

## Between Goa and America: knowledge about cancer in two books written by Jesuits (XVIII century)

Entre Goa y América: conocimientos sobre el cáncer en dos libros escritos por jesuitas (siglo XVIII)

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**Abstract:** In this work we comparatively analyzed two works written by Jesuits at the beginning of the XVIII century, the first in India and the second in America, which contained a chapter on cancer. Both works were influenced by humoral theory/Hippocratic-Galenic medicine, with appropriations of local knowledge. The works can be included in a set of books that gradually constitute the language of natural sciences in modernity, a process marked by the definition of new terms and concepts, and in which the fragmentation of certain meanings occurred as a result of new empirical observations in the field of natural sciences. Translation processes and contact networks are relevant in the production of knowledge in both centers, but certain borders also make it difficult to translate concepts produced in other centers. The sources analyzed consisted of medical-surgical and pharmacy treatises from the beginning of the XVIII century, dictionaries of the period, as well as Annu Letters of the Jesuit Province of Paraguay and bibliography on the first modernity.

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**Resumen:** En este trabajo analizamos comparativamente dos obras escritas por jesuitas a principios del siglo XVIII, la primera en la India y la segunda en América, que contenían un capítulo sobre el cáncer. Ambas obras estuvieron influenciadas por la teoría humoral/medicina hipocrática-galénica, con apropiaciones de conocimientos locales. Las obras pueden incluirse en un conjunto de libros que paulatinamente constituyen el lenguaje de las ciencias naturales en la modernidad, un proceso marcado por la definición de nuevos términos y conceptos, y en el que la fragmentación de ciertos significados se produce como resultado de nuevas observaciones empíricas. Los procesos de traducción y las redes de contacto son relevantes en la producción de conocimiento en ambos centros, pero ciertas fronteras también dificultan la traducción de conceptos producidos en otros centros. Las fuentes analizadas consistieron en tratados médico-quirúrgicos y de farmacia de inicios del siglo XVIII, diccionarios de época, así como Cartas Anuas de la Provincia Jesuítica del Paraguay y bibliografía sobre la primera modernidad.

**Keywords:** ciencia, cáncer, jesuitas, India, América.

### Introduction

At the end of the XVI century and the beginning of the XVII century, the description of new objects of knowledge was being assimilated within natural philosophy, so that the development of “sciences” took place in a global context resulting from maritime expansions (ROMANO, 2015). In 1560, the main information that reached the Europe concerning the natural world of Asia came from jesuits texts of natural diversity, and the process of “globalization” of the world, resulting from the circulation of knowledge and contacts, resulted in the increase of a series of natural descriptions and in the understanding of the fauna and flora about what was known until then by the Europeans.

Authors have studied this process starting from the circulation of plants, medicines and products, such as studies on the missionary pharmacy (ANAGNOSTOU, 2011). Over the years, Jesuit missionaries made linguistic and logistical investments, and their writing economy, characterized by bringing descriptions of natural history, was used to represent the peoples of Asia and America to Europe, which until then had been unaware of them. The understanding of new external realities resulting from the missionary process did not happen, however, without an exercise of internal modification (ROMANO, 2019, p. 7). In the process of contact, the Iberian missionaries participated in commercial networks with other religious orders, empires and private actors in locations in Asia and America and in Europe, composing circuits of comings and goings that were responsible for producing processes of circulation of knowledge, characterized by accommodating knowledge in pre-existing systems.

In this process of translating knowledge into matrices of thought specific to their experiences, the missionaries were responsible for appropriating knowledge and ended up, consciously and unconsciously, discarding local knowledge throughout the mapping of both nature and humanity. From the scientific writing process, more supported by consecrated literatures of the scholars of the time, countless works were produced. Two, however, were analyzed in this article and, as they were of a medical nature, included chapters on cancer. The first, a book from 1720, written by priest Afonso da Costa, entitled “Árvore da Vida... [Tree of Life...]”, and the second, a treatise on surgery written

in polyauthorship, that is, with more than three handwritings and without the name of the authors in its length, titled “Libro de Cirugía Traslado de Autores Graves y Doctos...” from 1725.

In the first of them, the “Árvore da vida...”, Afonso Costa compiled knowledge of medicine and pharmacy relevant to the work of missionaries in the area. Written in the Portuguese language of the time, it brought simple and compound remedies influenced by Galenism together with experimentation and local knowledge, of which Ayurveda medicine can be mentioned (VIOTTI, 2019, p. 467). In the period in question, the combination of theories was current, so that the presence of unorthodox or formally justified medical treatments and prescriptions was not uncommon, even in official treatises or works endorsed by scholars (EDLER, 2013). At the same time, from an epistemological point of view, it is not possible to achieve a total separation between medicine, pharmacy, chemistry and natural philosophy in the 1600s, since these fields of knowledge made up a more or less interdependent system with relationships between one and the other (BRACHT, 2016, p. 105).

In the case of works on medicine and pharmacy written in the missions, a recurrent theoretical influence was Hippocratic-Galenic medicine. According to Ivone Reis, humoralism predicted healing through opposites, based on the existence of three types of hot temperaments and a fourth in which opposites persisted. There were the opposites of hot and humid, which would be cold and dry and the opposite of hot and dry, which would be cold and humid, and vice versa (REIS, 2013). If each era is marked by the realization of different questions in the field of science, or that mobilize the understanding of the natural world.

The comparison of medicinal works owned by the Jesuits in the region of the Jesuit Province of Paraguay allowed some notes restricted to their delimitation. The medicinal knowledge in force in the printed works held by the Jesuits in the early XVIII century was largely influenced by appropriations of different Galenisms, as well as proto-iatrochemicals, including local magical-religious knowledge, added to local experimentalisms (FLECK, 2014). About the notions of the body in some of the works, it can be said that the missionaries combined both a medicine based on the use of reason on the body seen as a system or machine, and a religious healing action resulting from the understanding of the body as a mystery, or, from the pre-conception that the healer was God.

In this case, relics, prayers and other procedures combined with the practice of surgery and medicine were performed. The medical practice of the Jesuits in the seventeenth century was based on

a religious and metaphysical view of the world according to which healing came from God. When the cycle of inflammations and non-malignant tumors came closer to the end, that is, when the illnesses “were giving way or seemed to give way”, and there was the illusion of divine healing. This phenomenon was discussed by Marc Bloch in *Reis Thaumaturgos* (1993). At these times, a relationship between faith and miracle was established by the discourse of the Jesuits, who used it for conversion (FLECK, 2014).

The production of works of a medical and pharmacological nature resulted from a process in which the writing and appropriation of local characteristics constituted a way of understanding the territories in which they inhabited, in order to consume information about them, considering that there was a circulation internal writing of the Society of Jesus in schools. By knowing, it was also more possible to control the natural world and the social space in which it was inserted. On the other hand, the investigative action cannot be seen only from the perspective of knowledge-power, since the Society of Jesus was an order capable of forming and producing a significant number of “scientists” (natural philosophers), as convincingly demonstrated by Miguel de Asúa in *Science in Vanished Arcadia* (2014).<sup>51</sup>

For Asúa, the Order had the structure to train and maintain natural philosophers in the New World of the XVIII century and intellectual activity was stimulated among literate members, who could use the internal networks for text circulation of the Company in which they were inserted (Asúa, 2014). Some Jesuits can be considered as agents who carried out experiments in different fields of natural sciences. In terms of cancer studies, the study present in the tenth chapter or annex in the *Libro de Cirugía* manuscript can be mentioned.

