THE PORTUGUESE DISCOVERIES AND THEIR INFLUENCE ON EUROPEAN MEDICINE

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Resumo
Os Descobrimentos e a Expansão europeia foram um fenômeno que modificou profundamente indivíduos, nações e sociedades tanto no Novo como no Velho Mundo. Os contactos protagonizados por indivíduos e a bagagem material que transportavam consigo introduziram na América agentes microbianos responsáveis pela difusão de doenças que tiveram um efeito demográfico devastador junto da população ameríndia. Proponho-me abordar a difusão das doenças epidémicas no Velho Mundo junto da população indígena incidindo a minha abordagem às colónias portuguesa e hispanoamericanas; e à influência que os produtos vegetais do Novo Mundo tiveram na terapêutica ocidental.

Key words: Atlantic Ocean; Old World diseases; New World encounters; Imperial expansion; Therapeutic properties of plants; Traditional knowledge

1. OBJECTIVES AND APPROACH

The process of expansion on a global scale that was initiated by Spain and Portugal in the 15th century enabled contacts and encounters - that were often transformed into conflict and confrontation - between civilizations and cultures of different regions of the planet. It resulted in a meeting of the East and West, and was an encounter between ancient unknown worlds and an unveiling of new worlds. The important role that navigation techniques and naval construction played in enabling the progress of adventurers overseas that were still populated by mythological creatures and were rife with very real dangers is well known. Likewise, one is aware of the importance of the role of wind systems and ocean currents or the monsoon for the progress of ships and the discernment of coastlines.

The different forms of political, administrative, commercial, military and urban control that were established by the Iberian kingdoms in vast regions that included not only extensive oceanic tracts but also, in many cases, interior regions of the African, Asian and American continents have also been studied. One has focused upon the political and ideological discourse underlying the formation of colonial empires that, in their structure
and in the construction of a specific identity, adopted their "mother countries" as their paradigm.

Finally, one can view the Discoveries and European expansion as a phenomenon that had a profound act on individuals, nations and societies, both in the New World as well as in the Old World. This is plainly evident, for example, in the transferal of cultural techniques that saw the construction of buildings and the implantation of urban centers with European features scattered over the four corners of the earth; in the diffusion of military technology that gave rise to the episode of the introduction of the rifle in Japan or in the acclimatization of plant specimens such as corn, potatoes or cassava, which had a decisive impact on nutritional habits and, in certain periods, on the very survival of the world population.

It is undeniable that European expansion enabled an accentuation of not only the circulation of individuals, raw materials, technical instruments and materials, but also of innovative technologies and a reciprocal awareness of cultures, attitudes and ideas that, in many cases, was not entirely translated into understanding or exchange.

These contacts realized by individuals and the material baggage that they took with them, also introduced, in many regions around the globe, microbial agents that were responsible for the diffusion of diseases that had a devastating demographic impact upon indigenous populations who had no immunity against the diseases of the Old World, such as smallpox, measles, influenza, typhus, diphtheria, bubonic plague, cholera and scarlet fever. This impact has been defined by Sheldon Watts in the following words: "On no other continents in historic times has a combined disease and Construct phenomenon led to the collapse of an entire indigenous population" (Watts, 1997, p. 84). After pondering upon the theme that was proposed to me for this paper, I opted not to approach the consequences of the Discoveries in Western medicine in its entirety. Rather, I chose to expound upon two topics that I consider important: the diffusion of Old World epidemic diseases amongst indigenous Amerindian populations, focusing upon the particular case of Latin America, i.e. the Portuguese and Hispanic American colonies; and the influence that natural products and, especially, plant species from the New World had in Western therapeutics.
I would like to emphasize that the process was not bi-dimensional. There is no doubt that the new Hispanic arrivals were the prime agents responsible for the diffusion of pathogenic germs that caused devastating diseases amongst Amerindian populations. As a counterpart to this, they were also the ones who transmitted diseases such as syphilis (which was called the "European disease", "Portuguese disease" or "St. Job's disease" by Asian populations), chiggers (a Brazilian cutaneous disease caused by an insect that lays eggs in human skin) and, as is currently the subject of a controversy being debated by Anglo-Saxon and Hispanic historiography, yellow fever, amongst European, Asian and African populations³.

On the other hand, the commercial network that was formed by Iberian ships and caravels enabled the appropriation and diffusion of therapeutic and food products that, without exception, had vital repercussions on different continents. Doctors and surgeons, dispensaries and new medicines, hospitals and medical practices that were hitherto unknown amongst the Amerindians were also transported to the New World⁴. It was a process of exchange at a global level and not only one of appropriation and imperial expansion by the European powers.

