



DOCUMENTING THE TROPICAL NATURAL WORLD IN THE ACCOUNT OF ANTONIO PIGAFETTA *

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ABSTRACT

In the account of his journey of circumnavigation, Antonio Pigafetta (1492-c.1531) noted the uniqueness of the places that he had visited. In addition to peoples and landscapes, he described trees, fruits and herbs, as well as insects, birds, fish and mammals. He referred to numerous species, some of which were new to, or little known in the West.

In this essay, I will analyse Antonio Pigafetta's references to the plants and animals observed during his overseas travels. The species recorded around the world suggest that he was both a keen observer and well resourced. His observations allowed him to describe a world which, united by the oceans, revealed a surprising continuity. For the Italian, many of the vegetable and animal species that he observed in the Americas, on the islands of Southeast Asia or on the vast oceans were similar to others spotted previously, in other regions, by European voyagers. From the Indies to the African coast and from the Atlantic to the Pacific, the globe navigated by Pigafetta demonstrated continuity never before attested to. Crossing boundaries established by political agreements and routes defined by commercial interests, the description of this unified and circumnavigable planet contributed, throughout the 16th century, to the emergence of a new way of understanding nature.

In this article, I will seek to identify, in some Early Modern botanical treatises, echoes of this new way of looking at the natural world, as proposed by Antonio Pigafetta.

KEYWORDS: Fernão de Magalhães; circumnavigation; tropical natural world; circulation of botanical knowledge; cloves; *Syzygium aromaticum* (L.) Merr. & L.M.Perry.

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DOCUMENTANDO EL MUNDO NATURAL TROPICAL EN EL RELATO DE ANTONIO PIGAFETTA**RESUMEN**

En el relato de su viaje de circunnavegación, Antonio Pigafetta (1492-c. 1531) señaló la singularidad de los lugares que había visitado. Además de pueblos y paisajes, describió árboles, frutos y hierbas, así como insectos, aves, peces y mamíferos. Se refirió a numerosas especies, algunas de las cuales eran nuevas o poco conocidas en Occidente.

En este ensayo, analizaré las referencias de Antonio Pigafetta a las plantas y animales observados durante sus viajes. Las especies registradas en todo el mundo sugieren que era un observador agudo y tenía muchos recursos. Sus observaciones le permitieron describir un mundo que, unido por los océanos, reveló una sorprendente continuidad. Para el italiano, muchas de las especies vegetales y animales que observó en las Américas, en las islas del sudeste asiático o en los vastos océanos eran similares a otras observadas anteriormente, en otras regiones, por viajeros europeos. De las Indias a la costa africana y del Atlántico al Pacífico, el globo navegado por Pigafetta demostró una continuidad nunca antes certificada. Traspasando fronteras establecidas por acuerdos políticos y rutas definidas por intereses comerciales, la descripción de este planeta unificado y circunnavegable contribuyó, a lo largo del siglo XVI, al surgimiento de una nueva forma de entender la naturaleza.

En este artículo buscaré identificar, en algunos tratados de botánica de la Edad Moderna, ecos de esta nueva forma de mirar el mundo natural, propuesta por Antonio Pigafetta.

PALABRAS CLAVES: Fernão de Magalhães; circunnavegación; mundo natural tropical; circulación de conocimientos botánicos; clavos de olor; *Syzygium aromaticum* (L.) Merr. & L.M.Perry.

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DOCUMENTING THE TROPICAL NATURAL WORLD IN THE ACCOUNT OF ANTONIO PIGAFETTA ¹

Antonio Pigafetta (1492-c.1531) was born into a wealthy Vicenzan family and was educated in an environment of some sophistication. His father and uncles owned a notary office in the city. He travelled to Spain in 1519 and arrived in Seville three months before the departure of the Magellanic armada². He likely took advantage of this period of waiting in the Andalusian city to establish contacts, update his reading and gather together documents related to the natural world of the Indies, Brazil and Islands of Central America. Likewise, it is possible that he interviewed voyagers and sailors recently landed following ocean crossings. Antonio Pigafetta joined the crew of the *Trinidad* ship as an assistant to Fernão de Magalhães (1480-1521)³. Without a specific role, he was given a salary which, for a man of his social background, might be considered modest⁴. The observation and recording of the natural world would be one of the facets of the project that, in August, 1519, he was ready to embrace. More than the recording of degrees of latitude or ocean currents, Pigafetta seemed interested in observing peoples, admiring flocks of sea birds, schools of flying fish and marine mammals or describing drugs and spices.

The work he published, in addition to the experience he acquired over the voyage, attests to a sound cultural foundation. It should be remembered that the account known

¹ The original Portuguese version of this essay was presented at the *XVI Simpósio de História Marítima. Fernão de Magalhães e o conhecimento dos Oceanos* (Lisboa: Academia de Marinha, 2019).

² Regarding Pigafetta, see Canova (1999) and Alessandrini (2019: 61-80). See also the Introduction and Bio-bibliographic essay in Pigafetta, (2007: ix-lvi).

³ There has been in-depth research on Fernão de Magalhães and the project he presented to the Spanish king, but this is a subject beyond the scope of this essay. See, among others: Lagoa (1938), Teixeira da Mota (1975), Thomaz (1975), Garcia (2007).

⁴ Antonio Pigafetta earned a monthly salary of 1,000 maravedis (mvds), amongst the lowest wages of the crewmembers. Fernão de Magalhães's salary was 8,000 mvds, the pilot major earned 4,150 mvds and a sailor 1,200 mvds. Apparently, only the cabin boys and pages earned less than Antonio Pigafetta: 800 and 500 mvds respectively. See: Avonto (1992) and Alessandrini (2019: 61-80).

today does not correspond to the voyage journal he wrote⁵. In the time between his return to Seville until the publication of his account, Pigafetta had the opportunity to analyse new documents and deepen his reading, which sanctioned or enriched his extraordinary transoceanic experience. His volume constituted, therefore, a careful write-up of the many notes that he took throughout his ocean crossing⁶. In addition to the texts of Marco Polo⁷, Nicolo de Conti⁸, Montalboddo⁹, Ludovico de Varthema¹⁰ and Americo Vesputio, Pigafetta had access to the reports of agents of the King of Portugal, such as those by Duarte Barbosa and Tomé Pires¹¹. He also made use of texts of a more scholarly nature. Apart from Jean de Mandeville’s work *Voyage autor de la terre*¹², books such as Pliny’s *Natural History*¹³, Ptolemy’s *Geography*¹⁴ or Peter Martyr of Angleria’s *De Orbe Novo*¹⁵ were also present in his study.

⁵ Having returned to Spain, he offered a today lost version of his journal to King Charles V. Throughout this essay I will make frequent recourse to the English version of Antonio Pigafetta’s text which I will refer to in abbreviated form: Pigafetta, (2007): This recent edition by Theodore Cachey Jr is based on the Italian edition of the Ambrosiana manuscript prepared by Canova (1999).

⁶ Regarding the narrative model and the handwritten versions of Pigafetta’s text, see: Canova (1999: 32-35; 2001: 1-34), Pozzo (2005: 426-450), Castro *et al.* (2007: 67-75), Vagnon (2010: 99-111), Alessandrini (2019: 61-80).

⁷ Marco Polo (1254-1324) was a Venetian merchant and explorer who travelled through Asia along the Silk Road between in 1271 and 1295. His travels were recorded in a book that described the Eastern lands, natural resources and cultures to Europeans. His text enjoyed a wide circulation. Pigafetta probably possessed one version of this text.

⁸ Nicolo de Conti (1365-1469) was an Italian merchant, explorer, and writer. He travelled to India and Southeast Asia, and possibly to Southern China, during the early 15th century. His travel account included descriptions of peoples, plants, animals, and other Asian natural resources. The report was incorporated by Poggio Bracciolini in *De varietate fortunae*, Book IV (1544). During the 16th century several versions of de Conti’s account circulated in Europe.

⁹ Fracanzano da Montalboddo (15th century – c. 1510) was an Italian cartographer. He published *Paesi nouamente retrovati* (1507), a collection of texts of travels that enjoyed a wide circulation in Europe.

¹⁰ Ludovico du Varthema (c. 1470-1517) was an Italian aristocrat from Bologna who travelled to Asia. He returned to Europe aboard the Portuguese fleets. The account of his travels, *Itinerario de Ludouico de Varthema Bolognese*, was published in Rome in 1510 and had a wide circulation.

¹¹ Duarte Barbosa (c.1480-1521) and Tomé Pires (c.1465-c.1540). Both spent long periods in the East serving the Portuguese administration. Thanks to the efforts of these royal officials, the kingdom was informed of the regional contours of the East, of its ports and markets, of the lives of its peoples, of the eating habits of its societies and its wealth of natural resources. *The Book* of Duarte Barbosa and the *Suma Oriental* of Tomé Pires unveiled a part of the world hitherto unknown to the West. Their reports contained important cartographic descriptions and new references to peoples, cultures, markets, trade routes and Asian natural resources. They described a wide variety of tropical fruits and presented new descriptions of spices, aromas and other commodities.