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51 To exemplify some scientific studies carried out by missionaries in South America in the first modernity, we can mention Buenaventura Suárez, recognized for astronomical observations and who carried out correspondence exchanges with the Royal Society, having also translated concepts of Newtonian physics into the Platine context (ASÚA, 2014, p. 3). Secondly, an individual with more practical training in Hospitals in Spain who migrated to America, Pedro Montenegro, known for having made “galenist” classifications of native plants identified by the Guaranis, and compiled them into a book in which he presented his skills of botanical illustration and natural description, the *Materia Medica Misionera* (1710) (ASÚA, 2014, p.316). In the case of a third name, one could mention Ramón María Termeyer (1737-1814), who published an essay in 1781 in which he carried out electricity experiments with electric eels and tested the impacts of shocks, presenting the results as drawings of animal dissections, apparently trying to identify the part of the animal responsible for producing the electrical discharges (ASÚA, 2014, p. 279).<sup>51</sup> Finally, a fourth quotable name would be that of Athanasius Kircher (1602-1680), a German polymath who wrote essays on natural philosophy, oriental languages, medicine, religion, mathematics, and ancient history (Ibid, p. 57). For Asúa, there was a baroque style of science in Kircher that was characterized by the combination of a new experimental physics with Renaissance hermeticism, that is, a commitment to a mechanical view of the natural world involved by explanations based on occult forces that allowed the maintenance of Christian premises of the world.<sup>51</sup>

In the *Libro de Cirugía*, the Arabic word *zaratán* was used to designate breast cancer in women, a type of cancer clearly identified at the time. “Zaratan is a preternatural tumor that comes out of the mammillas or teats, hard, uneven, with annoying pain, which does not afflict continuously, and when it afflicts it is not intolerable pain, this definition is from Pedro Miguel, and behind Robledo f. 139”. (LIBRO, 1725, p. 395). The mention of D. Diego Antonio de Robledo refers to the work *Compendio Cirurgico util y provechoso a sus Professors*, published in Madrid in 1687. Comprising ten chapters, the third chapter dealt with cancers and *zaratáns* and was consulted for the writing of the subchapter *Del Zaratan* in the XVIII century manuscript.

The treatment of the *zaratáns* involved a preparation of fresh frogs that were boiled in water, with butter added, so that the metal pot was placed over the fire covered until all the fat had distilled and the frogs had dried. A second recipe involved using egg yolks, nightshade juice and sulfur, stirred in a metal bowl with a stick. The recipe had a good reputation among the so-called scholars: “it is from Lasaro ribeiro, which assures it has been paid off with the many tumors of the Pechos haun that were cancerous, and Robledo dice, which has used it many times, and achieved it effect” (LIBRO, 1725, p. 396).

### **Treatments for cancer in the work “Arvore da Vida...” (1720)**

Written over three decades, the “Tree of Life dilated into showy and salutary branches...” was conceived from the consultation of the experts of the period and from experiments and observations, as pointed out in the subtitle “Copied from several Authors thus printed, as manuscripts, of various news and experiences seen and approved... Offered by Father Affonso da Costa of the Society of Jesus of the Province of Goa” (COSTA, 1720). The work allows understanding the dissemination of medical knowledge in the Portuguese colonial world (VIOTTI, 2019, p. 6), considering that there were commercial exchanges between overseas territories such as the circuit involving Goa, India, Brazil and Macau. By appropriating information from the natural world and marketing products resulting from knowledge from the biosciences, the Jesuits played the role of producers of knowledge in a context after the maritime expansionist movements, using their contact networks to develop, test and adapt recipes according to their availability and conditions (BOUMEDIENE, 2011).

In the book written in Goa, there was a subchapter entitled “Dos Canceres, e seos remedios”, referred to as “Folha 29”, and located on page 368. According to the definition presented in the work,

cancers could be called “cancerous sores”. On the place where there was the disease, as reported, the leaves of Solano Linozo were applied, which were prepared in a pan over the fire, until they turned into oil. Preparation was essential because it not only “cures cancer, but also old sores and inflammation” (AFFONSO, p. 370). Reading the chapter, one can see a strong emphasis on therapies associated with the use of plants and plasters, which will be verified below in the compilation of recipes for the chapter of this work. In the sequence, it can be seen that wild carrot flowers and buds were collected, choosing the smallest white flowers for the preparation of a recipe. These flowers were trampled on to crush them so that a poultice could be made from the condensate, to be applied on the spot (COSTA, 1720, p. 369). Secondly, Diapalma leaves were dissolved in tansage and placed on the cancer if it was not open or, if it was, a bath was carried out on the spot with water from strawberries or the cerefolio plant.

Thirdly, the leaves of Solano Linozo and olive oil were used for the preparation, which, after being crushed and left to dry, could be placed in a pan to cook with water until they formed an oil. The mixture could be applied on the sick spot five or six times until it generated some effect (COSTA, 1720, p. 369). This ointment was removed from the bottom of the pan with a slotted spoon, and placed in another to be strained using a cloth, the mixture being placed in the same pan over low heat. The criterion for removing the fire consisted of removing it when the wax was melted (COSTA, 1720, p. 370). The preparation of plasters with the use of plants was related to a healing logic that was based on the use of substances to slow down inflammations, and to make them dry and heal faster. The plants, which were collected from the new environment in which the Jesuits were inserted, were not the same plants of the first classic recipes presented by the scholars in Europe, but new specimens found on the frontiers by the missionaries, liable to require the adaptation of the recipes. in the face of local needs (FLECK, 2014).

The work “Árvore da Vida” devoted a few paragraphs to dealing with cases in which cancer was found in the mouth. Interestingly, mentions were made only of this specific type of tumor, since other works of the period presented descriptions of other types of cancer. However, in these cases, two types of remedies were applied. First, chicory leaves, tansagem leaves, rue leaves were used, counted in equal parts, together with a spoonful of honey. Having these ingredients in hand, they were boiled in sufficient quantity of spring water and clay pot for the space of a quarter of an hour. After twenty-five minutes, the honey was removed from the pan and the liquid could be gargled (COSTA, 1720, p. 371).

White wine could be used as an ingredient for this kind of mouthwash, being mixed with acrimony after boiling. In cases of inflamed cancers, the remedy used involved taking a quantity of burning water, together with an amount of turpentine and Apparicio oil, which could be dissolved. On top of a cloth quantities of burning water could be placed. On the other hand, pepper and human excrement could be used on the site, taken to the fire and transformed into powder. The use of human excrement seems to be different from the therapy used in other medical treatises of the period, such as the *Compendio Chirurgico*, by Robledo, written in Spain, or even the “*Libro de Cirugía*”, a treatise on South America in 1725, in which the mentions of excrements, when they appeared, always referred to the dejections of other mammals, such as horses (LIBRO, 1725).

The next recipe involved “tansagem”, in equal parts, and “gem” salt, which could be mixed and placed in a wet pan, later used to grease the cancers. Although the text does not typify, they refer to superficial cancers, nodules and hard lumps, places where there was sometimes pain and inflammation, as is typical of the definitions of cancers in medical treatises of the period. In the recipe presented to treat them, pink honey was used, with Aypo, barley flour, mixed until the formation of an ointment, which could be applied on cancers (COSTA, 1725, p. 375). In the case of mouth cancer, chicory leaves, tansagem [tansagem], rue leaves were applied, accompanied by a spoonful of honey.

Wet cloths with oxycrate were used on the illnesses, as well as white ointment. Tansage leaves, pink honey and barley flour were applied to the tumors. The recipes end in a relatively short chapter that did not bring more details about cases in which surgeries or other procedures should be performed, such as the use of cauterization. These more severe resources could be found in works such as *Compendio Chirurgico*, by Diego Robledo, written in Spain in 1694, or in other works. Regarding the mentioned ointments, it can be said that the Jesuits had the habit of creating apothecary spaces for the production of ointments, with reports of a vast production of different types of ointments in the apothecary of the College of Córdoba in the Jesuit Province of Paraguay (FLECK, 2014).

For Bracht (2020), local populations played a fundamental role in the construction and circulation of medical and pharmaceutical knowledge in the Portuguese East. Much of this knowledge was produced by individuals who were not doctors, surgeons or apothecaries educated in Europe, but rather local agents, the majority of whom did not have formal education in medical schools in urban centers. Agents sometimes mentioned in their prescriptions and medicinal procedures curative notions

resulting from contact with information resulting from exchanges between Asian groups and Africans and Europeans (BRACHT, 2020, p. 376).

### **Treatments for cancers in the work “Libro de Cirugía...” (1725)**

In the work “Libro de Cirugía Traducido de Autores Graves y Doctos [...]”, produced in the region of the Jesuit Province of Paraguay, ointments and plasters of different types were used (FLECK, 2020). According to the surgery manuscript, treatments for cancer followed a line of action that began with identification, through conversation with the patient, touching the tissue region and observation with the naked eye. Then, when cases of cancer were identified, purges were used – the use of drinks to make you vomit, urinate or defecate, with a view to eliminating excess humor – followed by the use of herbal plasters. In most cases, the treatment ended at this stage, but, when the cases were more severe, surgeries were used (LIBRO, 1725, p. 394).

The plants that were used in the platinum manuscript for plasters consisted of tansage – a common element with the work of Afonso Costa, with tansage mentioned by ancient scholars such as Dioscórides – nightshade, hemlock and scabiosa. These plants, in the case of the Jesuit Province of Paraguay, underwent a kind of “galenization” on the part of Pedro Montenegro, a Jesuit botanist and missionary who wrote a work in which he circumscribed the plants to the qualities proper to the humoral theory. Namely, the humors were phlegm, blood, cholera and melancholy and could be seen through a secondary character by: dry/humid, cold/hot, thin/thick and sweet/bitter, qualities expressed in pairs (VIOTTI, 2020, p. 5). In the manuscript, one could find a combination of two or three of these humoral types mentioned above.