2. THE DISEASES: CENTERS, AGENTS OF TRANSMISSION AND PROPAGATION FACTORS

At the very outset, I would like to make it clear that America was not a land free from disease. Human remains found by archaeological excavations, artistic representations and texts or pictographic codices belonging to pre-Columbian societies who had writing systems, as well as accounts by individuals of colonial societies, such as soldiers, administrators, missionaries or travelers, all lead to an undeniable conclusion: American societies prior to the period of contact were affected by infections ranging from gastrointestinal diseases, infectious diseases of the respiratory system, viruses, yellow fever, tuberculosis, anemia, osteoporosis, caries and parasitic diseases, as well as boussarole and venereal syphilis, which rapidly spread amongst the population of the Old World⁵.
It is also known that some of the diseases that existed prior to the period of contact, such as tuberculosis, attained unusual proportions amongst Amerindian populations who were affected by the ecological devastation that resulted from the Iberian colonization, as a result of bad nutrition and maltreatment of the indigenous population, demoralization, lack of hygiene and medical assistance for the sick, as well as by political, social and cultural disintegration. To these diseases were quickly added the ones brought by the Europeans, causing a true demographic catastrophe amongst the indigenous populations, who had a different immune system or, as has recently been propounded, a genetic homogeneity that enabled certain viruses, such as smallpox or measles, to adapt themselves rapidly to the immunological response of their host and thus attack individuals with the same genetic characteristics in a much more aggressive manner

In addition, one must keep in mind that the chronology of the diffusion of diseases in the New World is uneven according to the territory under consideration. In many regions of Hispanic America, such as, for example, the island of Hispaniola or the sophisticated Aztec and Incan Empires, the appearance of epidemics of European origin occurred much earlier than in Brazil. For example, in 1518, the Taino, who were the inhabitants of Hispaniola, were attacked by an epidemic described by a missionary as being similar to the easily recognizable smallpox, but in a much more virulent form. In the mid 16th century, this population had died out completely. In the same way, shortly after Hernán Cortes’ visit to Tenochtitlán, smallpox caused much death and destruction amongst the Aztecs. The epidemic helped the conquistadores to subjugate Montezuma's Empire, which submitted to the Spanish armies in 1521.

As for the Portuguese colony, the first epidemic diseases were seen amongst the Tupiniquins and Tupinambás in 1550. The first smallpox epidemic, followed by an outbreak of measles, devastated the Brazilian coastal regions only from 1562 onwards, drastically reducing the numbers of Amerindians in colonized areas and affected groups in regions as far apart as Bahia and São Paulo. This phenomenon has normally been explained by the characteristics of the Amerindian occupation of the land that, in colonial Luso-Brazilian territory, was demographically more rarefied and predominantly nomadic or semi-sedentary in nature, as well as by the characteristics of the Portuguese colonial
presence that, for a long time, remained confined to the coastal regions. The diseases that decimated the Amerindian populations were defined by the colonists who survived almost unscathed, as "the secret judgment of God". Divine mercy saved the faithful, and punished and destroyed those who opposed it, those who were savages, barbarians, cannibals, polygamists and sodomites, i.e. those who lived without faith, laws or king. The Amerindians, situated on an inferior level in the hierarchy of human development, had to submit, acculturate themselves and become Christians. In this regard, Jose de Acosta stated: "All those who are scarcely men, or only half men, must be taught how to become men, and be instructed as if they were children".

Finally, it is important to mention that if many of these infections originated in Europe, the ships that called at the ports along the American coast formed a network that transmitted diseases that came not only from the European continent but also from Asia, and especially, from Africa. Dauril Alden and Joseph Miller in "Out of Africa: The Slave Trade and the Transmission of Smallpox to Brazil 1560-1831" consider the smallpox epidemics to have been leading killers and consider tropical Africa to have been "the primary source of smallpox contagion in Brazil", particularly during the 17th and 18th centuries, when an increase in the slave trade resulted in more frequent and intense connections between the ports on both sides of the Atlantic.

Further, one must keep in mind that many of these infections propagated themselves more rapidly than the colonizing presence, provoking sequels amongst Amerindian groups who, until that time, had not had any contact with Europeans. Viruses and bacteria were spread by the indigenous people themselves by means of lines of communication and internal commerce or, also, by wars between tribes. As a consequence empires and kingdoms that were in the throes of crises of dynastic succession or had been demographically debilitated by the epidemics, fell more easily into the hands of the Spanish and Portuguese conquistadores, as was the case of the Incan Empire or the region that lies between the basins of the Plate and Paraguay rivers.