¹² John Mandeville (14th century) was the supposed author of the book known as *The Travels of Sir John Mandeville*, a travel memoir which, by 1356, circulated in French. The text was translated into many languages and was very popular. Despite the extremely unreliable and often fantastical nature of the travels it describes, it was used as a work of reference by several European travellers, such as Columbus, Magalhães and many others. Pigafetta probably had access to Magalhães’s reading material. Regarding the probable library of the navigator, see: José Manuel Garcia (2007) or Rui Manuel Loureiro (2019).

¹³ Pliny the Elder (1st century) was a Roman author who wrote *Natural History*, which became an editorial model for European encyclopaedias. Organized into 37 books, this text was a mandatory

This essay focusses on the animal and vegetable species recorded by Pigafetta. Following his account of his voyage from when he set off from Sanlúcar de Barrameda, it will highlight those elements of the natural world which caught the Italian’s eye. Using narrative models of the time, Antonio Pigafetta introduced his readers to a vast circumnavigable world. What he witnessed indicated that, by controlling the transoceanic routes, it was possible to interact and trade with different peoples who, by knowing the natural resources of the regions they inhabited, could bring about a profitable trade in exoticisms and tropical products on a global scale.

Describing novelties

Portuguese and Spanish maritime voyages had been bringing Europe news of the people and natural world of Asia, Africa and America since the middle of the 15th century. The challenges that navigation on the high seas had presented pilots and sailors led to the adoption of important technical innovations on board ships. As a result, sailors and pilots were assigned serious duties which required great accuracy. From observing the height of the stars to recording the natural world, these tasks led a greater appreciation of the experience of these sailors who had no scientific training. Rather than ostentatious textual knowledge, it was everyday “experience” that would contribute to the sailors’ survival. Therefore, personal testimony took on a fundamental role in contemporary accounts of royal agents, pilots, merchants, missionaries or travellers¹⁶.

reference for any European author who wrote about the wonders of nature or natural resources and phenomena. The work was translated into several languages, had a wide circulation and was very popular in Early Modern Europe.

¹⁴ Claudio Ptolomeu (c.100-170 AC) was a mathematician, geographer, astronomer and astrologer from Alexandria. He was the author of important scientific treatises in particular *Geography*, which included a thorough discussion of the geographic knowledge of the Ancient world. By the end of the 15th century, this text was “rediscovered” by European scholars who translated it into Latin. This geographical treatise had several editions and, in the 16th century, was extensively commented on and corrected.

¹⁵ Pedro Martyr of Angleria (1457–1526) was a Milanese Humanist at the service of the Catholic Kings. The letters and pamphlets he sent to princes, bishops, and scholars spread news about the Columbine voyages throughout Europe. In *De Orbe Novo*, Martyr described American natural resources and the first contact between Europeans and Amerindians. The volumes of *De Orbe Novo/Decades* underwent several iterations and were widely disseminated.

¹⁶ This topic goes beyond my analysis. On the role of “experience” in the Iberian empires, see: Pimentel (2001: 17-30), Cañizares-Esguerra (2006), Barrera-Osorio (2006), Domingues (2007: 460-479), Delbourgo and Dew (2008), Bleichmar *et al* (2009), Portuondo (2009), Sánchez (2010: 449-460), Almeida (2011: 381-400), Leitão and Sánchez (2017: 167-186).

The Italian began recording new observations before the armada had even left the Canary Islands behind. The description of an incredible phenomenon -a tree capable of storing water and which was for the people of the *Isla del Hierro* the only source of freshwater available to them- signalled Pigafetta’s intent from the very beginning of his account. The text was meant to be factual and accurate. However, the Italian could not resist recording some natural wonders and unusual facts¹⁷.

Before arriving at the equinoctial line, the fleet was surprised by 60 days of torrential rain. The rain and the storms that Pigafetta witnessed revealed to him that “contrary to the opinion of the ancients” the region was neither dry, nor torrid. (PIGAFETTA, 2007: 7). To state the opposite of what textual tradition held, was more to propose something new than to challenge Antiquity. Pigafetta would note the fragility of the knowledge of the ancients at every opportunity. During the Atlantic crossing, despite the weather and observations of extraordinary phenomena -St. Elmo’s Fire¹⁸- Pigafetta’s records were limited to the peculiarity of some seabirds, schools of flying fish and sharks (PIGAFETTA, 2007: 7-8)¹⁹.

On 13 December, the armada disembarked in *Baia de Santa Lúcia* to stock up on water, food and firewood. Pigafetta wanted to draw attention to his passage through the lands of the King of Portugal. The extraordinary fertility of this land seems to resonate with the reports of other voyagers, such as Colombo or Americo Vesputio, who had described the nature of Central America and Brazil²⁰. Pigafetta began by mentioning plants and animals that he considered useful supplies for the armada or which were already familiar to Europeans through the texts of Michele de Cuneo²¹ or Peter Martyr

¹⁷ Just as Jean de Mandeville’s account recovered so many of the wonders described in the texts of Pliny, Jacques de Vitry and the medieval bestiaries, Antonio Pigafetta’s report brought into view an “extraordinary” new natural world. This point will be taken up later.

¹⁸ This phenomenon was observed at different times during the trip. Considered a blessing by sailors, it was attributed to the protection provided by Saint Elmo, Saint Clare and Saint Nicholas.

¹⁹ Throughout the text, Pigafetta presented somewhat rudimentary descriptions of plants and animals. Given this lack of descriptive details, the accurate identification of the species observed cannot be guaranteed. However, by linking the location of where the species were found, with the morphological or behavioural characteristics described, it is possible to suggest the names of some of the species. It should, therefore, be noted that this identification will always be hypothetical. In many cases I have followed the identification suggested by Castro *et al* (2007). To update the scientific nomenclature, I consulted the websites: <http://www.worldfloraonline.org/> and <https://www.gbif.org/>

²⁰ On the encounter of Europeans with the New Worlds in Early Modern times, see, among others: Chiappelli (1976), Gerbi (1985), Elliott (1992), Pagden (1993), Grafton (1995) and Ladero-Quesada (2008).

²¹ Michele da Cuneo (c.1448–1503) belonged to a family of businessmen, shipowners, politicians, diplomats, and great landowners from Savona, and, as such, was almost a countryman of Columbus. In

d’Angleria. Saving readers from the description of a list of American legumes and vegetables that they might not recognise, he limited his observations to previously described fruits.

“...the *land of Verzin*, [...] where we got a plentiful refreshment of fowls, potatoes, many sweet pine cones (in truth the most delicious fruit that can be found), the flesh of the *anta*, which resembles beef, sugar cane, and innumerable other things, which I shall not mention in order not to be prolix” (PIGAFETTA, 2007: 8).

These references to the Brazilian natural world are simple, but quite important. They reflect some of the tropical plants and animals known in European sources by 1519. The “potatoes”, probably sweet potato / *Ipomoea batatas* (L.) Lam., which, according to Peter Martyr, resembled turnips from Normandy, were taken by Columbus to Isabella I of Castile as proof that he had reached land sailing westwards. The dissemination of *sweet potato* in Europe only became widespread in the second half of the 16th century, so in the 1520’s it would have been little known²². The “sweet pine cones”, probably pineapple / *Ananas comosus* (L.) Merr., had first been referred to in a letter written by Michele da Cuneo, the aforementioned Italian aboard Columbus’ second voyage to Central America, who described it to a friend in 1495²³. The fruit was much appreciated by natives of the New World and by Europeans who had tasted it when landing there. Peter Martyr made reference to the only sample that survived the Atlantic crossing and which king Ferdinand “prefers to all others”²⁴. At the time when Pigafetta mentioned it, the pineapple would have been, for the majority of his European readers, a highly desirable and previously unseen fruit²⁵. The “sugar cane”, probably *Saccharum* L., was the source of a treasure: sugar, a product used in delicious culinary recipes and valuable therapeutic formulations. Apparently, sugarcane was introduced by

1495 he wrote a letter to his friend Girolamo Aimari describing his voyage to Central America aboard Columbus’ ships. For a modern version, see: Gil and Varela (1984: 235–60).

²² On the circulation of these American plants, see: Laufer (1929: 239-251), Laufer (1938), Ferrão (2015).

²³ “There are also some plants that resemble artichoke plants, but are about four times as tall and produce a fruit shaped like a pine cone, but twice the size. Their fruit is excellent and can be cut with a knife like a turnip, and it seems to be very wholesome.” (*Michel de Cuneo’s letter on the Second voyage*, 28th October 1495). See: Carvalho (2020: 9, 89).

²⁴ The Italian chronicler wrote on it: “It is like a pine-nut in form and colour [*sic*], covered with scales, and firmer than a melon. Its flavour [*sic*] excels all other fruits. This fruit, which the King prefers to all others, does not grow upon a tree but upon a plant, similar to an artichoke or an acanthus.” (Martyr of Angleria 1912). See: Carvalho (2020: 9, 89).

