physician Antonio Cialli travelled between Europe and the colonies, not only geographically, but also between two spaces of production of knowledge.

The sources presented here allow us to conclude that the circulation of medical and surgical knowledge on healing waters between Brazil and Portugal in the 18th century was not a linear process.

The sources we use, namely those produced in Brazil or by those performing in Brazil, encourage us to think that their authors were already followers of the knowledge arising from iatrochemistry, in a period of extended discussion and changes within the Portuguese and European academic world. We do not have, however, overwhelming evidence that the writings produced in colonies, namely in Brazil, were crucial to the changes that occurred within the surgical and medical fields in Europe, even if we still work with this scenario as a stimulating hypothesis.

Summing up, our view is that, hypothetically, the interest and the general public acceptance of those findings, particularly in Brazil, might not be met at the same extent within the academic and the scientific community, thus the added need for validation of that knowledge or the reserved acceptance of the healing properties of those waters. This raises the issue of the authority, both of locality and the status of the agents of production. We claim furthermore that even without the acceptance and recognition of the metropolis, the colonial space could develop relevant medical surgical practices as well. The historiography has been pointing out that the knowledge was developing in both territories[52]. We should note that every territory contributed in a specific way, and even without a general appreciation in the metropolis, this was one important way of producing knowledge, which requires further attention.

[52] RAJ, 2013.

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MEDICINAL PLANTS OF BRAZIL IN THE PHARMACOPOEIAS OF THE FRIAR JOÃO DE JESUS MARIA

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Resumo: Ao longo do século XVIII a literatura farmacêutica inicia um novo capítulo na história da farmácia e, em um sentido abrangente, da própria história médica portuguesa. A incessante impressão de farmacopeias, que culminaria na publicação da primeira farmacopeia oficial do Reino de Portugal em 1796, evidencia o esforço dos médicos e boticários – e posteriormente do Estado – para a regulamentação, modernização e adequação da disciplina aos métodos científicos que estavam em decurso no período. Entre os autores do período, destaca-se o monge-boticário e administrador da botica do Mosteiro de Santo Tirso, Frei João de Jesus Maria (1716-1795), autor da *Pharmacopea Dogmatica Medico-Chimica, e Theorico-Pratica* e *Historia Pharmaceutica das Plantas Exóticas*. Influenciado pela classificação lineana e pelos ideais de ilustração de Domenico Vandelli, as obras do Frei Jesus Maria são marcadas por um particular interesse na flora colonial, especialmente do Brasil. Para Jesus Maria, um maior conhecimento e um uso racional da flora colonial com propriedades medicinais, além do desenvolvimento das práticas terapêuticas, proporcionariam o acréscimo de novas e lucrativas fontes comerciais. Dessa forma, suas obras inventariam diversas plantas originárias do Brasil, uma vez que estas práticas eram marcadas pelo uso popular e seriam articulados, pelo autor, aos conhecimentos científicos europeus desse período.

Palavras-chave: Farmacopeias; História da Farmácia Portuguesa; Botânica; História da Medicina.

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Abstract: The pharmaceutical literature through the 18th century states a landmark in the history of pharmacy and, in a broader sense, in the Portuguese Medical History too. The continuous printing of pharmacy books along 18th century would culminate in the first official Portuguese pharmacopoeia in 1796, highlighting the efforts from the physicians and the apothecaries – and later, also from the State – to regulate, modernize and adapt the discipline to the scientific methods that were in progress at that period. Among the authors, is noteworthy the monk-pharmacist of the Santo Tirso Monastery, friar de Jesus Maria (1716-1795), the author of *Pharmacopea Dogmatica Medico-Chimica, e Theorico-Pratica* and *Historia Pharmaceutica das Plantas Exóticas*, who was influenced by the Linnaean classification and the ideals of Domenico Vandelli. The pharmacopoeias of friar Jesus Maria were, then, marked by a peculiar interest in the colonial flora, particularly from Brazil. In this context, the author states that further researches along with a logical use of the colonial flora would not only give rise to a greater development of the therapeutic practices but also profitable commercial sources. In that sense, his work is remarkable by categorizing several plants from Brazil, where those practices were already marked by the popular usage, and the author later would apply to the European scientific knowledge of that period.

Keywords: Pharmacopoeias; History of Portuguese Pharmacy; Botany; History of Medicine.

INTRODUCTION

The news of the first gold-bearing veins discovered in Brazil, the specific site that would be denominated *Capitania de Minas Gerais* from 1720, would be quickly spread throughout the Portuguese Empire. Although 16th century reports had identified the existence of alluvial gold in other spots of the colony, as in the south coast of São Vicente[1], the amount has never been as significant as found in Minas Gerais around 1690. In spite of the good news that were expected by the Portuguese Crown since the beginning of the Portuguese occupation in the New World, the extracted amount from the colony's rivers until then was never so symbolic. Since the ports of the neighbour kingdom, for instance, would receive «naus» loaded with precious metals, only the quantity of silver would reach 30.000 tons, between the years 1560 and 1685[2]; while the Portuguese America, on the other hand, would not have explored a greater source of potential profit by the same period.