If the Amerindian tribes possessed medical knowledge that was more or less effective in treating the diseases that they were habitually afflicted by, when they were confronted with the diseases introduced by colonists or conquistadores they were
completely helpless\textsuperscript{10}. Their traditional remedies were not effective, medical treatment for patients was not, in some cases, a practice that was traditionally followed and in many cases, there were no survivors within a family or group. Many tribes who were affected by the epidemics tried to survive by fleeing to areas that were increasingly more remote from the European presence. Others placed themselves in a position of notorious dependence upon the missionaries of various religious orders, who were known to have curative and palliative capacities, sometimes identified with magic, and who were less aggressive than the colonists in exploiting indigenous labor\textsuperscript{11}.

3. THE INFLUENCE OF THE NEW WORLD ON THE THERAPEUTICS OF THE OLD WORLD

It is obvious that the pre-Columbian civilizations, irrespective of the degree of complexity of the civilizations and cultures that characterized them, had developed therapeutic practices for the treatment and cure of many diseases that afflicted the American population. They practiced a pre-scientific medicine, the product of an empirical knowledge of the pharmacological application of natural products mixed with magic, superstition and religion\textsuperscript{12}. The power of steam baths, massages, fumes, suction, amulets and talismans was more effective when their priests, pajés and shamans muttered magic formula and powerful spells and manipulated and ministered plants and roots\textsuperscript{13}. For example, Incan medicine utilized coca to stimulate physical activity and suppress fatigue, thirst and hunger and quinquina as a febrifuge and in the treatment of malaria. The Aztecs used guaiacum, jalap, castor oil and sarsaparilla as hallucinogenic agents. The Guaranis of Paraná and Uruguay medicated themselves with yerba mate for its properties as a stimulant and stomachic powers and with paico, a kind of chenopod, against intestinal parasites.

Many of these products, such as sassafras, guaiacum and tobacco, were taken to Europe and introduced into European medicine. "Iberians who expanded their pharmacopoeia with native medicinal herbs did not, however, alter their theories about the causes and cures of disease or the practice of medicine. They transplanted their medical traditions intact from Iberia to the New World but extended them in anemic form to the
frontier, where all but the largest towns and military posts lacked doctors and hospitals" (Weber, 1992, p. 316).

From the 16th century onwards, natural products that were used for alimentary, industrial and therapeutic purposes and had, until then, been unknown or used sparingly owing to their rarity and high prices in the Old World began to arrive in Europe14. If the New World became one of the main suppliers, it is also important to note that, in an initial phase, Europe's attention was focused on the Orient. The discovery of the route via the Cape of Good Hope enabled a direct access to the sources of various spices that, from being rare and expensive products, used in kitchens of the elite or in doctors' and surgeons' dispensaries, now began to be consumed and appreciated by a far wider section of the population.

Having established himself in a centre of production and commercialization of spices, in the capital of the Portuguese Empire in the Orient and thus being able to directly observe the medicinal remedies used in the pharmaceutical art of the time, Garcia de Orta, a Portuguese doctor who graduated from the Universities of Alcalá de Henares and Salamanca, wrote the work entitled Colóquios dos simples e das drogas e coisas medicinais da Índia, published in Goa in 1563. This individualized description of the pharmaceutical species of the Orient is, perhaps, one of the most well known and unquestionably accepted contributions to Western medicine that resulted from the Portuguese Discoveries and the efforts of the Portuguese Renaissance cultural elite15.

Garcia de Orta's work was circulated in Europe by means of a Latin version edited by the doctor and botanist Charles de l'Escluse that was entitled Aromatum e Simplicium Medicamentorum apud Indios Nascentium Historia (1567) and was continued and perfected by another Portuguese doctor, Cristóvão da Costa in his Tractado de /as drogas y Medicinas de Las Índias Orientales (1578). The latter describes in a much more detailed manner many of the plant species mentioned by Orta and adds the iconographic representations that were missing in Colóquios16.

However, both the Portuguese as well as the Spanish soon realized that they could find natural products in the New World that could be applied in the field of medicine just as well as the well-known spices of the Orient. The work that corresponded to the treatises of
Orta and Costa with regard to the Western Hemisphere was written by the pen of Nicolás Monardes, a doctor from Seville, and the three volumes of his work spread throughout the educated circles of Europe as a documental body of unique worth\textsuperscript{17}.

With regard to Brazil, the initial information first appeared in the letters and accounts of Jesuits, such as those by Father Manuel da Nobrega or José de Anchieta, in private correspondence by colonists, soldiers, sailors and travelers who went about exploring and getting to know the land, as well as in descriptions that, for a long time, remained unpublished, such as those by Pero de Magalhães de Gândavo, by Father Fernão Cardim or by Friar Vicente do Salvador\textsuperscript{18}.