²⁵ As a fruit which was highly sensitive to transportation, it would rot during the Atlantic crossings. At this time, the pineapple would only arrive in Europe in a sugar syrup preparation.

the Portuguese into Brazil in 1502-1503 from plants originating in Madeira. In the meantime, its cultivation had been abandoned. The mention of *anta* meat, probably *Tapirus terrestris* (LINNAEUS, 1758), “which resembles beef” and hens suggests a dietary interest shared by Europeans and the indigenous people alike. In Brazil, it is also important to highlight the references to other animals (such as parrots²⁶ and monkeys²⁷) which would later enrich the menageries and private gardens of European aristocrats. These tropical species would become highly sought after and of high commercial value. While on the topic of commercial value, mention must be made of *Pau-Brasil*, probably brazilwood/ *Caesalpinia echinata* Lam., a tree from which a much sought-after red pigment was extracted and which was highly valued in the great weaving cities of Rouen and Antwerp. With the discovery of *Pau-Brasil*, the use of the dye extracted from Asian species declined²⁸. Later, it was overtaken by the widespread use of cochineal coming from Central America. Pigafetta also referred to “swine which have their navels on their backs” (probably *peccaries*) and to “large birds with beaks like spoons and no tongues”, probably roseate spoonbills / *Platalea ajaja* (LINNAEUS, 1758), much admired for their grace and beautiful feathers (PIGAFETTA, 2007: 10).

He also wrote of the trade conducted with local populations, with birds, fish and other food products being exchanged for work utensils, mirrors and trinkets.

“For one fish hook or one knife, those people gave five or six chickens; for one comb, a pair of geese; for one mirror or one pair of scissors, as many fish as would be sufficient for ten men; for a bell or a lace, one basketful of potatoes (these potatoes resemble chestnuts in taste, and are as long as turnips); for a king of diamonds, which is a playing card, they gave me six fowls and thought that they had even cheated me” (PIGAFETTA, 2007:8).

Before leaving the lands of Brazil, Pigafetta included a short vocabulary that could be of use in future commercial trade. It is noteworthy that the words listed were,

²⁶ These birds were highly appreciated for their ability to talk and for their colourful feathers. Described on the Banda Islands by Nicolo de Conti, admired in Brazil by Pero Vaz de Caminha, spotted on the islands of the Caribbean by Columbus and mentioned in Ternate by Tomé Pires, these birds seemed to fill the tropical skies with sound and colour.

²⁷ Probably the golden lion tamarin – *Leontopithecus rosalia* (LINNAEUS, 1766).

²⁸ It is important to note that, like previous descriptions, Portuguese cartography also associated Brazil with the same products. In *Atlas Miller* (c.1519), attributed to cartographers Lopo-Homem-Reineis, the contours of *Terra Brasilis* was associated with half-naked natives, colourful parrots, small monkeys and brazilwood forests.

above all, the names of utensils brought from Europe. (PIGAFETTA, 2007: 11)²⁹. These could be used in subsequent journeys to acquire local products

After having passed *Rio de la Plata* (where he referred to seven small islands rich in precious stones), Pigafetta described, further south, the incredible population of “geese and sea wolves”, probably the Magellanic penguin/ *Spheniscus magellanicus* (FORSTER, 1781) and the Patagonian sea lion/ *Otaria flavescens* (SHAW, 1800).

“Then proceeding on the same course toward the Antarctic Pole, coasting along the land, we encountered two islands full of geese and sea wolves. Truly, the great number of those geese cannot be told; in one hour we loaded the five ships [with them]. Those geese are black and have all their feathers alike both on body and wings, and they do not fly and live on fish. They were so fat that it was necessary to skin them rather than to pluck them. Their beak is like that of a crow. The sea wolves are of various colours, and as large as a calf, with a head like that of a calf, ears small and round, and large teeth; they have no legs but only feet with small nails attached to the body, which resemble our hands, and between their fingers the same kind of skin as the geese. They would be very fierce if they could run; they swim, and live on fish” (PIGAFETTA, 2007: 12).

When Magalhães’s fleet passed through, the penguin populations must have been considerable. The similarity to other populations of this bird species observed at approximately the same latitude, at the Southern tip of the African continent in the region of *Cape Agulhas*, might have motivated Pigafetta to record the presence of these animals in such a similar way.³⁰ The oneness of the Earth seemed to be evident in its manifestations. In addition to the resemblance of animal species observed on both sides of the Atlantic, atmospheric phenomena also repeated themselves. As Pigafetta highlighted, St. Elmo’s, St. Nicholas’ and Saint Clare’s fires illuminated the skies of all the oceans navigated.

²⁹ Throughout his work, Pigafetta recorded four different vocabularies: from Brazil, Patagonia, the Philippines and Indonesia. For an analysis of the terms collected, see: Cardona (1976: 32-33) and Canova (2001: 1-34).

³⁰ In *Roteiro de Vasco da Gama*, we read: “And on this island [*Seal Island/Mossel Bay*], there are many fur seals, and they are as big as very large bears, and they are fearful and have very big teeth.” [...] “And on this island there are some birds the size of ducks, and they do not fly because they have neither feathers nor wings, and they call them “*fortilicaios*” and we killed as many as we wanted...” (*Roteiro da viagem de Vasco da Gama*, 1999). Although the reference does not mean that Pigafetta knew this account in particular, it is important to point out that Magalhães had already travelled through the south African region, so he might have witnessed these animals at similar latitudes on the other side of the South Atlantic.

It was with much amazement that, a little further south, Pigafetta described the giants of Patagonia³¹. The Patagonians wore the very soft skin of the guanaco, probably *Lama guanicoe* (Müller, 1776), a common animal in Patagonia³²- and ate a diet of flour made from the roots of a grass, probably cassava³³. It was during his stay in *Port de San Julián* that Pigafetta referred to the “ostriches³⁴, foxes³⁵, sparrows” and other animals of the region that might be of interest for their eggs, feathers or hair (PIGAFETTA, 2007: 17).

The voyagers also established commercial trade in this region: animals for jingle bells, mirrors, clothes or caps, reflecting the interest of the indigenous people in the objects that the Europeans had taken with them. The lexis noted here far exceeded the half dozen words recorded in Brazil. The presence of a native on board seems to have helped register a wide range of terms. Of the almost one hundred words listed, while some related to animals (ostrich, goose, fish, dog, wolf, parrot and *missiglioni*), there is not a single reference to the vegetable world (PIGAFETTA, 2007: 21-22).

During the crossing of the Strait, the rigors of the climate and the difficulties of navigation seem to have distracted the voyager from his observation of the natural world. Apart from some whales which were travelling through the region, Pigafetta referred only to fur seals and some very large birds -probably yellow- crested penguins or royal penguins.

About the *Strait of Patagonia*, he wrote:

“We called that strait the ‘strait of Patagonia’ where one finds the safest of ports every half league in it, excellent waters, the finest of wood (but not of cedar), fish, sardines, and *missiglioni*, while smallage, a sweet herb (although there is also some that is bitter), grows around the springs, of which we ate for many days as we had nothing else. I believe that there is not a more beautiful or better strait in the world than that one” (PIGAFETTA, 2007: 20).

³¹ The term used to describe these *Tehuelche* populations is suggestive of Pigafetta’s reading. See: Lida de Malkiel (1952: 321-323) or Pigafetta (2017: 231-233).

³² In his *Travels*, Jean de Mandeville also described the encounter with giants. In his book, Polo also made reference to the encounter with extraordinary men. Giants, cynocephalus, cyclopes and other fantastic creatures, were frequently referred in ancient and medieval literature, folklore and mythology. See: Bane (2016).

³³ According to Pigafetta, the native people ate a flour they called “capac”. It is difficult to say what this was exactly, though it was probably a flour of the *Manihot esculenta* Crantz variety.

³⁴ When he saw the rheas - *Rhea americana* (LINNAEUS, 1758) - Pigafetta recorded them as ostriches, the African running birds which were highly valued for their feathers and extraordinary eggs. Once again, the oneness of the natural world is suggested.

³⁵ It is difficult to identify with precision the species of this Patagonian fox.

The only plant mentioned was a kind of celery that was the only food (fresh or preserved in vinegar) that the seafarers consumed³⁶. It was thanks to this grass that the mariners withstood the hunger, disease and hardships of the crossing³⁷. Perhaps for Pigafetta, this “sweet herb” which was provided them, reminded him of the episode from the Holy Scriptures³⁸. This difficult and long-lasting crossing recalls the *Exodus*, the Biblical episode in which Moses led his people, over a 40-year period, out of Egypt to the *Promised Land*³⁹. During this long passage of a seemingly endless desert, the people fed themselves exclusively on a sweet resin, named *manna*⁴⁰.

Other seas, other lands; an endlessly new natural world

Upon arriving in the immense Pacific Ocean, Pigafetta described a striking episode in which the protagonists were shoals of flying fish⁴¹. This species observed at the entrance to the Pacific, probably different from the Atlantic species previously described, seemed to justify the inclusion of the narration.

“In that Ocean Sea one sees a very amusing fish hunt: the fish [that hunt] are of three sorts, and are one cubit and more in length, and are called dorado, albicore, and bonito, which follow the flying fish called *colondrini*, which are one span and more in length and very good to eat. When the above three kinds [of fish] find any of those flying fish, the latter immediately leap from the water and fly, as long as their wings are wet, more than a crossbow’s flight. While they are flying, the others run along behind them under the water following the shadow of the flying fish; the latter have no sooner fallen into the

³⁶ Ginês de Mafra, a sailor and a survivor of the Magellanic expedition, also referred to this vegetable species. It is probably *Apium australe* Thouars, an abundant species in the Strait and which the seafarers consumed fresh or preserved in vinegar. For some scholars, the high Vitamin C content may have allowed the seamen and crew to survive the Pacific Ocean crossing. Cunningham, who travelled through the strait in the 19th century, noted the abundance of *Apium graveolens* L. there. Cunningham (1871: 118-119).