Impoverished by the high costs of the Imperial administration, the gold discovery was seen with great enthusiasm by the Portuguese Crown. Moreover, the revelation of the new source was especially positive due to the decline of the sugarcane agroindustry, which was the main colonial economic pillar, but suffered a strong competition between the Antilles plantations[3]. The slightly dark[4] nuggets

[1] LICCARDO *et al.*, 2012.
[2] GARNER, 1988: 899.
[3] SCHWARCZ & STARLING, 2015: 109.
[4] Most gold mines in the first half of the 18th century were withdrawn from the shores of the rivers, known as ouro de aluvião. Due to the presence of palladium in its composition, which gave the metal a slightly darkened color, the first miners called it ouro preto (black gold). This was also the later name of the main city of gold extraction of this period, formerly known as Vila Rica (MEDEIROS, 2001: 32f.).

of gold finding was a turning point for this particular colony, since the royal administration gradually grew and it became an important resource, to the detriment of the earlier preference for the East Indies. The same euphoria was also felt among the citizens, both from the colony and Portugal, in a way that the mines were quickly filled by all sorts of people. A profusion of adventurers, merchants, liberal professionals, residents from other captaincies and even foreigners, many of them without any previous experience with mining; and this, increased the rank of those who sought for a portion of the wealth from what appeared to be the Portuguese *El Dorado*.

Despite of the increasing flow of the new inhabitants, which developed the region by forming and establishing new villages, its structure, though, was not yet satisfactorily capable to withstand such large population that at the end of the century the food shortage reaches worrying levels[5]. This scenario, then, had been registered by the Jesuit priest André João Antonil (1649-1716) in his book *Cultura e Opulência do Brasil,* originally published in 1711, reporting the abandonment of the plantations by the settlers. Additionally, he also pointed out that the high cost of the low amount of food that could be found in the warehouses, made hunger be a constant reality for the miners. The author, hence, describes seeing, at the roads leading to the mines, «not a few dead corpses with corn cob in their hand, without any other sustenance»[6].

The amount of gold, though, was too much to be ignored. Besides, the amount of gold taken in the Brazilian mines in the first seventy years of the 18th century was estimated to be more than half of what was being mined in the whole world, in comparison to the previous two centuries[7]. Furthermore, the Portuguese Crown has settled a severe administrative structure in regards to taxes and regulations upon the production, articulated by the *Intendência do Ouro*; which taxed both miners and counties, prohibit the commercialization of gold without the royal seal, apart from strict inspections in the drainage networks.

The Portuguese government quickly relied on the gold obtained from its colony in the New World, since it had financed almost the entirely Imperial system as well as the purchase of manufactured goods, mainly bought from England; in that sense, the entry cargos into the ports of Lisbon would be proportionately as great as the outflows. It is not surprising that the signs of production collapse around middle of 1760 would bring fear to the Portuguese Empire, as until the middle of the 18th century the gold was accounted for in tens of tons, and in the last decades became hundreds of kilos[8].

In the following years the impact was clear to the Portuguese economy. If in one hand, the attitude of the Crown was to tighten the control of the taxes charged, which provoked the revolt of the

[5] DIAS, 2001: 46.
[6] ANTONIL, 1837: 153.
[7] FIGUEIRÔA & SILVA, 2000: 178.
Although it is difficult to specify the actual amount of extracted gold, specially due to the existence of numerous clandestine networks and consequent evasion of a considerable part of the production, it is estimated that, only in remittances from the taxes collected by the crown, the total sent to Lisbon was 3,5 tons at 1725, 4,2 tons at 1731 and 11,5 tons at 1741 (SCHWARCZ & STARLING, 2015: 125).
[8] SCHWARCZ & STARLING, 2015: 125.

local elites, creating insurrection movements, such as the *Inconfidência Mineira*[9]. On the other hand, the Portuguese Crown began to seek both in science and technology the answer behind the decrease of the gold extraction and the improvement of its mining process in colony[10]. There was, as consequence, significant investment in mining machinery and development of techniques to identify new gold extraction spots; the results, however, had small effects in the decreasing amount of the extracted gold. The aftermath came in both ways: Portugal experienced a considerable decline of their income; and Minas Gerais, once the highest urban concentration of the colonial region, suffered a period of accentuated ruralisation of its social structure.

BRAZILIAN PLANTS AND THE ECONOMIC POSSIBILITIES

As in any other European nations, the Portuguese Enlightenment was characterized by the attempt to rationalize gains from the colony, in the way that the economic potentials would be better commercially exploited. In addition, the gradual decrease in profits from the extraction of gold, as explained above, imposed this condition, finding a new source of profit was a premise that conditioned the maintenance of the colonial process. In regards to the knowledge of the natural potentialities, the Portuguese government envisioned a strategy to combine further knowledge of colonial fauna and flora along with the development of overseas trade of natural specimens. The project, thus, was directly linked the economic development of the Kingdom to the natural knowledge of the New World possessions.

The aim was relevant since Portugal had not imposed in the Brazilian nature any study of great scientific relevance during the first two centuries of colonization, which, in contrast, the Spanish had objects, in the territorial possessions, widely disseminated by documented books, as *Historia natural y moral de las Indias* written by the Spanish Jesuit José de Acosta (c.1539-1600). Several letters were produced by treaties of travellers, clergymen and settlers. They contain a rich description of the Brazilian nature, which has been found in the first century of discovery – but not many people had access to these material. Most of the works about Brazilian nature has actually never been diffused through Europe. Some examples can be inserted in this text, such as the letters written by the Jesuits Manuel da Nóbrega (1517-1570) and José de Anchieta (1534-1597), which remained closed to the Jesuit networks of communication, in spite of the meaningful representation of the knowledge of the colonial nature. Other cases like books of the *Tratado Descriptivo do Brasil em 1587* by Gabriel Soares