There were several cases of tumors in the manuscript, and the classification encompassed: phlemon, herpes, edema, gangrene, scabies, erysipelas, zaratán (tumors in the breasts), tiña, lamparon, ranuela, calluses, scirrhus (cancer composed of the mood melancholy or black bile) and carbuncles. The semantic definition, quite comprehensive, encompassed many terms that did not have such a clear relationship with illnesses considered “cancer”, since, at the same time that the chapter on cancer in the manuscript written in the reductions made mention of zaratás, breast cancer, gangrene and carbuncles were also present.<sup>52</sup>

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<sup>52</sup> It is pointed out that the notion of cancer as a cellular disorder is later, resulting from the studies of cells. As lens manufacturing techniques and degrees of magnification developed, it was possible to closely observe tissue structures



According to Bluteau's Dictionary, the word cancer had a very broad meaning in the 18th century, encompassing a large number of inflammations, as “cancro” meant “cancer, disease” (BLUTEAU, 1789, p. 224) and “cancer” meant “malignant ulcera, which gnaws at the part of the body, where it is. Evil that goes on ruining” (BLUTEAU, 1789, p. 224). The dictionary definition at the time corroborates the thesis that the term cancer was applied to tissue diseases of different orders. The treatments involved, in humoral logic, the application of purges, followed by the use of herbal plasters, which could involve eight ingredients: tansage, nightshade, hemlock, scabiosa, crabs, frogs, egg fat and oil. Then, surgery was performed on site, along with cauterization and medicinal powders were applied, of which two could be listed: caperose and oxycete. With a view to not sticking only to the pages on cancer in the two works, which would be, on the one hand, reductive or which would result in the loss of the whole, some aspects associated with other parts of the works can be mentioned.

In the period in which the *Libro* was written, there was the influence of a type of astrological medicine. At the time, astrology predicted that certain plans and procedures would be adopted depending on the position or phase of the moon. According to Thomas, the influences of astrology in books of the time concerned the planets transmitting different amounts of the four physiological qualities of heat and cold, dryness and humidity, and in the resulting interaction all physical change was understood (THOMAS, 1991: 238). In this way, astrology was less a separate discipline than an aspect of an image of the world, necessary for the understanding of physiology and, therefore, of medicine (POLETTI, 2011). On one of the pages of the manuscript, there was an astrological guide to the treatments entitled “Declaracion de los Dose Signos, y sus complecsiones”.<sup>53</sup>

If in the *Platinum* manuscript some relationships are established between appropriations of Galenisms related to the humoral theory, together with practices of astrological medicine, associated with a type of calendar that marked out times of the year and their influence on certain healing procedures; on the other hand, in the case of the work written in India, in Goa, the established influence of Galenism is characterized by a trace of Ayurveda medicine verified by Marchetto and Viotti (2022). Although the appropriations of Galenisms imply situating it as a more or less closed

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and, with that, understand the internal structures of cells, composed of nucleus, membrane, various organelles and other elements.

<sup>53</sup> Astrology could also guide the performance of medical procedures by the Jesuits. The missionaries, an order that, initially, was not dedicated to activities involving bodily contact, began to have authorization to practice medicine in the Platine context: “we give each and every one of the aforementioned Society of Jesus, experts in medicine, which is now and will be in the future, so that, with the permission of their superiors, they may freely exercise the office of healing both the sick of the same Religion, as well as strangers and secular people” (LEONHARDT, 1937, p. 104).

system, with its internal forces of the humours, the flows and therapies quite based on the use of purges and bloodletting (cuts for the removal of excess humors through the flow of blood), there were joint appropriations of treatments influenced by other aspects, as characteristic of the polysemy of medicine at the time.<sup>54</sup> It may be considered pertinent to comment that, in the *Cartas Anuas* written by the Jesuits in the Jesuit Province of Paraguay, there were reports of some cases of tumors and the simplified description of some therapeutic procedures (TERNUS-ABREU, 2020).

To cite an example, they mention the case of brother Nicolás Pérez Palavecino, who had “a malignant tumor in his leg” (LEONHARDT, 1927, p. 104). In a second case, dated from the year 1738, a woman had a tumor next to her ear, which was “duro como una piedra”, and was treated by her brother José Gómez, who used a magico-religious practice when no other remedy was available. “had given results”. Gómez applied “la consabida reliquia del Santo”. He drew “the powerful relic, and applied it to the creature. At the moment the danger of death is over, and a little time after that the creature is healthy and well”.

In a second account of tumors in the *Cartas Anuas*, between the years 1663 and 1666, an indigenous person fell ill with an aposthema. One of the priests, in order to “overcome the repugnancy and cure the patient”, opted to “kiss the sores as if they were flagrant roses and suck the infected matter”. The act of sucking the wound was referred to as a Jesuit apprenticeship, but he refers to a practice carried out by indigenous people: “it seems that all this I learned from San Javier, from whom he was very devout, whom he sought to imitate throughout”. Cases like this seem to suggest that tumor healing practices underwent a hybridization process throughout the “contact” experience (PRATT, 1999).

In another case of tumor with Jesuits, dating from the cauterizing remedies were caustic that burned, in some cases using an object heated to fire or a flame itself. The pain that ensued was quite severe, and Brother José Planes could not resist the treatment and the progression of the disease. Realizing the seriousness of his condition, he “announced to his confessor that he would rest in el Señor the eve of this day, of our beloved San Ignacio” (TERNUS-ABREU, 2020).

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54 According to Edler, medicine was a field that was only “universalized” in the second half of the XIX century at the cost of many fractures, since the great medical schools had many differences between them (EDLER, 2013).

### Distant collections and the role of prosecutors in science circuits

One of the aspects when analyzing it from the perspective of an order that maintained collections and produced compiled texts of a scientific nature is to reflect on a certain “science in transit” produced from scientific collections managed and arranged in distant spaces, considering that there was the composition of libraries by the missionaries that classic works such as the texts of Hippocrates, Galen, Pliny and Paracelsus were brought to compose the collections. Classic works were referred to throughout the length of the *Libro de Cirugía* (BIEHL, FLECK, 2020) and are also found in the work *Árvore da Vida*. While the platinum work has multiple authorship, due to the multiplicity of handwritings, the Goa work has a single author. Each one of them, in turn, was produced from the consultation of local collections of classic texts, activated during the writing and that were brought from ships.

The analysis that takes into account the circulation of texts depends, in this case, on paying attention to the individuals who made the logistics company possible.<sup>55</sup> In the case of the Jesuit Province of Paraguay, those who supplied the schools and brought books were the Provincial Procurators. In Córdoba, in 1730, for example, it was the procurator Antonio Machoni who brought seven hundred new books by ship (CA 1730-1735 In: PAGE, 2004, p. 309).

Both in America and in India, the Jesuits composed significant collections and libraries. There were, of course, some in vernacular languages, but most were books in Latin, the language of science at the time (MOYA, p. 779-780). It is known that some Jesuits even received provisions to buy books and set up private libraries, and among them were science books, including books on medicine, physics and mathematics. (MOYA, 2012, p. 777-797). According to Furlong, the Father General of the Society of Jesus, RP Tirso González, wrote in the year 1699 to the Provincial in Paraguay, Ignacio Frías, in the year 1699, requesting that he guide the Attorneys of the Society to take with them books that should be distributed to students, in order to provide them with readings (FURLONG, 1925, p. 469).<sup>56</sup>

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<sup>55</sup> Most Jesuit foreign missions can be seen as commercial ventures. Jesuits tried to conquer markets and establish financial sustainability to survive in the economy of capitals.

<sup>56</sup> If libraries and collections are consulted and end up composing mosaics of influences that make up medical texts and prescriptions for treating illnesses, including cancer, it can be said that the material conditions in which libraries and collections are constituted are factors defining the production of scientific knowledge associated with such books. Or, at least, the systematization of part of the known knowledge available. In this sense, one can consider the overseas role of agents that bring together centers of knowledge production to substantially reduce the limits of access to updated texts in frontier contexts such as the case of Goa or the Missions of the Plate.