³⁷ It should be noted that, with the desertion of the *San Antonio*, food reserves became substantially reduced.

³⁸ This passage through the Strait lasted almost 40 days (from 21/10 to 28/11/1520).

³⁹ Similarly, Fernão de Magalhães led the expedition from the Atlantic to the Pacific Ocean and to the Spice Islands.

⁴⁰ “An edible white honeylike substance known as *manna* forms drops on the stem of salt cedars, or French tamarisk trees (*Tamarix gallica*) which came from heaven.” <https://www.britannica.com/science/manna-resin>

⁴¹ The symbolism that the Europeans of this period conferred on flying fish was relatively consensual. Artists like Bosch (c. 1450-1516) represented several flying fishes in paintings as *The temptation of St. Antony* (1502). Apparently unsatisfied with being merely a swimmer, the flying fish wanted to fly. This description, read as a metaphor, could symbolise the ambition of those “sailors” – like Magalhães, Elcano or Pigafetta – who, after passing the Strait, “in addition to swimming, also wanted to fly” and reach the spice islands.

water than the others immediately seize and eat them: it is a truly beautiful thing to see (PIGAFETTA, 2007: 20-21).

The ocean crossing, which lasted 3 months with no stops for water or replenishing of firewood and fresh food, wore down the sailors. Without sightings of new lands, Pigafetta turned his attention to the firmament, noting the rarity of the stars in the Antarctic skies. In the absence of the *Polar star*, a “new” southern constellation guided the pilots. The absence of the Polar in Southern skies had already been noticed by other travellers like Marco Polo, Mandeville, Nicolo de Conti or Americo Vespucci. The Portuguese sailors used a four stars constellation to guide them in the Southern hemisphere: The Crux (*cruzeiro do Sul*)⁴².

Passing through the “Islands of Thieves”, the Italian referred to the local consumption of “coconuts⁴³, potatoes⁴⁴, birds, figs a span in length [bananas]⁴⁵, sugar cane, and flying fishes besides other things” (PIGAFETTA, 2007: 28). Just as had happened in the region of Brazil, Pigafetta referred to the natural products which, in Europe, were considered rare and about which most readers would have only known through their reading. The arrival at the Philippines archipelago introduced a surprising array of natural products into Pigafetta’s account. Despite the dramatic episodes which took place there - including the death of Fernão de Magalhães - which affected the course of the expedition, the narrative overflows with the colours, aromas, flavours and textures provided by local products. Pigafetta also collected and recorded a wide-ranging vocabulary from Cebu, where there was a plentiful supply of rice, millet, ginger, bananas, oranges, lemons, sugarcane, potatoes, honey, coconuts, jackfruit, palm

⁴² Referred to by Alvise Cadamosto at the Gambia river (c.1455), it appears that João Faras was the first European to depict this constellation correctly. Faras sketched and described the constellation in a letter sent to the Portuguese monarch, D. Manuel I (1 May 1500).

⁴³ Probably the fruit of *Cocos nucifera* L.. Due to their enormous importance for Eastern peoples, the coconuts had already been described by Marco Polo, Nicolo de Conti, Ludovico de Varthema, Duarte Barbosa or Tomé Pires. The similarity of Pigafetta’s account with other texts in circulation at the time has been noted by Sanz (1975: 381-409) and Canova (2001: 1-34).

⁴⁴ Pigafetta gives no description, which makes it difficult to know if he was referring to yam (*Dioscorea* L.) or sweet potato (*Ipomoea batatas* L.), a species of Andean origin that might have been taken to the Pacific archipelago at an early date.

⁴⁵ The banana had already been introduced into the New World by Columbus from the Canaries. It would have been known by some Europeans since it was present on the Mediterranean and North African coasts. Was Pigafetta referring to the banana? Or the cooking banana? Recent studies reveal that the banana had been grown and consumed on several Indonesian islands since ancient times. The voyager might, after all, have been confronted with a local variety which, however, did not surprise him. Nicolo de Conti alluded to the banana during his tour of India; Duarte Barbosa stopped to describe it in the Mombasa region and Ludovico de Varthema described those he saw in Calicut

wine, gold and meat of varying quality⁴⁶. Products that could be used to replenish the ships as well as for bartering. In Palawan, he remarked on the cockerels, which were larger than European ones, and whose fights he enjoyed⁴⁷. He also mentioned the rice liquor which he described as stronger as and better than the palm wine. In Borneo, referred to the habit chewing betel and mentioned the value of this masticatory in the establishment of diplomatic relations⁴⁸.

On one of the small islands in the Celebes Sea, Pigafetta saw some strange and previously undescribed animal and plant species:

“In that island there are wild boars, of which we killed one that was going by water from one island to another [by pursuing it] with the small boat; its head was two and one-half span long, and its teeth were large⁴⁹.

There are large crocodiles there, both on land and sea, oysters and shellfish of various kinds; among the last named we found two, the flesh of one of which weighed twenty-six pounds, and the other forty-four⁵⁰.

We caught a fish that had a head like that of a hog and two horns; its body consisted entirely of one bone, and on its back it resembled a saddle; and it was small⁵¹.

There are also found trees that produce leaves. When they fall they are living and walk about. Those leaves are very similar to those of the mulberry, but are not so long. On both sides near the stem they have two feet. The stem is short and pointed. They have no blood, but if one touches them they run away. I kept one of them for nine days in a box. When I opened the box, that leaf went round and round it. I believe those leaves live on nothing but air⁵²” (PIGAFETTA, 2007:76).

The allusion to each of these extraordinary creatures, comparable to others which feature in medieval bestiaries, in Pliny's text or even in the accounts of Mandeville, Marco Polo and Nicolo de Conti, kept the link between tradition and modernity alive. The wonders of the East never failed to fascinate the Italian.

It was as an eye-witness that Pigafetta described Asian drugs and spices.

It was on the island of Mindanao that Pigafetta encountered cinnamon⁵³

⁴⁶ For an analysis of this list, see: Canova (1999: 249-257).

⁴⁷ These cockfights had already been described by Marco Polo and Nicolo de Conti.

⁴⁸ The use of this masticatory, so common in the East, was described by many voyagers, chroniclers, apothecaries and Western doctors. Regarding this product, see: Loureiro, (2006: 49-63).

⁴⁹ Probably babirusa/ *Babyrousa babyrussa* (LINNAEUS, 1758).

⁵⁰ Probably a giant clam/*Tridacna gigas* (LINNAEUS, 1758).

⁵¹ Probably a boxfish/ *Lactoria cornuta* (LINNAEUS, 1758).

⁵² Probably insects of *Phyllium* genus.

⁵³ Probably *Cinnamomum burmanni* (Nees & T.Nees) Blume. The Ceylan cinnamon (*Cinnamomum verum* J.Presl.) was one of the most valued spices in European markets. The description of this aroma was presented by Nicolo de Conti, Ludovico di Varthema or Duarte Barbosa.

“The cinnamon tree grows to a height of three or four cubits, and is as thick as the fingers of the hand, and it has but three or four small branches. Its leaves resemble those of the laurel; its bark is the cinnamon. It is gathered twice per year. The wood and leaves give off as strong an aroma as the cinnamon when they are green. Those people call it *caiumana*: *caiu* means ‘wood’, and *mana*, ‘sweet’, hence, ‘sweet wood’ (PIGAFETTA, 2007:78).

Much like Ludovico de Varthema, Nicolo de Conti or Tomé Pires, Pigafetta described other valuable spices such as nutmeg (*Myristica fragrans* Houtt), ginger (*Zingiber officinale* Roscoe), and pepper (*Piper* L.). The commercial importance of these commodities led him to describe them in some detail⁵⁴.

Illuminated once more by St. Elmo’s, St. Nicholas’ and St. Claire’s fires and guided by the expertise and knowledge of two local pilots, the expedition continued on its route. The proliferation of the novelties revealed by nature seemed to prepare the reader for the revelation that was approaching: the imminent arrival at the Maluku Islands.

At last the Maluku islands...and its precious cloves

In this section of the text, when describing the landing at Tidore, Pigafetta’s testimony should be regarded, in the eyes of its readers, as both credible and reliable. His previous narrative, all the experiences recorded, all the peoples and cultures thus far described should be sufficiently plausible for the reader to trust what he was about to attest to. This Italian was, after all, the first European to land in Tidore, heading West. As Pigafetta wrote, these were the only islands where the clove plant grew⁵⁵. As if to

⁵⁴ For a description of Asian spices, see: Nutmeg (PIGAFETTA, 2007: 93); Ginger (PIGAFETTA, 2007: 100); Pepper (PIGAFETTA, 2007: 114-116).