[9] MAXWELL, 1995.
The *Inconfidência Mineira*, also known as *Conjuração Mineira*, was an attempted conspiracy with separatist intent fomented by military members, intellectuals, clergymen and rural landlords of Minas Gerais dissatisfied with the high taxes charged by the Portuguese Crown. The movement was dismantled at 1789, still in its elaboration phase, due to the delation of Joaquim Silvério dos Reis, one of its members. Although twelve of its members were sentenced to death, only Joaquim José da Silva Xavier, known as *Tiradentes*, was effectively executed. The date of his death (April 21) is a national holiday in Brazil, his name being inscribed among the Heroes of the Country. For more information about *Inconfidência Mineira*, its antecedents and consequences in the Portuguese Empire, see Kenneth Maxwell's book *A devassa da devassa – a Inconfidência Mineira: Brasil e Portugal (1750-1808)*.
[10] FIGUEIRÔA & SILVA, 2000.

de Sousa (1540-1591) and *Tratados da terra e gente do Brasil* by Fernão Cardim (c.1549-1625), remained unknown for centuries, being only published entirely in the 19th century. However, some exceptions can be found three centuries earlier: the publication of the French travellers André Thevet (1502-1590) and Jean de Léry (1536-1613), for instance, as well as the book *História da Província Santa Cruz* written by the Portuguese chronicler Pêro de Magalhães Gândavo (1540-1580), a major report about the Brazilian Nature which widespread only in Europe for decades.

The *Historia Naturalis Brasiliae* (1648), written[11] by George Marcgraf (1610-1644) and Guilherme Piso (1611-1678) during their service for the Dutch Crown in Brazil, was for the first time a work, that in a broad and more consistent way, described the Brazilian nature for the European naturalists[12]. The arrival of these naturalists occurred during the Dutch West India Company occupation of the Northeast coast of Brazil, charged by John Maurice, Prince of Nassau-Siegen (1604-1679) to whom the book was dedicated. As previously mentioned, the Gândavo's *História da Província Santa Cruz*, published almost a century earlier, was in fact the first printed book about the Brazilian nature, however, the Dutch publication differs from this one since it was printed in Latin, as the scientific language of the period, what allowed it to be widely spread and reachable to more readers. The *Historia Naturalis Brasiliae* is also distinguished by its contents: written in cohesion with the scientific literature of the 18th century; richly illustrated; engraved with unknown plants, fish, insects, mammals and reptiles from Brazil, which were received with great curiosity among the naturalists in Europe. The book was also focused in the medicinal properties of those animals and plants, in addition to the dieses that the settlers were vulnerable. In addition to the medical treaty, the work reported about geography, the population and the sugarcane plantation system in the Northeast of the Brazilian coast.

The importance of *Historia Naturalis Brasiliae* for the European intellectual community, therefore, has crossed centuries, being considered the main source for the Brazilian nature until the beginning of the 19th century[13]. And, despite of all those relevant subjects shown in the book, the pursuit of the understanding the Brazilian territory – undertaken by the Portuguese Crown, church and private groups or individual actions – occurred throughout the entire colonization period, but no work that has been produced could ever had the prominence like the Dutch's, in this matter.

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[11] Originally it was credited only to Guilherme Piso, who wrote it under the direction of Johannes de Laet (1581-1649). However, there were uncertainties about the authorship of Piso in the entire work, due the general knowledge about the relevant role of George Marcgraf, who had died in Luanda before the publication of the work, during the expedition. Ten years after the first publication, Piso reissues the work, adding new content, as the Marcgraf's *Tractatus Topographicus*, besides emphasizing that many of the iconographies of the book were drown by Marcgraf. Thus, the historiography admit the double authorship of the *Historia Naturalis Brasiliae*, being the first part, *De Medicina Brasiliensi*, written by Piso, and the second, *Historiae Rerum Naturalium Brasiliae*, written by Marcgraf.

[12] EHRENPREIS, 2015: 78-86.

[13] In the early 19th century, due to the emergence of the new botany and zoology as well the arrival of the Portuguese Crown to Rio de Janeiro, Brazil receives a significant increase in the number of foreign expeditions in its territory. Among them, the expedition of Johann Baptist von Spix (1781-1826) and Carl Friedrich Philipp von Martius (1794-1868), which classified thousands of species of Brazilian fauna and flora. The expedition was carried out by the Austrian-German Artistic Mission, which several scientists and artists followed the princess Maria Leopoldina (1797-1826), future wife of Emperor D. Pedro I (1798-1834) to record and catalogue the local nature and landscapes. For more information, consult *A nova Atlantida de Spix e Martius: Natureza e civilizacao na Viagem pelo Brasil, 1817-1820* written by Karen Macknow Lisboa.

It was only in the last quarter of the 18th century when Portuguese scholars produced similar works – with scientific nature –, as a result of numerous scientific expeditions sponsored by the Crown in its imperial overseas expansions; among them the expedition of Alexandre Rodrigues Ferreira (1756-1815) is an outstanding example. This naturalist was educated at the University of Coimbra, and had done extensive research during his big journey through Amazonia between 1783 and 1792, studying the rivers Amazonas, Negro, Branco, Madeira, Mamoré and Guaporé[14]. During this journey, he reported many dossiers describing numerous species of animals and plants, geographical maps, types of fauna, flora and the population of the regions he had explored to the Lusitanian capital. These material was later compiled in several works, but, at his time the reports were not yet covering all the articles sent to Rodrigues Ferreira to Portugal[15].

Although the expedition by Alexandre Rodrigues Ferreira was remarkable, this event did not represent new perspectives in terms of potentialities of the colonial nature. Instead, at the beginning of this century, there were many other researchers that have made research and transmitted the qualities and the uses of the flora and fauna of Brazil. One of them is the main object of this paper: the pharmacopoeias published in Portugal during the 18th century.