Considering that these are two works produced in the extensions of Empires, both on the Spanish and Portuguese sides, and whose relations established with the center of the Order, in Rome, pointed to the triangulation of the Jesuits in different spaces of the globe, the role of the subjects who carry out the connections between the links of the chain can be substantial for the understanding of networks in the case of the analysis on the production and circulation of knowledge. The overseas role of Jesuit procurators has been extensively studied in historiography (JOAQUIM, 2014, FECHNER, 2014, MARTÍNEZ-SERNA, 2014).

The role of procurators, individuals responsible for representing the interests of the Society of Jesus abroad, was significant in this debate on the sciences. The attorneys made it possible to obtain goods, negotiated products and allowed the operation, in part, of colleges and reductions, spaces for the production of pharmacological knowledge, medicine, and certain experiments (FLECK, 2014), having occupied an intermediate position among the members of the Company and those individuals from the metropolis, negotiating with Jesuits but also with European civil authorities (GARCÍA, 1995), in contact with merchants, travelers and contacting future new members for the Company.<sup>57</sup>

In the case of the Jesuit Province of Paraguay, they made sporadic trips to Europe for supplies, purchases, convincing subjects to join the Order, to solve problems, and deal with customs and tax bureaucracy. Seville was a place of passage, in which they had contact with the Local Attorney of the Indies. According to a 1592 map, there were two maritime entry/exit routes for the vessels that participated in the procuradores, (i) a route further north and (ii) another to the northwest.<sup>58</sup>

Observing the spaces in which the Portuguese acted, on the other hand, it can be said that their activity in the East was a gradual expansion. The Atlantic islands accessed by the Portuguese gradually became large-scale plantation spaces, and employed slave labor by the Crown. The Spaniards, on the

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<sup>57</sup> One of the examples of a mediation role figure was Bento da Fonseca, in Lisbon, who approached the monarch of the time (JOAQUIM, 2014). The work of the Prosecutors was dedicated to building a network of communication and circulation of information, having been, for Martínez-Serna, the main administrators of the Order's assets, watching over its interests (MARTÍNEZ-SERNA, 2014). The attorneys would be in an intermediate position between the Company's spiritual interests, and its timeless orientation, for an adaptation to material, mercantile, logistical practice.

<sup>58</sup> For García, the performance of prosecutors in Spanish America was associated with bureaucratic procedures, such as reviewing and writing bureaucratic documents, dispatches, dispatch letters and other papers. Sending money remittances, surveys related to administrative control at the sites, recruiting and selecting missionaries, and preparing supplies and ships were the responsibilities of these individuals (JOAQUIM, 2014). In a 2019 study entitled "A Europa Portátil", historian Corinna Gramatke discussed the performance of prosecutors and showed a list of the names of individuals who traveled from Paraguay to other places. The periodicity, from one to three years, indicated regularities, and the number of individuals expressed an expressive size of local demands. The most significant variable was the fact that Gramatke identified that many trips were made by routes other than New World-Europe and Europe-New World, indicating that perhaps there would be exchanges between platinum spaces and the Orient.

other hand, had possession of the Canary Island, and implanted another island, the Madeira Island, around 1420, in the Azores, in 1427, in the Cape Verde Island, in 1460, and in the São Tomé, in 1471.

Despite the analysis of this article focusing on books written in Goa, India and in the Jesuit Province of Paraguay, due to the fact that both bring information about cancer, it can be said that the Jesuit order, which is involved in the production and compilation of medicine and pharmacy knowledge associated with cancers at the time, was involved in geographic spaces and networks that were not limited to the senses of Goa-America and America-Goa. As pointed out by Fausto, the Jesuit order had a complex performance, being partly considered as “a State within the State” (FAUSTO, 2008, p. 75).<sup>59</sup>

Although one of the texts comes from Spanish America and the second from Portuguese America, analytical relationships can be established between them, recognizing that there are specificities arising from the political system and the dynamics of each of the kingdoms. Although for a long time historians took these regions (Goa and Plata) as mere receivers of knowledge produced in the great centers, the two treatises are indicative – and, however, they were not presented in their entirety in this article – that scientific productions very substantial for the time were conceived in regions considered to be on the periphery. In this sense, also presenting its character as a center of knowledge production is pertinent, which is supported by the fact that even spaces in the Old Continent of the period also had scientific productions that were sometimes fragmented and disparate, as was the characteristic of a period in which science was, little by little and very slowly, becoming institutionalized in the great centers.

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<sup>59</sup> Prosecutors, on the other hand, should not be seen as mere *vectors* for the dissemination of enlightened or European knowledge in peripheral areas. The debates on circulation, and the critique of the diffusionist view, allow for a more nuanced understanding of the local character of the sciences in early modernity. Regions such as Goa and Paraguay were centers of knowledge production, as attested in the printed texts analyzed in this article, the attorneys acted as links of centers, connecting people, books, trades in prescriptions and triacas and other products, having a non-existent role. - negligible in the co-creation of knowledge produced locally from these networks. The action and initiative to make contact with the world outside Prata or Goa also related to the missionaries' need to adapt to adversities and seek resources. The literature points to the lack of inputs experienced in less urban contexts. Over time, this process of adaptive movement produced ways of acting that sometimes deviated from the guidelines accepted in science schools and the definitions of Rome, the unit of reference for missionaries (HADDAD, 2014). On the other hand, the effervescence produced in the contact zones and their singularities, especially in the production of knowledge, had a positive side in the use of diversities, especially in the local flora and fauna, which were different from those of the Europe, which was reflected in new scientific studies and fundamental questions in science.

### Circulation of texts

The notion of the circularity of micro-history has aided externalist studies of the sciences and can be seen as a precursor to the notion of circularity that later scholars such as Kapil Raj sought to develop for cultural studies in the sciences. For Kapil Raj, the sciences did not spread from Europe to the rest of the world as predicted by a first narrative about the Scientific Revolution of the XVIII century. He proposed that the effervescence of the sciences in this period and a little before it would have been due to multiple productions in different territories, connected and modified by the networks that were established.

Therefore, the circulation of knowledge could be defined as: "different from simple mobility, insofar as it implies a double movement back and forth, which can be repeated indefinitely. Circulating, things, men and notions are often transformed. Circulation implies a gradual aspect, and not in the simple reproduction through space of already formed structures and notions" (RAJ, 2015, p. 170). For Carlo Ginzburg (2008), circularity involves how individuals interact with dominant culture.<sup>60</sup>

According to Chartier, care must be taken not to incur in a kind of "ideal type" of the actors' practices. For Ginzburg, the perception of circularity in the text presents a back-and-forth from top to bottom and from bottom to top between the popular and the erudite.<sup>61</sup> Studies on translation and cultural translation contribute to the analysis, since science books are the physical material for compiling knowledge, in which theories and systems, organization of postulates, medical prescriptions and selection of bibliographies come together.

The existence of a limited set of readers in the XVI and XVII centuries sheds light on the need to approach the reading practices through which knowledge circulates (CHARTIER, 1995). At the same time, the different popular forms of reading imply the recognition that they never develop in a

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<sup>60</sup> The discussion on circulation has to do with discussions of microhistory initiated by Carlo Ginzburg in the context of debates on popular and peasant culture and the dominant, or literate, cultures that held more power in the early modern period. Carlo Ginzburg analyzed the case of a miller, in his book *O Queijo e os Vermes*, trying to capture how an individual inserted in the peasant culture of the interior of Italy made a reading, with his lenses, of high culture, defending logical arguments in the face of a panel made up of individuals from the dominant culture and with the death sentence as their destiny. An aspect to be mentioned is that Ginzburg, when working with the hypotheses formulated by Menocchio, presupposed an oral culture that was the heritage not only of Menocchio, but also of a vast segment of sixteenth-century society." (GINZBURG, 2008, p. 10).

<sup>61</sup> "It is possible to summarize in the term "circularity": between the culture of the dominant classes and that of the subordinate classes there existed, in pre-industrial Europe, a circular relationship made of reciprocal influences, which moved from bottom to top, as well as from top to bottom. low (exactly the opposite, therefore, of the "concept of absolute autonomy and continuity of peasant culture" attributed to me by a certain critic). (GINZBURG, 2008, p. 10).

separate and specific symbolic universe of high culture (CHARTIER, 1995).<sup>62</sup> As a result of the views addressed by Chartier, many historians have focused on locating popular culture based on the distribution of certain objects or specific cultural models.<sup>63</sup>

With regard to the two works on medicine, one of the approaches that could be attempted would be to find a fit between these propositions by Chartier on the appropriation of knowledge for studies in the history of sciences. Surely, the exercises of appropriation by the authors about the universes available for the production of texts indicate selections and options in the production of knowledge about cancer. These syntheses are not very clear in the two works. One can, however, consider that the cultural translation of the other as an important element, since many of the scientific works produced in the context of both the New World and in the case of the work written in India relied on the collaboration of different individuals, often from different cultures. different. The synthesis that takes place in the production of knowledge, on the part of those who do it, is constituted as a frame of a broader whole, on the part of the understanding of those who carry out the synthesis.