⁵⁵ The clove – *Syzygium aromaticum* (L.) Merr.&L.M.Perry – the objective of the expedition, was one of the most valuable spices. Due to its antiseptic, anaesthetic and aromatic qualities, it had been used, since ancient times, in several therapeutic formulations. Coming from distant lands, it was displayed on the dining tables of the rich as a sign of wealth and sophistication. Until the beginning of the 16th century, Europeans had disregarded the exact region of origin of the clove, limiting their knowledge to scholarly reports and geographers such as Iconoplustes, Ibn Batuta, Al Idrisi and Al Mansuri. The texts of Marco Polo and Nicolo de Conti were vague when it came to information on the origin of the clove, but they situated the islands of Southeast Asia as the area of production of this valuable spice. The first description of the clove plant was published in Varthema’s *Itinerario*. The reports of Duarte Barbosa, Tomé Pires and of other Portuguese who had visited the Maluku islands in the meantime, such as Jorge de Albuquerque, remained handwritten. Regarding the information on cloves in circulation, see: Lagoa (1938); Thomaz (1975: 29-48), Silva (1987: 135-146), Thomaz (1995: 219-345), Pearson (1996), Lobato (1999: 104-130), Donkin (2003), Carvalho (2017: 189-212).

emphasise to his readers the significance of the first description of cloves conducted first hand by a westward-bound voyager arriving at the Maluku islands, he writes: “That same day, I went ashore to see how the clove grows” (PIGAFETTA, 2007: 92)⁵⁶.

Unlike on other occasions, when he had made it clear that he had disembarked alongside Magalhães, on that day more than six months after his death, the Italian told his readers that the ownership of this first *live* description belonged to him.

He goes on to describe the clove tree:

“The clove tree is tall and as thick as a man’s body or thereabout. Its branches spread out somewhat widely in the middle, but at the top they have the shape of a summit. Its leaves resemble those of the laurel, and the bark is olive coloured.⁵⁷ The cloves grow at the end of the twigs, ten or twenty in a cluster. Those trees have generally more cloves on one side than on the other, according to the weather conditions.⁵⁸ When the cloves sprout they are white, when ripe, red, and when dried, black⁵⁹ [...] Those trees grow only in the mountains, and if any of them are planted in the lowlands near the mountains they do not survive. The leaves, the bark, and the green wood are as strong as the cloves.⁶⁰ If the latter are not gathered when they are ripe, they become large and so hard that only their husk is good”⁶¹.

He adds: “Almost every day we saw a mist descend and encircle now one and now another of the mountains [where the cloves grow], on account of which those cloves become perfect”⁶² (PIGAFETTA, 2007: 92-93).

After referring to the natural riches of the island he adds:

⁵⁶ In some versions of Pigafetta’s text, the day of the week is identified: “En ce jour de dimanche je m’en allais à terre pour voir comment naissent les clous de girofle.” Castro *et al* (2007: 184).

⁵⁷ This observation is correct as, in this species, the branches grow vertically, creating 45° angles. Ferrão (1993: 103-138).

⁵⁸ This is an interesting observation since floral buds develop more in the parts exposed to the sun. Ferrão, (1993: 103-138).

⁵⁹ This change in colour was previously noticed by Varthema and by Portuguese reporters.

⁶⁰ The essential oil extracted from cloves is particularly rich in eugenol. Eugenol - an aromatic compound that gives the spice its characteristic aroma - is present in the different organs of the plant. It is at its most concentrated in the flower buds immediately before the opening of the flowers. This compound is also found in the vegetative organs of other tropical species, which led some navigators arriving in new lands to identify them mistakenly as clove trees. See: Ferrão (1993: 103-137), Cunha *et al* (2009: 254-265; 2015: 40-43).

⁶¹ When the flower buds are not harvested, a fruit called “mother clove” is produced. This fruit has a smaller amount of eugenol and, as such, is of less commercial value. However, being heavier, many traders mixed it with flower buds to deceive buyers. The agents of John III of Portugal, such as Francisco Palha, António Galvão or Gabriel Rebelo, would later become more aware of these matters.

⁶² This ecological peculiarity explains, in part, the unique conditions of growth of the spice in these islands.

“One also finds there parrots of various kinds, and among the other varieties, some white ones called *cathara*, and some entirely red called *nori*; one of those red ones is worth one bahar of cloves, and that class speaks with greater distinctness than the others” (PIGAFETTA, 2007:101-102)⁶³.

As before, Pigafetta carried out an extensive survey of terms used locally. In this his most comprehensive lexicon, he included everyday terms, parts of the body, numbers, plants, animals and the names of natural resources. (PIGAFETTA, 2007: 102-109).

Apart from these valuable spices, Pigafetta listed the exotic presents that were sent from the King of Tidore to Charles V.

“He [the king of Tidore] sent to the king of Spain a slave, two bahars of cloves (he sent ten, but the ships could not carry them as they were so heavily laden), and two extremely beautiful dead birds as presents. Those birds are as large as stock doves, and have a small head and a long beak; their legs are a span in length and as thin as a reed, and they have no wings, but in their stead long feathers of various colours, like large plumes; their tail resembles that of a stock dove; all the rest of the feathers except the wings are of a tawny colour; they never fly except when there is wind. The people told us that those birds came from the terrestrial paradise, and they call them *bolon diuata*, that is to say, ‘birds of God’” (PIGAFETTA, 2007: 99)⁶⁴.

Apart from these well-known products, confronted with a huge fruit “larger than a cucumber” floating in the water- probably *coco-de-mer*, the seed of *Lodoicea maldivica* (J.F.Gmel.) Pers. - Pigafetta reprised a “legend” described by Marco Polo⁶⁵. According to this legend, a mythical bird named *Garuda*, was capable of lifting elephants into the sky and building its nest at the top of a giant tree.

“They also told us that a very huge tree is found below Java Major toward the north, in the gulf of China (which the ancients call *Sinus Magnus*), in which live birds called *garuda*, which are so large that they carry a buffalo or an elephant to the place of that tree called *puzathaer*, and the tree is called *caiu pauganghi*, and its fruit *bua pauganghi*: the latter is larger than a cucumber” (PIGAFETTA, 2007:120).

⁶³ Like in Brazil, these wonderful birds with colourful feathers attracted Pigafetta.

⁶⁴ Prior to Pigafetta, Nicolo de Conti and Tomé Pires had referred to these extraordinary birds. Throughout the sixteenth century, chroniclers and travellers wrote of these wonderful and precious birds that, being so rare, reached a high commercial value. For more information on the importance of these birds in Early Modern Europe, see: Marcaida (2014).

⁶⁵ During the 16th century this prodigious coconut seed become one of the most envied pieces of the *Kunstcammers* of kings, prelates and aristocrats. On *Lodoicea madivica*, see Carvalho and Fernandes (2011: 153-162). On Renaissance collections of *naturalia* and *artificialia*, see: Olmi (1992), Findlen (1994), Daston and Park (1998) or Mason (2009).

The visual evidence of seeds of such large dimensions floating in the seas led the Italian to allow for the reliability of the myth. Just as when, departing from the Canary Islands at the beginning of his account, Pigafetta had written of a wonder of the vegetable world - a tree that was locally famous for distilling water - when leaving the islands of Southeast Asia, he allowed for the existence of a tree which, due to the unusual size of its “fruits”, made the belief of the local peoples possible⁶⁶. In Pigafetta’s account, new plants and animals, incredible creatures and astonishing phenomena punctuated the journey. The extraordinary expedition which, for unforeseen reasons, went far beyond the initial scope of Fernão de Magalhães, revealed the undeniable unity and continuity of the circumnavigable world. United under different skies and several oceans, peoples all around the world could, from the 1520’s onwards, communicate, share experiences and trade.

As Pigafetta wrote,

“On Saturday, 6 September 1522, we entered the bay of Sanlúcar with only eighteen men, and the majority of them sick. [...] From the time we left that bay [of Sanlúcar] until the present day [of our return], we had sailed 14,460 leagues, and furthermore had completed the circumnavigation of the world from east to west” (PIGAFETTA, 2007:126).

The world as one: echoes of Pigafetta’s account in some botanical texts

Maximilianus Transilvanus, the secretary of Charles V of Spain (1500-1558), had the opportunity to interview the recently-arrived survivors about their long expedition⁶⁷. In order to narrate such a great feat to the Cardinal of Salzburg, and to send him some of the exoticisms which had just been unloaded from the ship *Victoria*, Transilvanus wrote a detailed letter in 1522. Written in Latin, the document was printed in Cologne in 1523. As was to be expected, it achieved immense success among a wide-ranging readership. In the 1530s, the Italian versions of Transilvano’s and Antonio Pigafetta’s texts were brought together in *Viaggio fatto da gli spagnoli*. Later, in 1550, new versions of these testimonies were published in Venice by Giovanni Battista Ramusio in his collection of

⁶⁶ On this topic, which goes beyond my analysis, see: Canova (2001: 1-34).

⁶⁷ Maximilianus Transilvanus (c.1490-c.1538) was a relative of Christopher de Haro, one of the sponsors of the Magellanic expedition. He had the opportunity to interview each survivor of the circumnavigation voyage. Pigafetta’s report was the main source about this global expedition (1519-1522).

voyages: *Delle Navigatione et Viaggi*. Although various versions on this voyage of circumnavigation circulated in Europe and, with them, much new information on the Asian drugs and spices was disseminated; the scholarly community awaited the disclosure of new botanical knowledge duly validated by the authorities at the service of the King of Portugal⁶⁸. Perhaps having these imperial commitments in mind, Pier Andrea Mattioli (1501-1577), one of the most prominent commentators on the *De Materia Medica* of Dioscorides, exhorted the Portuguese physicians to present authoritative descriptions of the Asian drugs, spices and other natural resources⁶⁹.