PORTUGUESE PHARMACOPOEIAS

The 18th century was notable for a continuous and an incessant publication of pharmaceutical texts, in which several pharmacopoeias have been printed. The first one was the *Pharmacopea Lusitana,* published in 1704, and followed by six other publications of the same category. Chronologically there were: the *Pharmacopea Ulyssiponense* (1716) written by João Vigier, a french apothecary who lived most part of his life in Portugal; the *Pharmacopea Tubalense Chimico-Galenica* (1735), by Manoel Rodrigues Coelho; the *Pharmacopea portuense* (1766), by António Rodrigues Portugal; the *Pharmacopea Dogmatica Medico-Chimica, e Theorico-Pratica* (1772), by friar João de Jesus Maria; the *Farmacopéa Lisbonense* (1785) by the luso-brazilian physician Manuel Joaquim Henriques de Paiva; and finally the *Pharmacopeia Geral para o Reino, e Dominios de Portugal* (1774) written by Francisco Tavares, Professor at the Faculty of Medicine of the University of Coimbra and personal physician of the Queen D. Maria I (1734-1816).

Additionally, translations from English pharmacopoeias have also been printed, such as the *Pharmacopea Baetana*, the *Pharmacopoeia Collegii Regalis Medicorum Londinensis* and the *Pharmacopea Meadiana.* However, it is not completely assertive that the 18th century pharmacopoeias were the first publications of this genre in Portugal, even if Zacuto Lusitano (1575-1642) and Francisco Sanches (1550-1622) have written pharmacopoeias in the previous period. It is necessary to emphasize, though, that the publications of the 18th century were directed to apothecaries, while the others

[14] PATACA, 2006: 251.

[15] As an example how several unknown material is related to the Rodrigues Ferreira's voyage, in 2010 during an investigation at the University of Coimbra, were discovered several Brazilian fishes preserved in the form of herbarium and identified by Rodrigues Ferreira according to the Linnaean system.

were to physicians[16]. Thus, it is legitimate to say that the 18th century represents a new style of publication, aimed for the apothecaries' ability to the drug usage, recipes and its productions.

Despite of all the works being published as pharmacopoeias, there was a clear difference in the contents presented between them: both concerning the interests of the authors and the scientific paradigm that targets these publications. In a sense, the heterogeneous character varied between them, which reflects on the differences of its authors, as well as the period of publishing also was a criteria. Physicians, surgeons, apothecaries and religious apothecaries wrote their personal notions about the pharmacy, medicine and healing in their pharmacopoeias. And despite the scientific aim, there were authors who used this publications as a way to advertise their pharmacies and medicines[17]. To sum up, although these Portuguese pharmacopoeias presented scientifically rigorous content, they were not strictly scientific texts; instead, they were also a medium for professional and commercial expansions.

The publication of pharmacopoeias became a phenomenon among the 17th and 18th centuries, what did not only occur only in Portugal, but rather was also expressed in other European countries. The first work to inaugurate the style[18] was the *Pharmacopoeia Londinensis* that had its first edition in 1618, which aim was to regulate the apothecary as a profession. Other cities had their own pharmacopoeias versions: Amsterdam, Brandenburg, Stockholm and Edinburgh; to name a few. In Spain, the first pharmacopoeia was published in 1734. The first official pharmacopeia (*Pharmacopoea Hispana*), has been printed in 1794, the same year as the first Portuguese pharmacopoeia[19].

THE BRAZILIAN DRUGS DESCRIBED BY THE PHARMACOPOEIAS

In the whole 18th century pharmacopoeias, with greater or lesser emphasis, underlined the importance of further awareness and usage of the Brazilian plants in terms of medicinal properties. Some authors, for instance, have devoted whole chapters to the exotic plants from the overseas colonies, and other parts of Europe and Asia. One of them is the *Pharmacopea Ulyssiponense* (1716), written by João Vigier (1662-1723). One of the chapters is dedicated to parts of the *Tratado das virtudes e descrições de diversas plantas, e partes de animais do Brasil, e das mais partes da América, ou Índia Ocidental, de algumas do Oriente descobertas no último século* in order to describe the drugs coming from the Portuguese overseas colonies. In almost 60 pages, João Vigier compiled a series of natural species hitherto that was until then unfamiliar to the most of the Portuguese apothecaries, among them there were: *cajú* (*Anacardium occidentale*), *ananás* (*Ananas comosus*), *bálsamo de copaíba* (*Copaifera sp.*), *inhames* (family Dioscoreaceae), *cacau* (*Theobroma cacao*), *contra-erva* (*Dorstenia brasiliensis*), *parreira-brava* (*Abuta sp.*), *jenipapo* (*Genipa americana*), *ipecacuanha* (*Psychotria ipecacuanha*), *pau-brasil* (*Paubrasilia echinata*) and *mangaba* (*Hancornia speciosa*).

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[16] DIAS, 2007: 75; CONCEIÇÃO *et. al.*, 2014: 50.
[17] DIAS, 2007: 314.
[18] Although the strict pharmacopoeia concept can be found in ancient texts, as Pedanius Dioscorides *De Materia Medica* (c.50), besides that the term appeared for the first time in a Basel publication on the 16th century, the Pharmacopoeia Londinensis was a precursor in systematizing the characteristics that would mark the subsequent pharmacopoeias.
[19] PITA, 1996: 176.