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<sup>62</sup> In dialogue with the sciences, the author's perceptions of cultural productions led them to two types of problems: 1) popular culture was being seen by historians as a coherent and autonomous symbolic system, which worked according to a different logic from literate culture. This vision took popular culture as responsible for producing an entirely independent world, while in fact there is a circulation that permeates both what is erudite, literate or popular, that is, they are interconnected worlds and not private or independent. 2) The second notion of popular culture that Chartier criticized consisted of considering popular culture as that culture embedded in relations of domination that organize the social world. For him, in fact, this notion saw popular culture as associated with a world dependent on another world, that is, inserted in a dependency relationship. These definitions end up constituting, over time, "a comfortable principle of classification" (CHARTIER, 1995, p.180). These questions may be relevant when asking: from whom do the practices of treatment and understanding of illnesses and the different notions of the body involved in the recipes present in the texts derive?

<sup>63</sup> Instead, he proposed that attention should be paid to the appropriation of cultural objects or models by certain groups or individuals, since the popular could not be described as a list of listed characteristics, as, first of all, the popular concerns to a type of relationship, to a way of using objects or norms that circulate in society. Chartier seems to criticize the way in which classical periodization has observed a dismantling of popular culture over time. According to this tradition, in the Golden Age, popular culture had freedom and independence, and in later times, when there was censorship and coercion, it was disqualified and fragmented. The case of the construction of the image of King Louis XIV shows an alleged abandonment by the upper classes of a culture common to all so far. However, for Chartier (1995), it is not a matter of pointing out a moment of disappearance of popular culture, since "the historiographic destiny of popular culture is therefore to always be stifled, repressed, devastated and, at the same time, always to be reborn from the ashes" (CHARTIER, 1995, p. 181). Debates about the production of scientific books and individual forms of appropriation would therefore involve a specific use of the concept of appropriation. Appropriation for Chartier is distinct from appropriation for Foucault, who understands it as the "social appropriation of discourses", that is, how discourses are dominated and confiscated by institutions. It is also distinct from the hermeneutic sense of appropriation, according to which appropriation corresponds to "the moment in which a particular narrative transforms the way in which a subject understands himself and the world", modifying his phenomenological experience. For Chartier (1995), appropriation aims at the elaboration of a social history of uses and interpretations, paying attention to the practices that produce meanings: "operate a screening between the practices most subjected to domination and those that use cunning with it or ignore it or, then, consider that *each* "popular" practice or discourse can be the object of two analyzes that alternately show its autonomy" or the her absence". (CHARTIER, 1995, p. 190).

For Ivonne Del Valle, the issue of “writing in the margins” is significant. The Jesuits who wrote the works would have been out of their comfort zone and faced with the unknown on a daily basis. The indigenous people who related to the Jesuits also produced local assemblages of power systems, intervening in power relations and, sometimes, producing conflicts and resistance to missional activity. For Del Valle, a phenomenological analysis of the missionary experience would allow the understanding of tensions between contradictory interests in specific territories (DEL VALLE, 2009, p. 14).<sup>64</sup> The loss of the mother tongue by the Jesuits who lived on the borders would reflect a weakening of the universe of these men, which represented a fracture in certain ways of understanding and belonging to the world. On the margins of the Western cultural paradigm, the physical, mental and linguistic constitution of its bearers began to crumble (DEL VALLE, 2009, P. 14).<sup>65</sup>

With regard to books, the analysis carried out on mentions of cancer rested more on more impersonal descriptions and less on references to social and symbolic universes associated with the writing of works by the Jesuits. The option was given in view of the available wealth of texts. Although the analysis of medical works pays attention to specific descriptions, studies that seek to see how knowledge is produced and modified from uses in other spaces may be suitable for a deeper and more local understanding of science. In addition, a relationship could be made with other documentation to

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<sup>64</sup> The dynamics of knowledge production are embedded in a history of cultural exchanges and hierarchies. For Monteiro (1994), it is a story of European domination over native populations, a relationship of hierarchical imposition of one over the other (MONTEIRO, 1994, p. 14). However, the prism of analysis regarding the production of knowledge, within the scope of the missionaries, is seen in this case more through the prism of negotiation than resistance, imposition, acculturation. In *The Comanche Empire* (2008), Pekka Hämäläinen analyzed and showed a native local empire that was able to impose itself in relation to external agents and colonial forces, demonstrating the need to relativize the rate of colonial domination, case by case, provided by the Pratt's contact zone concept.

<sup>65</sup> Del Valle considered that the Jesuits who inhabited the frontier of the colonial world did not exactly represent the western paradigm, since they were gradually going through transformations resulting from the environment in which they were located and in contact with other cultures. The writing of the Jesuits, therefore, would represent a writing of limits, a balancing act in which the enunciator judged his place at the crossroads of cultures. In this situation, the peripheries approached the centers in irregular and inappropriate ways, in confusing words. When leaving the centers and going to the frontiers, the Jesuits are affected by them and, when they return, their writings are modified. The objective of Dell Vale's study, when examining the writings of the Jesuits, consisted of: “understanding the economy of knowledge production that was required of delusional subjects who maintained their order with difficulty, and who, based on incoherent and fragmented, they produced ordered chronicles and encyclopedic general knowledge texts (DEL VALLE, 2009, p. 15). Jesuits wrote about the sciences while being in a certain kind of uncomfortable dislocation. Their productions reflected a kind of traveling condition, in which they were transformed during the slow writing process, which could take months. In this writing process, they dealt with the space in which they were situated and also with alterity. It could be added that, for Hartog, the lived experience concerned the crossing of “names, places, glances that mark the beacons, the moments in which things are disturbed or inflected”. (HARTOG, 2004, p. 16). On the other hand, the missionaries' narratives would act as devices for translating reality and shaping one discourse over the other (BIEHL, 2019, p. 42), although these texts do not contain anthropological descriptions, since the interests are related to pharmacy, surgery and medicine.



try to map the circulation<sup>66</sup>, an operation that presents some difficulty to be carried out. The exercise of analysis of phenomena in the history of science, along a line of criticism of diffusionism, it can be said that it would consist of seeking to examine the local character of knowledge produced in contexts such as Europe, America and Asia, mapping connections of networks and examining the appropriation, accommodation of knowledge and relationships that would allow a deeper understanding of the products of science.<sup>67</sup>

The two works constitute themselves as scientific texts produced in “contact zones”, to borrow Pratt's notion, border zones in which different agents interacted and carried out cultural exchanges in more or less asymmetrical power relations. Far from the metropolitan power, either from the Spanish Crown, in the case of the Jesuit Province of Paraguay, or from the Portuguese Crown, in the case of Goa, India, these scientific books were located, as cultural products, in frontier spaces. In this case, the frontier is conceptualized not as Turner's frontier, which was seen as a civilizing line that advanced, without recognizing a second culture, but the frontier as theorized by Pratt, for which frontier is the space in which the fortifications are fortified. relations between the two sides, mainly due to the distance from metropolitan power (PRATT, 1999).<sup>68</sup> According to Romano (2019), there was a political dimension to the spiritual conquest that came with colonization, and an equally political dimension to the practices that accompanied it.<sup>69</sup>

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<sup>66</sup> For Lissa Roberts (2009), the term circulation was conceptualized to distance itself from the notion of diffusion, according to which knowledge was implanted in other cultures. The definition of the term, for the author, would be: Roberts conceptualized circulation: “circulation is different from simple mobility, as it implies a double movement of coming and going, which can be repeated infinitely. In circulation, things, men and notions often transform themselves, and this implies leaving aside a simple reproduction of preconceived forms and structures (ROBERTS, 2009).