The task of describing the morphology, qualities and characteristics of the plants and drugs of the East would fall, then, to Portuguese doctors. As such, despite news about drugs of the Indies circulating in Western ports, markets and trading houses, European scholars greeted them with some reservation, and waited for the validation of the new knowledge by Portuguese physicians⁷⁰. Born in Castelo de Vide (Portugal) into a family with a Jewish background and a graduate of the universities of Salamanca and Alcalá de Henares, Garcia de Orta (c. 1500-1568) left for the Orient in 1534 as the private physician of Captain-General Martim Afonso de Sousa. There, he had the chance to visit local courts and to look around markets, where he saw products and asked traders about the qualities, prices and distribution routes of the goods. From 1538

⁶⁸ The *Treaty of Tordesillas*, signed in 1494 by the representatives of the monarchs of Portugal and Castille, divided the newly-discovered lands outside Europe between the Portuguese empire and the Crown of Castille along a meridian 370 leagues west of the islands of Cabo Verde. The lands to the east, would belong to the Portuguese kingdom; the lands to the west, belonged to Castile. The royal agents and scholars at the service of each peninsular crown ought to manage and validate the descriptions of peoples, lands and natural resources of each part of the world. As recently argued, Early Modern botany profited from colonialism and long-distance trade. According to Londa Schiebinger and Claudia Swan, the development of botany and Europe’s commercial and territorial expansion were closely associated with one another: Schiebinger & Swan (2006); Carvalho (2017: 187-212). However, the exact location of the longitude of the Moluccas archipelago – the Spice islands - was at that time impossible to determine by astronomic measures or mathematical calculations. Determining the location of the Anti-meridian defined by the Tordesillas Treaty needed a political solution. It was “solved” some years after the return of the Magellanic expedition by the *Treaty of Zaragoza* (1529). On these questions, see, among others: Denucé (1911), Teixeira da Mota (1975), Lobato (1999), Donkin (2003), Thomaz (1975), Garcia (2007).

⁶⁹ Pedanius Dioscorides (1st century AD) was a Greek physician. He wrote the important pharmacopoeia *De Materia Medica*, which describes about 600 plants, some animals and mineral substances. This treatise on *Materia Medica* was revised, corrected and commented on several times in Early Modern times. Mattioli, like Jean de Ruelle, Andrés de Laguna, Amato Lusitano or Valerio Cordo, were some of the European doctors that commented on, translated and revised this Ancient pharmacopoeia.

⁷⁰ As mentioned, after signing the Zaragoza Treaty, the Portuguese Crown had a new mission to accomplish: sponsorship for gathering new knowledge about the Far Eastern archipelago’s natural resources. Similarly, the Castilian physicians were to describe and test the properties of American plants and animal products. See: López-Piñero and Pardo-Tomas (1994), Goodman (1988), López-Piñero (2002), Cañizares-Esguerra (2006), Schiebinger and Swan (2006), Pardo-Tomas (2007: 173-193); Bleichmar *et al* (2009), among others.

he took up residence in Goa. There he set up a clinic, saw patients and managed a steady business and a wide network of contacts, comprised of royal agents, traders, missionaries and voyagers who entrusted him with the secrets and products they brought him from across the Orient. It was in this way that Orta accumulated, over a 30-year period, experience, knowledge and a wealth of information. He organised this valuable collection of data in *Colóquios dos Simples e Drogas e Coisas Mediciniais da India* (Goa: João de Endem, 1563)⁷¹.

As the clove was the spice that motivated the Magellanic voyage which, in addition to reaching the Moluccas sailing westwards, resulted in a feat of planetary dimensions, I looked in Orta’s chapter on the spice, for echoes of Pigafetta's story. In Colloquy 25, Orta presented the first modern monograph entirely devoted to cloves (ORTA, 1913: 213-221). It includes references to a wide range of authors such as Pliny, Paulo of Aegina, Galen, Aecio, Serapion, Avicenna, Razis, Mesue or Ruelius. In addition to these texts, Orta relied on the information recorded by several Portuguese agents, namely Francisco Rodrigues, Duarte Barbosa, Tomé Pires, António Galvão or Gabriel Rebelo⁷².

About Magalhães’s project, he wrote:

“Orta – You must know that Maluco is within the line of Portuguese conquest, which extends 200 leagues further, as has been proved by observing eclipses. But the devil entered into a Portuguese, [Fernão de Magalhães] who, because the king would not grant him an unjust favour for which he asked, when over to Castille, fitted out armed ships, and discovered a strait, before unknown, which lead by another route to Maluco” (ORTA; 1913: 215-216).

In *Colóquios dos Simples*, following this political and commercial partition of the world, the physician appears to assume that any new information regarding cloves (or any other Asiatic product) should be validated based on the knowledge collected by officers of the King of Portugal. The recording of news on the drugs, spices and natural

⁷¹ On Garcia de Orta and his work, see: Ficalho (1886), Carvalho (1934: 61-246); Boxer (1963), Loureiro (2012: 41-72), Pimentel and Soler (2014: 101-120), Carvalho (2015), Pardo-Tomas (2016: 195-212) or Brentjes (2016): 95-136.

⁷² António Galvão (1490-1557) and Gabriel Rebelo (? – c.1566), two Portuguese who served in the Moluccas, wrote two reports about the archipelago: *Informação das cousas de Maluco* (c.1544) and *História das Ilhas de Maluco* (c. 1561) respectively. These texts remained handwritten until the 19th century. On the handwritten sources of *Colóquios dos Simples*, see: Loureiro (2012: 41-72) and Carvalho (2013: 13-28).

resources of the East was, therefore, the responsibility of agents of the Portuguese crown⁷³. The task of managing and authorising the establishment of new knowledge regarding the natural products of the East Indies would fall to these men.

In 1567, Clusius (1526-1609), a renowned Flemish botanist, published *Aromatum et Simplicium* in Antwerp. This book was the Latin epitome of Garcia de Orta’s work. The volume, which had successive editions and translations until the end of the century, widely disseminated and commented on the knowledge shared by Orta. In the chapter dedicated to *garyophyllum*, Clusius reorganised the information brought together by the Portuguese physician⁷⁴. Even if he did not add any new information about cloves, he introduced a drawing of a clove branch and leaf and, at the end of the chapter, included a reference to Pigafetta’s text. This was the first explicit allusion to the account of the Italian in a text about Asian natural resources.

In the 1570’s, Juan Fragoso, physician at Philip II’s court, and Cristóvão da Costa, physician at Burgos, published their own versions of Garcia de Orta’s *Colóquios*. Neither of these Portuguese physicians made any explicit reference to Pigafetta’s account⁷⁵. Unlike Fragoso, who never left Iberia, Costa travelled to India in 1568 as the private physician of D. Luis de Ataíde (g. 1568-1571). He was appointed doctor at the Royal Hospital of Cochin [Hospital Real de Cochim]. Like Orta, his remarkable ability to communicate with the local people and to observe other medical practices enabled him to present a completely new treatise on Asian plants. With *Tractado de las Drogas*, European scholars became aware of a more accurate description of the clove tree. By the 1570’s, Costa’s testimony on Asian spices and drugs was much more comprehensive than Pigafetta’s descriptions⁷⁶.

Jacques Daléchamps (1513-1588) welcomed the testimonies of the Portuguese doctors and Clusius with equal interest. As such, in his voluminous *Historia Generalis Plantarum* (Lyon, 1586-1587), in order to describe the drugs and spices of the East, the

⁷³ However, some local names of spices and aromas are similar in Orta’s and Pigafetta’s texts.

⁷⁴ On the appropriation of *Colóquios dos Simples* by the Flemish botanist, see: Lopes (2006: 28-39) and Egmond (2016: 167-194).

⁷⁵ Their works were: Juan Fragoso, *Discurso de las cosas aromaticas, arboles y frutales y de otras muchas medicinas simples que se traen de la India Oriental...* (Madrid, 1572) and Cristóvão da Costa/Cristóbal Acosta, *Tractado de las Drogas y Medicinas de las Indias Orientales con sus plantas debuxadas al vivo...* (Burgos, 1578).

⁷⁶ Costa’s work was translated into French and Italian in the late 16th century. A Latin version was published in 1582. On Costa’s work, see: Rodríguez-Nozal & González-Bueno (2000), Carvalho (2006: 28-39), Pardo-Tomas (2016:195-212).

works of Garcia de Orta, Juan Fragoso, Cristóvão da Costa and Clusius appear side by side⁷⁷. However, the logic of the organisation of this botanical encyclopaedia still consigned the tropical plants to a separate section – Chapter XVIII, dedicated to *De Plantis Peregrinis*. Considered exotic, the drugs, spices and plants of the Indies, Brazil and Central America would remain separate from European ones. A legacy of Antiquity, this Eurocentric view of nature, and of the world, remained deeply rooted in the mentality of Western scholars⁷⁸.