In addition to that, there was also the *Pharmacopea Tubalense Chimico-Galenica* (1735), written by the apothecary Manoel Rodrigues Coelho (1687-?), that contains an entire chapter for the plants from the Portuguese colonies which is entitled *Em que se dá a notícia da origem dos símplices mais versados no uso médico, que das Índias, América, e de mais partes nos vêm a este Reino.* In this chapter, the author identifies species from the three natural kingdoms that can be used by the apothecaries, but, for him, the vegetable kingdom was the most effective to produce medicines. Among several Brazilian plants approached in the chapter, one has caught the apothecary's eyes: the *abutua* or *parreira-brava* (*Abutua sp*.), described as a root macerated, that once diluted in water can be used in the treatment of bloody diarrhea and many others intestinal diseases; while mixing with vinegar produces a plaster that can be suitable for healing of skin sores and cysts; and when it is cooked, it works for contusions due to labour pains, cramps, headaches, and, nonetheless, for liver sore treatments. The author also states that «besides other benefits […] it is great for causing urine, expelling kidney stones and bladder stones»[20].

Additionally, other authors that are worth mentioning in this matter were the Benedictine friar João de Jesus Maria (1716-1795), who has explored the therapeutic use of Brazilian plants the most; the main monk-pharmacist of the Santo Tirso Monastery, friar Jesus Maria who, in fact, had a distinct trajectory from the others authors of the 18th century Portuguese pharmacopoeias since he was the only author of the first Portuguese pharmacopoeia, published in 1704 also by the cleric D. Caetano de Santo António (c.1660-1739), and was directly connected to the church. The remaining authors, though, were apothecaries, surgeons or secular physicians.

The Christian authority took a noteworthy role in the writings of friar Jesus Maria, notwithstanding the previously mentioned authors had not expressed an agnostic nor anticlerical conception of medicine in their works. This condition had such effect that, for him, an apothecary, as a professional, should not expect wealth out of it, but, instead should raise Christian concept of compassion. He also declared that the pharmaceutical profession is not intended «for the poor, who need to support themselves; but only for rich people, who without oppression of the everyday urgencies will fulfil with plenty the expenses of the pharmacy»[21], in way to serve the needy ones without tying the gains to the pharmacy as a material subsistence.

The contrast between the Christian conception of the pharmacy and the emergence of a secular pharmacy, based on a secular discourse of profit and rationalization of healing, was not exclusive to Portugal but rather a reality experienced in other European countries. As stated by the medical historian Roy Porter, the period between the late 18th and early 19th centuries was characterized by the trust of medicine as a knowledge that enables man to unravel the mysteries of the natural world. That perspective was also corroborated by the population boom in Europe, when the scientific development and the visible improvement affected the quality of health. In a sense, more and more secularized the medicine was consolidating its role in the field of healing, a detriment to religious authority[22].

[20] COELHO, 1735: 189.
[21] BNP – *Fundo Geral Monografias*, S.A. 37520 V. JESUS MARIA, João de (1772) – *Pharmacopea Dogmatica Medico-Chimica, e Theorico-Pratica*. Porto: na Officina de Antonio Alvares Ribeiro Guimar.
[22] PORTER, 1998: 302.

THE WORKS OF FRIAR JESUS MARIA (1716-1795)

In his first work, the *Pharmacopea Dogmatica Medico-Chimica, e Theorico-Pratica*, published in the city of Porto in 1772, the friar Jesus Maria addresses an extensive number of Brazilian plants indicated as medicines. In an extracted passage of his prologue, the author states his concern about the incipient use of Brazilian plants, especially that the use could improve the trade and the development of medicine. He wrote:

> *It is to be regretted, according to the news that comes from people who lived in the Americas the lack that many plants of known effectiveness do in medicine, who say they have discovered with great experience and rustic rational agility the* ***caboclos*** *of those states; that, be sure, could be a usefulness in medicine and to increase the commerce profits, equal that seen in the genres coming from outside the Kingdom*[23].

Altogether, his *Pharmacopea Dogmatica* has 938 pages and is arranged in two different volumes. The first volume is divided into two treaties with 45 chapters, destined essentially to the medical matter, characterization of the pharmacy and presentation of pharmaceutical recipes.

The second volume is composed by three different treatises, which unlike the previous volume, does not have division by chapters. The first of these three treatises, entitled *Do Reyno Animal*, is the smallest of all. As it is clear from its title, it is intended to be regarded to the animals of the Kingdom that can be used for the pharmacy matters: The author divided the animals into three categories: fishes, birds and terrestrial animals. In addition to a study about the medical properties of these animals, the treaty also resembles a text of zoological interest, in which several specimens are portrayed without any medicinal use being attached to them. This is especially grounded for the non-European animals, such as the cetacean identified, also known as *Tritão*: «which from the middle to the top appears like a man. They say that it does a great damage in *Porto Seguro*, city below Bahia eight leagues»[24].

The *Tritão* description written by friar Jesus Maria corresponds exactly to the report made by Caspar Barlaeus (1548-1648) in *Rervm per octennivm in Brasilia et alibi nuper geftarum*, that was published in 1647. The work aimed to report the Dutch colonial empire in Brazil, containing a large number of maps, illustrations and articles about the region. Barlaeus has written about the *Tritão*, which in the indigenous language are called *ipupiaras.* They «are seen seven or eight leagues from *Baía de Todos os Santos*, as well as in the vicinity of *Porto Seguro*. It is believed that they kill men, squeezing them with their embrace, not on purpose, but for affection»[25]. A similar description, can be found in the *Vocabulario Portuguez e Latino*, published in 1721 by Raphael Bluteau (1638-1734),

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[23] CDF – *Monografias Farmacêuticas*, CDF-C13.4-012-A1CB.3. JESUS MARIA, João de (1777) – *Historia Pharmaceutica das plantas exóticas, seus produtos, naturalidades e virtudes para facilitar os conhecimentos dos vegetaes e servir de addição à Pharmacopea Dogmática*. Coimbra: [s.n.].