<sup>67</sup> In the case of the two books analyzed, the operation did not take the breath it should have, not aiming for circulation, but on the other hand, it would have the small originality of the specific crossing of the analysis of tumors in works between two empires. Still on circulation, for Roberts, although circulation seeks to distance itself from diffusion, it could be seen a bit as a vision of the notion of progress within a supposed Western and non-Western dichotomy. Based on the dichotomy pointed out by Roberts, it can be said that talking about science, in this relationship between constructs involving Westerners and non-Westerners, would end up referring to a limited construct, in the case of works produced in contact with non-Westerners, such as the medical texts produced in contact with the Guaranis. Asúa analyzed a case of scientific production resulting from a joint work between Guaranis and Buenaventura Suárez, a type of solar clock, pointing to the existence of this type of collaboration for the manufacture of scientific instruments in some isolated cases, but perhaps recurrent in the region of Rio de Janeiro. of Silver (ASÚA, 2014).

<sup>68</sup> For Certeau, the texts written by the Jesuits could be seen as a hermeneutics of the other, which transports to the America and to the East a whole kind of Christian exegetical apparatus, born of a relationship with the Jewish otherness that was applied to the biblical tradition, to Greek or Latin antiquity (CERTEAU, 2013, p. 239). , is perhaps too centered on an ideal Jesuit figure, which could be questioned.

<sup>69</sup> Many works emphasized the political dimension of Jesuit action in the American continent, which led to the subjugation and destruction of local populations.<sup>69</sup> However, the production of knowledge in natural science was much more a collaborative process than an impositive process. People have a natural tendency to collaborate.

About the limits of circulation, it is possible to point some aspects. According to 17 of the transcriptions of documents from the General Archive of Seville (Anhang 17) carried out by Corinna Gramatke about the vessels headed from Europe to the Jesuit Province of Paraguay, it was possible to point out that the majority itinerary of the vessels of the Jesuit procurators were Europe-New World and New World-Europe. However, some of the itineraries consisted of other routes (GRAMATKE, 2019). It is not known whether this circuit involved Goa, as they were two units of the Order separated by empires, and direct contact between the missions could not be confirmed. In terms of the circulation of knowledge, colonial spaces could be defined as mobile, dynamic and mutable regions, but still frontiers, with limits that are sometimes difficult to overcome (BRACHT, 2018, p. 189).

Postcolonial studies have emphasized the criticism of the notion of “colonial science”, since it does not value the connections that existed between the European world and the African and Asian worlds.<sup>70</sup> According to the understanding of the time by the Europeans, the Indies were composed of a number of ports and states, in addition to kingdoms and sultanates of the islands of the Malay archipelago. Under the control of Arab rulers and merchants, located between the Strait of Hormuz and the east coast of Africa. The region consisted of a number of merchant communities, whose ports were sometimes autonomous and, at other times, governed by distant empires, with Asian, African and European vessels passing daily (BRACHT, 2016, p. 95).<sup>71</sup>

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<sup>70</sup> In view of this, the *Connected History perspective* sought to blend the connections made between the Asian, African and American regions, thinking in this case of spaces in which the Jesuits acted. As they were routes that did not coincide, given that one work was in territory owned by Portugal, while the other was in territory owned by Spain, it is possible to return to the limits of circulation pointed out by Bracht (2019). From the Portuguese Empire onwards, the East Indies comprised the entire region that surrounded the Indian Ocean, in which the circulation of large vessels was influenced by the climate regime of the monsoons. The extent of the East Indies, whose center was Goa, varied significantly between the XVI and XVIII centuries.

<sup>71</sup> Some of the locations with which Goa had some proximity were producers of glass, spices, luxury goods and metallurgy. This macro-region, managed by the Portuguese crown, had riverside territories, ranging from the Cape of Good Hope to Japan (THOMAZ, 1994). According to Bracht (2016), Europeans found it difficult to move inland in the Indian subcontinent during the XVI century and most of the XVII century, only penetrating the most coastal layers, which was only better done throughout the XVIII century. Charles Boxer demonstrated that the difficulties faced in the process of expansion and establishment of the Portuguese Empire were due, in part, to logistical problems (BRACHT, 2016, p. 99). The limits of the work of analysis of cancer treatments in both works are associated with the fact that the analysis was done, in a certain sense, vertically, while, in practice, the complexity of the theme would require a slightly greater transversality in terms of the historical aspects involved considering that the analysis involves two distinct Empires. From the social point of view, there would be big differences in the political, social, cultural and religious dimensions between the societies of Goa in the period and the Jesuit-Guarani missions of Latin America. Even, as stated, the reductions in Colonial Paraguay had a waterway for logistical outflow, while the geography of Goa was not well worked on in this analysis. Even in the works of medicine and science available in the collections of the two Empires, there could be differences considering the censorship practices, taxes for the acquisition of materials, the availability of volumes in languages, respectively, Spanish and Portuguese for the composition of libraries. One of the problems not addressed in the analysis consisted of how the authors of the analyzed scientific treatises related to the complex networks of bureaucratic, administrative, religious, racial and economic structures of colonial universes. In an analytical study of

The two books can be seen as works of natural philosophy or the natural sciences of their specific time period and context. They convey a descriptive language of illnesses and treatments that can be carried out with the tools known to their authors. The works can be inserted into a set of texts that contribute to the construction of a metalanguage of science at the time, as medical texts will gradually begin to present a more technical language, which is the result of an accumulation of texts and technical definitions. and conceptual. Little by little, technical terms are gaining a certain consensus, especially those produced in official circles and evaluated by peers.

However, the process of universalizing knowledge is quite fragmented in medical and pharmaceutical sciences and occurred only in XIX century.<sup>72</sup> Furthermore, the process of incorporating physics concepts, which developed mainly from the XVII century onwards, was quite slow.

Although they were written in the XVIII century, it was not possible to locate influences from the dynamics of bodies, developed by Newton and published in 1687, or notes on experiments with prescriptions that were more influenced by notions of reproducibility of experiments, as began to be developed by Galileo Galilei (1564-1642). When he was interested in solving a problem using this method, Galileo isolated the problem into premises and carried out experiments repeatedly to test the data.<sup>73</sup>

In this sense, the authors' landscape of nature was not modified by the Newtonian image of nature and phenomena, or at least these affects are not observable in the text. A profound philosophical change was introduced in European universities after the studies of Galileo and later Newton were published on the movement of bodies. Until then, notions of cause were influenced by

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different works written in Goa in the XVIII century, Bracht listed four topics that make the understanding of medicine and pharmacy of the Portuguese Empire in Asia more complex. The following can be mentioned: i) the size of the territory in view of the lack of material and human resources and the need to use knowledge and local agents; ii) the role of religious orders, mainly, but not only, of the Society of Jesus, in the teaching and practice of science; iii) the State policies that were implemented throughout the seventeenth century for the inclusion of local agents in the knowledge production networks about the empire's natural potential; and iv) the transversality of racial issues (BRACHT, 2016, p. 109). In this sense, the theme of enslavement of Africans, their cultural and medicinal practices, as well as other elements are also inserted in a system whose variables are very complex when one intends to equate the production of knowledge and the elements that can be identified as circulation. Just to exemplify, the work *Árvore da Vida* mentions sugar from Brazil in its recipe book. It is known that the sugarcane production system in Brazil relied, in this period, on enslaved labor.

<sup>72</sup> For Russell, throughout the XVIII century and based on the reverberations of scientific production in culture, three factors occurred that are particularly important for the slow modification of structures of thought by a more literate portion of societies: 1. the affirmation of facts it should be based on observation and not on unsubstantiated authority; 2. the world would act as an autonomous system that would perpetuate itself in accordance with natural laws and without external control; 3. Earth would no longer be the center of the universe and man would not be its purpose. Furthermore, purpose would be a scientifically useless concept for the man of science in general (Russell, 1953, p. 17).

Aristotelian thought, which even predicted final causes or an idea of purpose. Galileo and Newton contributed to the creation of a background image, a landscape of a disinterested nature of the observer (also part of it). These studies allowed the understanding of force relationships and the development of expressions with vectors to quantify magnitudes, as well as leading to an understanding of relationships involving time and reproduction of experiments, first with Galileo's studies, and later with Newton. Such introductions into the thinking of the time had impacts as violent as the introduction of Euclid's Elements in early times.

The Newtonian image of the world, which can be expressed by interpreting matter in terms of forces, inertia and movement and by Newton's second law, in which the force and movement of two bodies can be quantified, is not reflected in the texts. Human bodies could also be seen as vectorially decomposed objects, which gradually led, especially in the XVIII century, to a mechanistic and materialist understanding of matter, which was already carried out by some physicists in the XVIII century.<sup>74</sup>

It is not a question, when analyzing that the two medical treatises do not use Newtonian concepts, but Aristotelian ones, that they are behind in scientific terms what they could be. Historical analysis starts from concrete conditions and seeks to avoid anachronisms. One must consider the time required for the absorption of Newton's ideas in European scientific centers, and not just the years of advent of Newton's theories in his lifetime.