Pigafetta’s legacy: the oneness of the plant world

Europe needed to wait until the 17th century to discover this global way of looking at the natural world that Pigafetta proposed. During the 16th century, other authors presented global analysis of the human bodies or *bird eyed views* of the continents and oceans⁷⁹. In the beginning of the 1600s, *Pinax Theatrum botanicum* put forward a new reading of the vegetable world. Authored by Gaspard Bauhin (1560-1624) it offered a completely different way of observing and organizing the flora of the world. Fruit of a long undertaking of compilation work and of almost 40 years’ reflection on the order of Creation, Bauhin proposed a global reading of the botanical world. The botanist described a natural world in which plants were organised according to anatomical similarities, morphological characteristics or sensorial likeness; a view in which the organisation of plants did not depend on political treatises, imaginary lines and regional powers or even on the control of trade routes.

In 1623, Caspard Bauhin seems to have grasped this global reading of the world proposed by Pigafetta. Therefore, one hundred years after the widespread dissemination of Pigafetta’s account by Maximilianus Transilvanus, the voyage around the world he described seems to have had an impact on how scholars of the 1600s relearnt how to look and organize herbs, shrubs and trees.

⁷⁷ In the 17th century, the work was translated into French by Jean de Moulins, *Histoire Générale des Plantes*, Paris, 1625.

⁷⁸ In 1605, Clusius published *Exoticorum libri decem*, a compilation of Latin versions of medico botanical texts of *materia medica* from the Indies and the Levant. Apparently, for Clusius, the tropical and European floras should be treated separately.

⁷⁹ I am referring to Andrea Vesalius, *De Humanum Corporis Fabrica* (Basel, 1543) or Abraham Ortelius, *Theatrum Orbis terrarum* (Antwerp, 1570).

Bibliography

Primary sources edited

- BARBOSA, D., (1989). *Livro do que viu e ouviu no Oriente*, Lisboa: ALFA. [Edição de Luís de Albuquerque].
- BAUHIN, C., (1623). *Pinax Theatri Botanici*, Basel: Ludovici Regis.
- CONTI, N., (2004). *Les voyages aux Indes de Nicolo de'Conti (1414-1439)*. [Introd. de G. BOUCHON e A. L. AMILHAT-SZARY; trad. D. MÉNARD, Paris: Chandeigne].
- COSTA, C. da, (1578). *Tractado de las Drogas y medicinas de las Indias Orientales con sus plantas debuxadas al vivo por Cristobal Acosta*, Burgos: Martin de Victoria.
- DALECHAMPS, J., (1586-1587). *Historia Generalis Plantarum*, Lyon: G. Rovillium.
- FRAGOSO, J., (1572). *Discurso de las cosas aromaticas, arboles y frutales y de otras muchas medicinas simples que se traen de la India Oriental*, Madrid: Francisco Sánchez.
- MARTYR d'ANGLERIA, P., (1989). *Décadas del Nuevo Mundo. Crónicas y Memorias*, Madrid: Ed. Polifemo.
- MATTIOLI, P. A., (1572). *Commentaires à Dioscoride*, Lyon: G. Rouillé.
- ORTA, G. de, (1913). *Colloquies in the Simples and Drugs of India*, Delhi: Sri Satguru Publications. [Transl. by Clements Markham].
- ORTA, G. de, (1563). *Colóquios dos Simples e Drogas e coisas Mediciniais da Índia*, Goa: J. de Endem.
- PIGAFETTA, A., (2017). *Le voyage de Magellan 1519-1522. La relation d'Antonio Pigafetta du premier tour du monde*, Paris: Chandeigne. [Ed. and notes by X. de CASTRO].
- PIGAFETTA, A., (2007). *The first voyage around the world*, Toronto: University of Toronto Press. [Ed. by T. G. CACHEY Jr.].
- PIRES, T., (2017). *Suma Oriental*, Lisboa: CCCM, Fundação Jorge Álvares, Fundação de Macau. [Ed. R. M. LOUREIRO].
- POLO, M., (2005 [1854]). *The travels of Marco Polo*, London: Elibron Classics.
- TRANSILVANUS, M., (1523). *De Molluccis Insulis*, Roma: s/e.
- VARTHEMA, L. de, (2004). *Voyage de Ludovico Varthema en Arabie et aux Indes orientales (1503-1508)*, Paris: Chandeigne. [Trad. P. TEYSSIER, pref. J. AUBIN,].

Secondary sources

- ALESSANDRINI, N., (2019). “Antonio Pigafetta, cavaleiro do mar oceano. Uma reconstrução biográfica”. *Anais de História de Além-Mar*, Nº XX, pp. 61-80.
- ALMEIDA, O., (2011). “Experiência a madre das cousas – experience, the mother of things – on the ‘revolution of experience’ in 16th century Portuguese maritime discoveries and its foundational role in the emergence of the scientific worldview”, In

M. BERBARA & K. A. ENENKEL (Eds), *Portuguese Humanism and the Republic of Letters* (pp. 381-400). Leiden, Holland: Intersections Book Series, Brill.

AVONTO, L., (1992). *I compagni di Magellano con un'appendice sul roteiro di un pilota genovese*, Montevideo-Roma: Ediciones El Galeon.

BANE, T., (2016). *Encyclopedia of giants and Humanoids in myth, legends and folklore*, Jefferson, North Carolina: McFarland & Company.

BARRERA-OSORIO, A., (2006). *Experiencing nature. The Spanish American Empire and the the Early Scientific Revolution*, Austin: University of Texas Press.

BLEICHMAR, D.; DE VOS, P.; HUFFINE, H. & SHEEHAN, K., (Eds.) (2009). *Science in the Spanish and Portuguese Empires, 1500-1800*, Stanford: Stanford University Press.

BOXER, C. R., (1963). *Two pioneers in tropical medicine: Garcia de Orta and Nicolàs Monardes*, Londres: The Hispanic and Luso-Brasilian Councils.

BRENTJES, S., (2016). “Issues of best historiographical practice: Garcia da Orta’s *Colóquios dos Simples e drogas e cousas medicinais da India* (Goa, 1563) and their conflicting interpretation.” In H. WENDT (Ed.), *The Globalization of Knowledge in the Iberian Colonial World* (pp. 95-136). Chicago: The University of Chicago Press.

CANIZARES-ESGUERRA, J., (2006). *Nature, empire and nation. Explorations of the History of Science in Iberian World*, Stanford: Stanford University Press.

CANOVA, A., (1999). *Relazione del primo viaggio attorno el mondo*, Padua: Antenore.

CANOVA, A., (2001). “Far away countries and useful books: remarks on Antonio Pigafetta and other travels in the Pacific in the beginning of the Sixteenth Century”. *Studies in Travel Writing*, N° 5, pp. 1-34.

CARDONA, G.R., (1976). *Introduzione all’ethnolinguistica*, Bolonha: Il Mulino.

CARVALHO da SILVA, A., (1934). “Garcia d’Orta.” *Revista da Universidade de Coimbra*, N° 12, pp. 61-246.

CARVALHO, L. De M. & FERNANDES, F., (2011). “Exotica Naturalia – O enigma do coco-do-mar”. *Artis*, N° 9-10, pp. 153-162.

CARVALHO, T. N. de, (2006). “Imagens do mundo natural asiático na obra botânica de Cristóvão da Costa”. *Revista de Cultura [Macau]*, N° 20, pp. 28-39.

CARVALHO, T. N. de, (2013). "Local knowledge in Portuguese words: oral and manuscript sources in the *Colloquies on the simples* by Garcia de Orta". *Host - Journal of History of Science and Technology*, N° 8, pp. 13-28.

CARVALHO, T. N. de, (2015). *Os desafios de Garcia de Orta. Colóquios dos Simples e Drogas da Índia*, Lisboa: Esfera do Caos.

CARVALHO, T. N. de, (2017). “The depictions of the spice that circumnavigated the globe. The contribution of Garcia de Orta’s *Colóquios dos Simples* (Goa, 1563) to the construction of an entirely new knowledge about cloves”. *Abriu, Estudos de textualidade do Brasil, Galicia e Portugal*, N° 6, pp. 189-212.

CARVALHO, T. N. de, (2020). “The natural frontiers of a global empire. The pineapple – *Ananas comosus* – in the Portuguese sources of the 16th century”. *Humanities*, N° 9, 89.