[24] BNP – *Fundo Geral Monografias*, S.A. 37520 V. JESUS MARIA, João de (1772) – *Pharmacopea Dogmatica*… p. 13.

[25] BARLÉU, Gaspar – *O Brasil holandês sob o Conde João Maurício de Nassau: história dos feitos recentemente praticados durante oito anos no Brasil e noutras partes sob o governo do Ilustríssimo João Maurício Conde de Nassau, etc., ora Governador de Wesel, Tenente-General de cavalaria das Províncias – Unidas sob o Príncipe de Orange.* Tradução e notas Cláudio Brandão. Brasília: Senado Federal/Conselho Editorial, 2005, p. 164.

an English priest who has lived in Portugal since 1688. The *Tritão*, is described as «the gentile calls *Ypupiapia* […] these Tritons swims by the rivers, seven or eight leagues from *Baía de Todos os Santos*, & near of *Porto Seguro*, where they do great damage»[26].

The second treaty, *Das Agoas Mineraes, e Reyno Mineral*, starts with a brief text about the therapeutic properties of mineral waters, which was considered one of the first studies on the subject in Portuguese[27], nonetheless it was published after *Materia Medica* (1735) by Jacob de Castro Sarmento. Even though the friar Jesus Maria cites several authors throughout the study, the influence of Sarmento (1691-1762) on his work is huge. As an example, Jesus Maria wrote in his *Pharmacopea Dogmatica* about the weight of metals[28]. This description is very similar to the text of *Materia Medica*[29]; also in the presentation of instruments capable of defining the main chemical element of a certain aqueous solution, such as the *Boylean bomb* and the *hydrostatic balance*[30]. In addition to his study about thermal waters, the main subject of the present treaty is describe the medicinal characteristics of chemical compounds. He compiled 186 different formulas using 56 different chemical compounds (identified by treaty their Latin and Portuguese name and presented with their French, Italian, English, Spanish and German names).

The last and most extensive treaty, named *Do Reyno Vegetal,* is a broad compendium of plants with medicinal properties and recipes for medicines made out of plants and herbs. The aim of this treaty is to highlight the importance of botany for the apothecary profession: «which being one of the three parts of Pharmacology, comes to teach the preparation, description, virtues and uses of plants»[31]. As well as in the *Do Reyno Animal*, the author only embodies botanical features in several excerpts, putting aside the medicinal discussion; in a sense, he explores beyond the boundaries of the pharmacy as a subject. Consequently, many questions were raised about the vegetables morphology, reproduction and nutrition, along with the denominations of the diverse vegetables classes.

The treaty gathers a total of 389 species, sorted alphabetically from their Latin binomial in addition to their names in Portuguese, Spanish, French, Italian, English and German. Moreover, in each introduction of plants has a brief description of its morphology, fruition or flowering (when it is applied), and geographical distribution. However, as far as the distribution is concerned, Jesus Maria focuses on the place where the plant can be found, and not their place of origin; such condition can be seen in the case of *Ananas aculeatus,* commonly known as pineapple or *abacaxi* (*Ananas commosus*). Native from Brazil, the pineapple was domesticated and disseminated by indigenous peoples throughout the South America, Central America and Caribbean Islands still in the period prior to the European colonization[32]. Nothing about the place of its origin, however, was pointed out by the author, who only

[26] BLUTEAU, 1721: 298.
[27] LEMOS, 1991: 142.
[28] BNP – *Fundo Geral Monografias*, S.A. 37520 V. JESUS MARIA, João de (1772) – *Pharmacopea Dogmatica*… p. 60.
[29] SARMENTO, 1735: 1f.
[30] BNP – *Fundo Geral Monografias*, S.A. 37520 V. JESUS MARIA, João de (1772) – *Pharmacopea Dogmatica*… p. 72 f.; SARMENTO, 1735: 339.
[31] BNP – *Fundo Geral Monografias*, S.A. 37520 V. JESUS MARIA, João de (1772) – *Pharmacopea Dogmatica*… p. 1.
[32] FERRÃO, 1992: 55.

states that «there are many inquiring people in Lisbon and Porto who grow them in their gardens»[33]. And the reason for this event was because the *Pharmacopea Dogmatica* is essentially a book composed for and to apothecaries, despite it can be extended to other areas, the main end of the document was to support the pharmaceutical in the daily work. Paradigmatically, the pharmacopoeia reader's interest was to be able to find the plants and not their original place of dispersion.

The imprecision on the geographical location of the plants can also be seen in the description of *ipecacuanha* (*Psychotria ipecacuanha*). A widespread plant that can be found all over the Brazilian Atlantic forest and causes a strong urge to vomit due to the emetic present in its composition, and was synthesized in the 17th century[34]. Despite being natural from a Portuguese colony, the author, nevertheless, identified the plant from «dark places and gardens, particularly in Peru and Brazil»[35]. The author, actually, suggests four different species of *ipecacuanha*, which is distinctive by their colours from white to dark, being the gray one from Peru. Overall, the four species are defined as excellent for purging by disgorge and dysentery, a practice that was considered to be a good method to release internal obstructions of the human body[36].