The incorporation of scientific concepts from one field to another takes time, and the circulation of texts depends on concrete conditions to occur. On the other hand, there are ongoing scientific traditions that support standards, which take time to be modified by new ideas. Newton's classical mechanics took a long time to establish itself, since there was a background of Aristotelian influence that was better established in the academic centers of the period. Medical texts seem to be influenced by the ideas of Causes in Aristotelian thought, including final causes. They can be inserted,

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<sup>7474</sup> As a result, in the language of empirical sciences, more physical and statistical elements that were based on quantitative data began to be adopted. Although there are substantive differences between the languages of each scientific field, especially between experimental sciences and mathematics in terms of object, intentionality and method, it can be noted that medical texts will gradually incorporate the notion of reproducibility of procedures, being carried out more repetitions to prove a therapy and also a more data-driven approach. The modern period, especially in scientific writing, will accompany a slow transformation in the cultural matrix, which will become more accentuated in the XX century, in which societies begin to establish a purpose not in religious thought, but in scientific thought. If in previous periods, the mechanistic vision of the universe was given by isolated agents, especially those who had access to foreign literature and academic spaces, later the language of dictionaries incorporated terms that helped to constitute the mechanistic imaginary of the world, such as: model, chain, causality, experiment, proof, theorem, refutation, nature, reality, description, induction, deduction and method (Guillen, 1987; Davis, Hersch, 1989).

in this sense, in a very long and complex historical process of fracturing the Aristotelian natural description for the consolidation of classical mechanics, although they are not texts that convey two dissident theoretical matrices, but were produced within an era that will also be the era of classical mechanics.<sup>75</sup>

### **Epistemological influences in medicine and differences between books**

According to Henrique Carneiro (2013), the rising practice of experimentalism, distinct from classic humoralism, had been gaining strength in the 1700s. The works of new empiricists, such as Rabelais, Garcia de Orta and Paracelso, who promoted changes in medicine, which coexisted, in the 16th century, with all kinds of herbal knowledge and with the auctions of drugs offered in the markets (CARNEIRO, 1994, p. 65). In addition to popular knowledge and the diversity of plants and drugs from the colonial empires, new assumptions emerged, such as iatrochemistry, which proposed healing through similars, thus opposing healing through opposites.

There are differences between Goa, in India, and the mission region in Colonial Paraguay. In terms of climatic differences, the sub-tropical climate is more common in the South American region, while in the territory of Goa, in South Asia, the climate is more tropical. Both have temperatures that vary between mild, high and very high, with conditions for the development of biological diversity in specimens. The characteristics of local plants in each of the territories resulting from the process of evolution and adaptation to the environment of fauna and flora are reflected in the biological specimens that are mentioned in the recipes, as the agents used what they could see and touch. In this sense, recipes are indirectly associated with an entire phylogenetic history of animals and plants that were in the regions in the past before the agents and also in the present.<sup>76</sup>

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<sup>75</sup> For Koyré, there was a slow historical process from which humanity sought to master of nature, while medieval or ancient man only pursued its contemplation. The mechanism of classical physics – Galilean, Cartesian, active, was destined to make humans “the master and possessors of nature”, which would be explained by the desire for exercise influence in the physical world (Koyré, 1966, p. 12). Over time, the notion of static nature became dynamic and the notion of agency surpassed these categories. The development of the Cartesian plane, proposed by Descartes (1596-1650) was substantial in making the mathematics subsequently developed more operational. The introduction of the axis coordinate system in the constitution of the imagination about mathematics can be considered a very strong change. Cartesian science and Galileo's science would be “a science of engineering”, which can be seen by the explanations that use images of Cartesian physics with its pulleys, ropes and levers.

<sup>76</sup> At the beginning of the XVIII century, the State of India no longer played a fundamental role in controlling Asian trade. Despite the smaller market share, India provided conditions for traders to carry out their work, as well as merchants, missionaries and even mercenaries, considering regions such as Macau, Abyssinia and Siam (Bracht, 2023, p. 456). The natives of Asia, many of whom were mestizos, formed an increasing portion of the groups dedicated to

In the 1700s, a gradual transposition of experimentalism with plants and animals to texts on *Materia Medica* and erudite medicine was observed, despite the continued use of magical remedies. Despite the scientific works of the Jesuits presenting, upon closer examination, sets of knowledge considered mestizo or peripheral within their authorized micro-universes of understanding, namely, Galenisms, the classification systems of the natural world that fit into a baroque conception, governed by occult forces that allowed the inclusion of the divine in its interior, it can be said that there are micro-contradictions between the lines of the works since they present elements that, in an orthodox reading, could be classified as witchcraft within more Jesuit discourses strict at the time. The mention of magic-astrological practices and even Ayurveda, in the debate about conformation within a Christian conceptual matrix, could imply the debate about what is magic and what is sorcery.

For Farberman, who analyzed persecution of women in the context of Buenos Aires and Córdoba in the XVIII century, there was a consensus at the time that witchcraft was associated with the ability to cause harm to others. In civil courts, proceedings against witchcraft practices and punishments of marginalized women would have been carried out. Farberman analyzed the relationship between the understanding of witchcraft, the criteria for crimes and the intertwining with gender and race. The Jesuits would have carried out cases against witchcraft, in the number of 26 cases in total. The Jesuits, therefore, rejected witchcraft practices, and fought against them. Black women would be the most accused of witchcraft, as they are associated with the stereotype of an uncontrollable sexual desire (GOLDBERG, 2000, p. 67-83). Indigenous women, on the other hand, would also be accused of witchcraft practices in cases found by the author in the town of Tucumán (FARBERMAN, 2016).

In this sense, an analysis of oncological treatments used in the context of America and Asia in the first decades of the modern period must take into account the colonial structures that were implemented, considering the composition of populations, the characteristics of the world of work and income and the existing social dynamics, which are marked by gender and class differences. These differences affect the percentage of individual freedoms and powers to act with curative treatments and obtain income that each agent has during the period in which they live (FARBERMAN, 2016).

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religious activities and also of the members dedicated to the secular clergy. With the incorporation of mestizos into the Orders, there were also slow changes in the structures and worldviews conveyed in internally circulated texts and works that aimed to describe the natural world, especially when the subjectivity of the authors appeared.

The plants, leaves, fruits and foods used by traditional populations to prepare medicinal recipes were collected from wooded regions where there was specific biological diversity. Little by little, there is a process of appropriation of these spaces by owners, purchase and acquisition by settlers and by the State. Laws and legal instruments are also being created at the same time as the introduction of new technologies and agricultural mechanization (MAJO, RELLY, 2020, p. 6). As a result, there is both a modification in the distribution of plants and biological specimens in the territories, as well as cultural changes in local social dynamics. If previously there was easier access to certain regions on foot, where there was a greater supply of resources, greater travel is now necessary to obtain resources, and there are also changes in the lifestyle of the populations. Territorial movements to collect resources become less frequent as they require resources and planning to be carried out.

For Bracht, there is evidence of the influence of traditional Indian medicine, or Ayurveda, in the way European doctors absorbed and learned knowledge about medicines and diseases from the Indian subcontinent (BRACHT, 2020, p. 376). In part, these adaptations are due to the availability of remedies that were found in the Indian context, of which local recipes were used in a more comprehensive and descriptive way. There were also the Vaydias doctors, who were Indian herbalists and apothecaries who worked in hospitals and also provided care to the Portuguese authorities (BRACHT, 2020, p. 377). Much of the knowledge reported and written by the Vaydias was absorbed and circulated in the networks of contacts established with European merchants and apothecaries.

At the Royal Hospital of Goa, created by the Portuguese Crown and administered by the Irmandade da Misericórdia and later by the Society of Jesus, doctors with Portuguese training worked. Records indicate, however, that the services of Indian doctors or healers were also required, which was mentioned in the work Notebook of various oriental medicinal recipes, from 1696, by João dos Reis. This work had a chapter called "Use and practice of pandits from the East", in which it reports on some relationships between Europeans and Indians at work at the Royal Hospital of Goa (BRACHT, 2020, p. 377). There was, however, a rivalry between Europeans and Indians who fought for space in the field of healing and care for the sick, inside and outside hospitals. These disputes occurred because salaries were higher in hospitals and in positions of higher social status, which were more difficult for Indians to access, who had empirical knowledge about local characteristics of nature in Goa.