- CASTRO, X.; HAMON, J. & THOMAZ, L. F., (2007). *Le voyage de Magellan (1519-1522). La relations d’Antonio Pigafetta et autres temoignages*, Paris: Éditions Chandeigne.
- CHIAPPELLI, F., (Ed.) (1976). *First Images of America: The Impact of the New World on the Old*, Berkeley: University of California Press.
- CUNNINGHAM, R. O., (1871). *Notes on the Natural History of the Strait of Magellan and west coast of Patagonia made during the voyage of H.M.S. Nassau in the years 1866*, Edimburgo: Edmonston & Douglas.
- CUNHA, A. P. da; DA SILVA, A. P. & ROQUE, O. R., (2009). *Plantas e Produtos Vegetais em Fitoterapia*, Lisboa: Fundação Calouste Gulbenkian.
- CUNHA, A. P. da & ROQUE, O. R., (2015). *Especiarias e plantas condimentares. Origem, composição e utilizações*, Lisboa: Fundação Calouste Gulbenkian.
- DASTON, L. & PARK, K., (1998). *Wonders and the Order of Nature, 1150–1750*, New York: Zone Books.
- DELBOURGO, J. & DEW, N., (Eds.) (2008). *Science and Empire in the Atlantic World*, New York and London: Routledge.
- DENUCÉ, J., (1911). *Magellan – La question des Moluques et la Première Circumnavigation du globe*, Bruxelles: Hayez.
- DOMINGUES, F. C., (2007). “Science and Technology in Portuguese Navigation: The Idea of Experience in the Sixteenth Century.” In F. BETHENCOURT & D. RAMADA CURTO (Eds.), *Portuguese Oceanic Expansion, 1400–1800* (pp. 460-479). Cambridge: Cambridge University Press.
- DONKIN, R., (2003). *Between East and the West: The Moluccas and the traffic in spices up to the arrival of the Europeans*, Philadelphia: American Philosophical Society.
- EGMOND, F., (2016). “Figuring exotic nature in Sixteenth century Europe: Garcia de Orta and Carolus Clusius”. In P. F. da COSTA (Ed.), *Medicine, Trade and Empire. Garcia de Orta’s Colloquies of Simples and Drugs of India in context* (pp. 167-194). London and New York: Routledge.
- ELLIOTT, J. H., (1992). *The Old World and the New: 1492–1650*, Cambridge: Cambridge University Press.
- FERRÃO, J. E. M., (1993). *Especiarias, Cultura. Tecnologia. Comércio*, Lisboa: MPAT, SECT & IICT.
- FERRÃO, J. E. M., (2015). *Le voyage des plantes et les grandes découvertes*, Paris: Chandeigne.
- FICALHO, Conde de, (1886). *Garcia de Orta e o seu tempo*, Lisboa: Imprensa Nacional.
- FINDLEN, P., (1994). *Possessing Nature. Museums, collecting and scientific culture in Early Modern Italy*, Berkeley: University of California Press.
- GARCIA, J. M., (2007). *Fernão de Magalhães e os portugueses*, Lisboa: Editorial Presença.
- GERBI, A., (1985). *Nature in the New World. From Cristopher Columbus to Gonzalo Fernández de Oviedo*, Pittsburgh: University of Pittsburgh Press.

- GIL, J. & VARELA, C., (1984). *Cartas de particulares a Colón y relaciones coetáneas*, Madrid: Alianza Editorial.
- GOODMAN, D., (1988). *Power and Penury: Government, Technology and Science on Philip II's Spain*, Cambridge: Cambridge University Press.
- GRAFTON, A., (1995). *New Worlds, Ancient Texts: The Power of Tradition and the Shock of Discovery*, Cambridge, MA: Belknap Press of Harvard University Press.
- LADERO-QUESADA, M. Á., (2008). “La descripción del Nuevo Mundo en la primera mitad del siglo XVI: Pedro Mártir de Angleria y Gonzalo Fernández de Oviedo”. *Catharum, Revista de Ciencias y Humanidades*, Nº 9, pp. 17-28.
- LAGOA, Visconde de (1938). *Fernão de Magalhães (a sua vida e a sua viagem*, Lisboa: Seara Nova.
- LAUFER, B., (1929). “The American plant migration”. *The Scientific Monthly*, Nº 28/3, pp. 239-251.
- LAUFER, B., (1938). *The American plant migration. The potato*, Chicago Field Museum of Natural History.
- LEITÃO, H. & SÁNCHEZ, A., (2017). “Too much to tell: Narratives styles of the first descriptions of the natural world of the Indies”. *History of Science*, Nº 55, pp. 167-186.
- LIDA de MALKIEL, M. R., (1952). “Para la toponimia argentina: Patagonia”. *Hispanic Review*, Nº 20, pp. 321-323.
- LOBATO, M., (1999). “O cravo, as Molucas e as especiarias”. En I. GUERREIRO (Coord.), *A epopeia das especiarias* (pp. 104-130). Lisboa: IICT; INAPA.
- LOPES, M. dos S., (2006). “A revelação das plantas. Garcia de Orta, Carolus Clusius e as espécies asiáticas na Europa”. *Revista de Cultura*, Nº 20, pp. 28-39.
- LÓPEZ-PIÑERO, J. M., (2002). *Historia de la Ciencia y de la Técnica en la Corona de Castilla*, Salamanca: Junta de Castilla y León, Consejería de Educación y Cultura. 4 vols.
- LÓPEZ-PIÑERO, J. M. & J. PARDO-TOMAS, (1994). *Nuevos materiales y noticias sobre la historia de las plantas de Nueva España, de Francisco Hernández*, Valencia: CSIC.
- LOUREIRO, R. M., (2006). “Betel chewing in 16th century European sources”. *Revista de Cultura*, Nº 20, pp. 49-63.
- LOUREIRO, R. M., (2012). “Information networks in the Estado da Índia, a case study: was Garcia de Orta the organizer of *Codex Casanatense 1889*?” *Anais de Historia de Alem-Mar*, Nº 14, pp. 41-72.
- LOUREIRO, R. M., (2019). “Em demanda da biblioteca de Fernão de Magalhães”. En R. M. LOUREIRO, *Em demanda da biblioteca de Fernão de Magalhães* (pp. 17-48). Lisboa: Biblioteca Nacional de Portugal.
- MARCAIDA, J. R., (2014). *Arte y Ciencia en el barroco español. Historia natural, coleccionismo y cultura visual*, Madrid and Sevilla: Marcial Pons Historia.
- MASON, P., (2009). *Before Disenchantment: Images of Exotic Animals and Plants in the Early Modern World*, London: Reaktion Books.
- OLMI, G., (1992). *L'inventario del mondo. Catalogazione della natura et luogui del sapere nella prima età moderna*, Bolonha: Il Mulino.

PAGDEN, A., (1993). *European Encounters with the New World: From Renaissance to Romanticism*, New Haven, CT: Yale University Press.

PARDO-TOMAS, J., (2007). “Two glimpses of America from a distance: Carolus Clusius and Nicolas Monardes.” In F. EGMOND, P. HOFTIJER & R. VISSER (Eds.), *Carolus Clusius. Towards a cultural history of Renaissance naturalist* (pp. 173-193). Amsterdam: Edita-KNAW.

PARDO-TOMAS, J., (2016). “East Indies, West Indies: Garcia de Orta and the Spanish Treatises on Exotic Materia Medica”. In P. FONTES DA COSTA (Ed.), *Medicine, Trade and Empire: Garcia de Orta’s Colloquies on the Simples and drugs of India in Context* (pp. 195–212). New York: Routledge.

PEARSON, M., (1996). *Spices in the Indian Ocean World. Expanding World*, Aldershot: Ashgate.

PIMENTEL, J., (2001). “The Iberian Vision: Science and Empire in the Framework of a Universal Monarchy, 1500-1899”. *Osiris*, N° 15, pp. 17-30.

PIMENTEL, J. & SOLER, I., (2014) “Painting Naked Truth: The Coloquios of Garcia de Orta (1563)”. *Journal of Early Modern History*, N° 18, pp. 101-120.

PORTUONDO, M., (2009). *Secret Science. Spanish Cosmography and the New World*, Chicago: The University of Chicago Press.

POZZO, G. da, (2005). “Serenità et ambiguità nella relazione di Antonio Pigafetta”. *Italica*, N° 82, pp. 426-450.

RODRÍGUEZ-NOZAL, R. & GOZÁLEZ-BUENO, A., (2000). *El Tractado de las Drogas de Cristóbal de Acosta (Burgos, 1578). Utilidad comercial y materia médica de las Indias Orientales en la Europa renacentista*, Ediciones de Cultura Hispánica; Agencia Española de Cooperación Internacional.

SÁNCHEZ, A., (2010). “La voz de los artesanos en el Renacimiento científico: cosmógrafos y cartógrafos en el prelude de la nueva filosofía natural”. *Arbor*, N° 186, pp. 449-460.

SANZ, L. T., (1975). “El mundo indígena conocido por Magallanes en las islas de San Lázaro”. In A. TEIXEIRA da MOTA (Ed.), *A viagem de Fernão de Magalhães e a questão das Molucas* (pp. 381-409). Lisboa: Junta de Investigações do Ultramar.

SCHIEBINGER, L. & SWAN, C., (2006). *Colonial Botany. Science, Commerce and Politics in Early Modern Europe*, Philadelphia: University of Pennsylvania Press.

SILVA, C. R. de, (1987). “The Portuguese and the trade of cloves in Asia during the sixteenth century”. *Studia*, N° 46, pp. 135-146.

TEIXEIRA DA MOTA, A., (Org.) (1975). *A viagem de Fernão de Magalhães e a questão das Molucas. Actas do II Colóquio Luso-Espanhol de História Ultramarina*, Lisboa: Junta de Investigações Científicas do Ultramar. Centro de Estudos de Cartografia Antiga.

THOMAZ, L. F., (1975). “Maluco e Malaca”. In A. TEIXEIRA DA MOTA, (Ed.), *A viagem de Fernão de Magalhães e a Questão das Molucas* (pp. 29-48). Lisboa: Junta de Investigações do Ultramar.

THOMAZ, L. F., (1995). “Especiarias do Velho e do Novo Mundo (notas histórico-filosóficas)”. *Arquivos do Centro Cultural Calouste Gulbenkian*, N° 34, pp. 219-345.

VAGNON, E., (2010). “De la Grèce Antique au voyage de Magellan. Les modèles humanistes d’Antonio Pigafetta et Maximilianus Transilvanus”. *Medievales*, N° 58, pp. 99-111.