These qualities and features were, in fact, described by José de Anchieta and Fernão Cardim initially, in the second half of the 16th century, so its use for the treatments against poisonous plants and animals. The botanical and medical descriptions only were only made in the the following century in the *Historia Naturalis Brasiliae.* Also, the Dutch book contains an engraving of the plant, describing with precise detail the medicinal properties and the practices done by the Brazilian indigenous population. The *ipecacuanha*, though, was pretty much unknown to the outside of the Portuguese Empire until the end of the 17th century, when a new and higher status had reached the plant through the physician Jean-Adrien Helvetius (1661-1727) who healed one of the Louis XIV through a medicine made out of the *ipecacuanha*[37]. Since then, and obviously by Helvetius' propaganda about the medicinal properties of the *ipecacuanha*, in just few decades the Brazilian root changed from an ordinary colonial medicine to a famous and popular remedy by European erudite physicians.

The root, then, became subject for several medical and pharmaceutical books throughout the late 17th and early 18th centuries, which the most famous was the *Relatio de novo Antidysenterico Americano magnis successibus comprobato* (1696) written by the German mathematician and philosopher Gottfried Wilhelm Leibniz (1646-1716). Also, the *ipecacuanha* was an exploratory matter as an effective medicine to heal the plague in the *Traité de la Peste* (1721), characterized by Jean-Jacques Manget (1652-1742).

In the 18th century, the Portuguese medical pharmaceutical books were also very much inclined to follow the European medical field trend; significant reports about ipecacuanha therapeutic qualities then, emerged. Although the Portuguese pharmaceutical books were very similar in terms of

[33] BNP – *Fundo Geral Monografias*, S.A. 37520 V. JESUS MARIA, João de (1772) – *Pharmacopea Dogmatica*… p. 43f.
[34] ASSIS & GIULIETTI, 1999: 205.
[35] BNP – *Fundo Geral Monografias*, S.A. 37520 V. JESUS MARIA, João de (1772) – *Pharmacopea Dogmatica*… p. 73.
[36] BNP – *Fundo Geral Monografias*, S.A. 37520 V. JESUS MARIA, João de (1772) – *Pharmacopea Dogmatica*… p. 74.
[37] DIAS, 2003: 318.

describing the medicinal use of the root, the ones from the late of the 18th century were way more complex than those from the earlier period. The major difference between friar Jesus Maria and other Portuguese authors consists in the way how he explained the chemical action of the plants, while, for the author, the therapeutic properties of ipecacuanha were due to the saline molecules of the root which act directly in cases of stomach obstruction, causing urine and vomiting[38].

Despite of lacking noticeability in the date of the production, his second book, the *Historia Pharmaceutica das Plantas Exóticas,* was not completed until 1777, when its publication was finally approved. But, according to the *Catálogo dos Escritores Beneditinos da Congregação de Portugal,* of a friar Francisco de S. Luís, Cardeal Saraiva, the book actually took eight or nine years to be written and was kept into the S. Bento da Saúde Monastery – currently Portuguese Assembly of the Republic – until it was donated by António José Nogueira to the Sociedade Farmacêutica Lusitana in 1837[39]. In the last page of the book, it is written that the printing should be held in May 1800. But in spite of all the necessary licenses, the work has never been printed. One of the possible reasons may have been the publication of this time which became the official pharmacopoeia of Portugal, the *Pharmacopeia Geral.*

In comparison with the first pharmacopoeia, the *Historia Pharmaceutica das Plantas Exóticas* was influenced by the works of Domenico Vandelli (1691-1754). Several types of plants had their binomial classification credited to this Italian naturalist as well as many excerpts in which the friar Jesus Maria expresses his admiration in such magnitude that the author have come to highlight the period for being extremely positive to the botany due to the investments that members of the nobility had subsidized for the construction of botanical gardens. For the Portuguese case the friar states that he admired: «The magnificent Jardim da Ajuda; which has a large number of exotic plants, due to Domingos Vandelli's the directive and vigilant instruction»[40].

After the Lisbon earthquake in 1775, the King of Portugal moved his court from Lisbon to Ajuda, where the natural phenomena had not much affected, additionally he willed to build a humanistic and scientific environment for his first-born son, D. José I (1761-1788) in this region, and, hired Vandelli to be the director of the botanical garden where there were more than 5000 species of plants, most of them being from abroad. Later, Vandelli was sent to Coimbra to lecture natural history at the University, which made friar Jesus Maria praise his lecturing to be extremely important for botany. He characterised Vandelli as «one of the greatest men of the Century»[41].

Going back to the manuscript, Jesus Maria had compiled 505 species of plants in 10 chapters, some of them could be found throughout the country, but the majority were coming from abroad, so the access for the apothecaries was only possible through commercial ways. Nevertheless, most part of the plants were only outlined by its medicinal properties, and another few by their pharmaceutical recipes (in total 241, most of them being distillation recipes).

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[38] BNP – *Fundo Geral Monografias*, S.A. 37520 V. JESUS MARIA, João de (1772) – *Pharmacopea Dogmatica*… p. 74.
[39] SARAIVA, 2016.
[40] CDF – *Monografias Farmacêuticas*, CDF-C13.4-012-A1CB.3. JESUS MARIA, João de (1777) – *Historia Pharmaceutica das plantas exóticas*… p. 3.
[41] CDF – *Monografias Farmacêuticas*, CDF-C13.4-012-A1CB.3. JESUS MARIA, João de (1777) – *Historia Pharmaceutica das plantas exóticas*… p. 5.

The author acknowledges his lack of understanding of the Brazilian plants. This complaint was clear on his statement about the little concern of the Brazilians to report the morphological characteristics and therapeutic properties of these species. One example could be the *orelha-de-onça* (probably *Tibouchina Sp.*), a plant native from Brazil with more than 35 species, that is mainly used in gardening because of its purple flowers; although its root is positive to heal coughs and pulmonary problems. About this species Jesus Maria has had nothing else to add then that the inhabitants of Bahia were «careless in discovering the medical things of their country»[42]. The same happens to *Raiz de Queijo*, indicated against various poisonings, headaches and uterine bleeding, but «due to the neglect of the nationals from the Americas of this Kingdom, very little facts are known about this root»[43]. Lastly, Jesus Maria confesses his doubts about the morphology of the plant called *Raiz de Chumbo*, sent from Bahia to Portugal to heal wounds, but he knew nothing about it. The friar affirms that a better description should be written «by Brazilians who are well educated in Botany»[44].