There was a group of Indian doctors, surgeons, herbalists and healers who were mostly educated in their own traditions, whose origins were mostly Hindu, and were more concentrated in communities in which Christian populations were a minority. On the other hand, there was a second

group, composed of agents educated in the European tradition, who worked more strongly with religious orders, whether close to the Dominicans, Franciscans, Augustinians and, mainly, Jesuits (BRACHT, 2020, p. 382). There were also benefits that the colonial administration reserved for agents who converted to the rules imposed by Christianity. There were racial barriers imposed by the colonial administration and, on the other hand, there was distrust on the part of the elites towards agents of the healing arts who were not converted (BRACHT, 2020, p. 384). This led to some non-Christian agents having less space to act and, on the other hand, it influenced the decision to convert a portion of agents into the healing arts.

In this article, we seek to address the treatments and concepts for cancer in two books from the 18th century, *Libro de Cirugía*, from 1725, and *Árvore da Vida*, by Afonso Costa, from 1720. The exercise of comparison between two works separated by oceans allowed us to point out that both had influences from Galenism in the treatment of tumors, as well as some common recipes for the time, such as the use of white wine. On the other hand, there were differences between them, so that in the Jesuit Province of Paraguay there were influences from astrological medicine, and also several plants with indigenous names and influences from the exchanges and learning of the Jesuits with the local inhabitants, notably Guarani, although these treatments indigenous peoples are not exactly portrayed in the chapter on tumors in the Platinum manuscript. What is observed in it is that, in other chapters, indigenous terms were present. With regard to cancer treatments, they were guided by: use of purges, cauterizations, use of medicinal plants in the form of plasters and local surgery to remove tumors.

In Goa's work, mentions appeared of the use of plasters, a common practice in medical treatises of the period, cited in French works as topical remedies (*remedes topiques*), like the mentions that are given in the book “*Sur la nature et guerison des cancers [...]*” (Montpellier, 1701). On the other hand, in the work *Árvore da Vida*, lighter treatments were portrayed than in the *Libro de Cirugía*, with no mention of surgical extractions. The difference in approach in the works is quite significant. While in the Goa work the use of plasters and strategies to soften illnesses and wait for them to pass a more advanced stage, becoming milder, were reinforced, in *Libro* there was an assessment of the situation of the tissue and, in more severe cases, the use of blades and knives was triggered. The main example was the extraction of tumors in the breasts, which happened in the *Libro de Cirugia*, denoting the more surgical profile of the work and, although of unknown authorship, its author's character of a surgeon: “When the cancer is in the breasts, and cannot be cured with any medicine, it will be stretched by cutting it with a knife, removing all the tumor with its raises, opening it in a cross will be defleshed,



and with the hands it will be squeezed out so that all the skin is removed. melancholic [...]” (LIBRO, 1725, p. 394).

It was not possible to find common names of scholars in the chapters on tumors. While in the *Libro de Cirugía* there is mention of Lasaro Ribeiro, name unknown, and renowned authors such as Hippocrates, Galen and Dioscórides, in the chapter on cancers in *Árvore da Vida* the prescription is presented more directly and without mentioning the authors of reference. In the debate about the unknown authorship of the *Libro de Cirugía*, there were discussions about Pedro Montenegro, the author of *Materia Medica Misionera* (1710) being its author. Although he had practical passages in which he learned surgery, such as at the Madrid Hospital (POLETTI, 2014, p. 179), it cannot be said that he is confirmed as an author, since more detailed analyzes have already been carried out by Biehl and Fleck (2020) and did not prove the authorship of the work.

The processes by which scientific theories are contested are gradually slow (KUHN, 1985) and discoveries lead to the contestation of provisional truths and the ways in which other truths are being questioned and new models are being conformed. In the case of cancer treatments, the slow change in paradigms from tissues to cells occurred as a result of internal debates arising from observation work with microscopes, especially in France, and it took place over a slow period, since there were practices carried out in spaces not -academics who reinvented galleonisms and produced new theories at the hands of practitioners, apothecaries, healers and barbers. The cellular understanding of cancers, associated with the microscopic observation of tissues and the understanding of the sub-parts that make up cells, were gradually incorporated into books on medicine, pharmacy and surgery, so that the tissue understanding of cancers, present in *Árvore da Vida* and the *Libro de Cirugía*, were gradually being superseded by emerging concepts in cell biology in later centuries.<sup>77</sup>

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<sup>77</sup>At the level of illustrating the process of change in theoretical frameworks subsequent to the treatises based on Galenism and its echoes, studies with microscopes produced some works, such as the work “The cellular pathology...”, by Rudolf Virchow. In this work, the German pathologist established some of the bases of the theory of general pathology, and in this period other studies also presented results using the notion of cell. In this work, Virchow brought definitions of the sub-parts of cells, dialoguing with other authors, such as Theodor Schwamm.<sup>77</sup>The conceptions of Virchow, Schwamm, Marie Bichat and other authors of the late 18th century should not, however, be associated with the 18th century, since they would produce anachronisms, errors in temporal associations. On the other hand, they could fall back on a narrative of the progress of the sciences that, if not well done and punctuated, could be simplistic. At the end of this analysis, it can be mentioned that the 18th century, analyzed from the manuscripts, involved the production of knowledge on the margins and was responsible for, in some cases, bequeathing contributions to the sciences, which do not “universalize” without big costs. On the other hand, efforts to show global links in knowledge production, although difficult to establish, are quite valid.

A better understanding of what the epistemology behind the understanding of cancers in the period of the first modernity is depends on some factors. First, there are scientific reports supported by treatises on medicine and science of the period, which were based on theories and on the framework of natural philosophy of the period, which was quite broad. On the other hand, texts written by priests in America and which, perhaps, dealt with tumors, had non-scientific purposes and, in many cases, were reports from memory.<sup>78</sup>

The works written "on the margins", as the two books can be considered, did not contain the same surgical instruments that were manufactured in the large centers of the time. The two texts on medicine and surgery are compared with a third text that is the result of an academic study in France at the time, entitled *Recherches sur la nature et la guérison des cancers* (1701). Published in Paris by Claude Gendron, the book presents surgical strategies for cancer cases, including breast cancer. The author describes several surgical instruments using specific nomenclatures. The study distanced itself from Hippocratic-Galenic humoralism by considering that the disease had a genesis in local tissue structures and not in a broader flow of humors. In this sense, it allowed advances in the field of surgery, being the thesis of a doctor educated in France at the time.

It can be said that the work published in Paris and resulting from studies in Montpellier is a work produced in a context of a center for access to resources and information, while the works produced in America and Goa, although resulting from orders that had connections and resources, being knowledge-producing regions, were not located in a privileged academic space during the period. The analysis of center and periphery is complex as these spaces were also knowledge-producing centers, however, it must be considered that certain borders are difficult to cross and that the arrival of certain resources and information can take time in both directions. A more accurate analysis could map the connections between spaces based on documentation. Another aspect is that the texts were produced in different languages, with linguistic borders on both sides.

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<sup>78</sup> Because they are memory texts, they had other elements with them, such as the appreciation of the role of conversion over local peoples. In these cases, illnesses and healing were included in divine participation, through the work of missionaries, with a view to putting the missional project into effect. A last aspect to be considered is the fact that the knowledge circulation networks and the very existence of the Order in different geographical contexts is due to the Order's ability to maintain itself economically, and also to its product commercialization strategy. It is through the economy and trade that one can better understand the relations of knowledge production, that is, it was through the structures of capitalism that there were conditions to scale the production of certain knowledge more broadly, once there was sustainability financial.

Although a detailed analysis may indicate a greater variety of plants mentioned in books produced in Goa and Colonial Paraguai of the period, it can be considered that the texts should be understood as works on the margins in terms of libraries available for consultation. It is possible that the authors had smaller collections to consult information than in Montpellier or Paris, considering that France constituted a very strong medical school in Europe.

It can be considered that Gendron's French text was more focused on technical aspects of how to perform removal surgeries and use instruments to operate, as well as describing the disease in terms of characteristics observable to the naked eye (ABREU; ABREU; MARTINS; 2023). However, the text produced in the South American missions made greater use of plasters and plants, as was the case with the text produced in Goa.

The incorporation of recipes with magical-astrological elements in the American case or traditional Indian medicine in the case of the Goa text were consequences of the difficulties in obtaining certain resources from abroad and mainly due to the knowledge of local agents, whose medicines were accepted by the communities. But, in a broader temporal view, what characterizes changes in cancer treatments are changes in structures of thought and the movement of change in accepted concepts, of acceleration and deceleration, which culminate in paradigms and new ideas (KUHN, 1977).

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