Due to the lack of information about the Brazilian nature, friar Jesus Maria commonly supported the therapeutic indication by using the traditional uses for those plants in Brazil as an example about how effective they were to heal. One evidence can be seen in the description of *guaraná* (*Paullinia cupana*), a climbing plant native of the Amazon and especially common in Brazil, its fruit's colour ranges from brown to red and contain black seeds partly covered by white arils, like eyeballs, has about twice the concentration of caffeine found in coffee seeds. The friar writes that «a composition, which seems to be a substance or an extraction out of vegetables, made by the gentiles from Pará»[45]. He also indicates *guaraná* for various stomach problems, headaches, hemorrhagic diarrhea and urinary incontinence, attesting that its medical properties are in fact generous, «the gentile people uses it as a universal remedy for all his illnesses»[46].

The therapeutic indication for the *cajú* (*Anacardium occidentale*) was also legitimized through the traditional indigenous use of the fruit. The cashew tree is a tropical tree that produces the cashew seed and the cashew apple. A native species from the Northeast of Brazil, but also widely spread in Southern Asia and tropical Africa. About the nut, friar Jesus Maria stressed out that they burn when they came into contact with the skin, but «the inhabitants of Brazil make from it an oil that prevents the wood rot, removes facial stains and kills the intestinal worms»[47]. Along with the indigenous knowledge, Jesus Maria also added that it was used by the slaves as a form of legitimation for

[42] CDF – *Monografias Farmacêuticas*, CDF-C13.4-012-A1CB.3. JESUS MARIA, João de (1777) – *Historia Pharmaceutica das plantas exóticas*… p. 358.
[43] CDF – *Monografias Farmacêuticas*, CDF-C13.4-012-A1CB.3. JESUS MARIA, João de (1777) – *Historia Pharmaceutica das plantas exóticas*… p. 368.
[44] CDF – *Monografias Farmacêuticas*, CDF-C13.4-012-A1CB.3. JESUS MARIA, João de (1777) – *Historia Pharmaceutica das plantas exóticas*… p. 395.
[45] CDF – *Monografias Farmacêuticas*, CDF-C13.4-012-A1CB.3. JESUS MARIA, João de (1777) – *Historia Pharmaceutica das plantas exóticas*… p. 255.
[46] CDF – *Monografias Farmacêuticas*, CDF-C13.4-012-A1CB.3. JESUS MARIA, João de (1777) – *Historia Pharmaceutica das plantas exóticas*… p. 255.
[47] CDF – *Monografias Farmacêuticas*, CDF-C13.4-012-A1CB.3. JESUS MARIA, João de (1777) – *Historia Pharmaceutica das plantas exóticas*… p. 267.

the medicinal properties of certain plants; the *Páo de Canhão* as an example was identified by the Latin binomial *Lignum Pormenti* and *Ambaiba* to the Indigenous people, which the Benedictine friar pointed out that the tree grows in Brazil and to its trunk «the negroes use to heal their wounds»[48].

Although popular medicine was often used as a way to legitimate the medicinal use of Brazilian plants, the author also pursued ways to combine popular knowledge to the European erudite medicine. This condition is especially present when the Benedictine friar described the óleo da copaíba, a resin extracted from the *copaifera* (*Copaifera sp*) a genus of flowering plants in the legume family Fabaceae. The oil extraction of that plant was widely explored by the Jesuits throughout the 17th century, being known as *the Jesuit's balsam*. Despite its use was essentially linked to traditional medicine, friar Jesus Maria emphasized that the therapeutic properties of the plant were attested by important physicians, among them were Johann Friedrich Cartheuser (1704-1777), who performed an experimentation that confirmed that the oil of Copaiba has the same medicinal properties as Terebinthin and Peruvian balsam; Thomas Fuller (1654-1734); and Friedrich Hoffmann (1660-1742), who attested that the oil intake is positive for healing infections and urinary obstructions[49].

CONCLUSION

As other medical books published in the 18th century, both works by Friar Jesus Maria (*Pharmacopea Dogmatica* and *Historia Pharmaceutica das Plantas Exóticas*) were results of the attempt to use the Brazilian nature in a more exploratory way. Historically the public policy of rationalizing the colonial resources was a feature linked to the institutional changes promoted by Marquis of Pombal. However, it was noticeable that pharmacopoeias written in the 18th century expressly contained the vindication about the necessity to raise awareness about the Brazilian medicinal plants in terms of usage and insights. In that sense, in both books of the friar Jesus Maria, the use of plants was described and supported by the traditional manipulation from the Brazilian indigenous; and, despites of this important point, the author in fact endeavoured to reconcile popular practices with European erudite medicine.

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[48] CDF – *Monografias Farmacêuticas*, CDF-C13.4-012-A1CB.3. JESUS MARIA, João de (1777) – *Historia Pharmaceutica das plantas exóticas*… p. 77.

[49] BNP – Fundo Geral Monografias, S.A. 37520 V. JESUS MARIA, João de (1772) – *Pharmacopea Dogmatica*… p. 221.

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www.edicoesafrontamento.pt
ISBN: 978-972-36-1695-4

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Cofinanciado por:

COMPETE 2020
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