These individuals described diseases and simple and compound medicines, based upon an observation of the manner in which the Amerindians utilized natural products within their reach to cure certain agues: the treating of cuts, stings and bites of insects and snakes, the treating of upset stomachs of children and the full bellies of the adults\textsuperscript{19}. In some cases, the ingredients and the preparation of these pharmaceutical remedies were hidden from the Europeans. It was generally the missionaires and the habitants of the hinterland, whites and mixed race individuals in daily, and in some cases even intimate and familiar, contact with the Amerindians, who had better success in unveiling these secrets.

Many of these observers were not doctors, nor did they have any intellectual or theoretical training in the field of medicine or pharmaceutics. Their observations are not exclusively oriented towards medical objectives but, rather, integrated in the scope of travelogues, descriptions of the land, fauna and natural products of the Americas or works of an economic or geographic nature.

When one considers the Brazilian case, one can state beyond a shadow of doubt that the first systematic and in-depth studies of the medicinal properties of Brazilian flora were made by the Dutch doctor Willem Piso who, along with Georg Marcgrave, participated in the elaboration of the \textit{Historia Naturalis Brasiliae}, published for the first time in Amsterdam in 1648\textsuperscript{20}.

The information obtained by these individuals resulted in an integration of American drugs in medical and pharmaceutical circles in Europe, sparking off an important, albeit low volume, trade in these products, that was complementary to the
importation of more stable and effective products that were already known and had traditionally been in use such as ipecacuanha, quinina, quinine, coca, sarsaparilla, tobacco, valerian, guaiacum and sassafras, which were destined to substitute some of the remedies that were then in vogue, as was the case of mercurials by guaiacum in the treatment of syphilis.21

These American drugs rapidly mixed with European remedies. If, from the very outset of contact, they were used empirically by Amerindians, missionaries, individuals of mixed race and middlemen who lived in the colony, they were soon incorporated into naval and colonial medicine, substituting unstable and obsolete products by others which were more accessible and effective. Integrated into European medicine, they caused alterations in the products that were the basis for the composition of pharmaceutical prescriptions and the prescription books of compendiums, pharmacopoeia and household remedies, and began to be administered in therapeutic medicine ministered by those responsible for the treatment and diagnosis of illnesses. They were used by the ladies of the court who wanted whiter teeth and perfumed breath, by aristocrats who suffered from gout owing to the kind of alimentary habits they followed and by everyone in cases of physical debility or fevers.22

However, this knowledge and utilization of the therapeutic properties of the plants from the New World were the result of a gradual and cumulative process that was not limited to the period of the Discoveries, contact or encounters.23 It was the consequence, albeit not exclusively, of the unveiling of the land, of its produce and the secrets that its original inhabitants passed from generation to generation. I also feel that the utilization of these products by the colonists was equally the result of the necessities of the new arrivals in order to survive in environments that were often dangerous and hostile. I think that it depended, above all, on the evolution of European medicine and pharmacology that, at the end of the 18th century and beginning of the 19th century, underwent a period of experimentation and renewal.

It was during this period that many of the traditional beliefs of the curative virtues of extravagant remedies, such as bezoar stones, elephant fat or anhuma horns were done away with. To substitute them, Europe sought new products that were more effective, more natural and less harmful for the treatment of diseases. In this search, the New World was
considered to be a cornucopia that contained all the treasures that were worth the effort to know, reveal and utilize.

This Europe of the 18th century, that witnessed the end of the plague and the decline of leprosy, fought, with a certain degree of success, against epidemic diseases, thanks to an effective policy of public hygiene, promoted and supported by the Absolutist States and by individuals allied with secular and religious institutions on a local and regional scale. But, above all, Europe sought to combat fevers - which were classified as continuous (simple, putrid, bilious and malignant), intermittent (seasonal, daily, tertian, quartan) and remittent or constant fevers - that, at the time, devastated the European kingdoms and the colonies. International commerce that enabled the diffusion of products that benefited the quality of life of the European population was also related to the propagation of pathological agents that were responsible for the appearance of "exotic epidemics", such as typhus, yellow fever and cholera. In this sense, the 18th century could well be called "the century of fevers".

In this context, the American products, especially Peruvian quinquina, appeared as the remedies of the moment, the quinquina plant even running the risk of extinction in the areas where it originated. As for other secrets with curative powers, they were sought by travelers, naturalists, botanists, cosmographers, physicians, geographers, doctors, surgeons, soldiers and merchants who undertook journeys, explored the territory and recorded their efforts in accounts, diaries, official letters, memoirs and geographical maps or drawings.

One of the most striking characteristics of this therapeutic medicine consisted precisely of an increase in therapeutic plant resources with the exotic drugs brought back by these scientific expeditions. Individuals with varied scientific backgrounds, and even those in administrative capacities, dedicated themselves to gathering traditional Amerindian remedies; inventoried American botanical species, specifying their curative properties; described in meticulous detail, the chemical and pharmaceutical characteristics of certain plants; and collected exotic plant specimens, which they then tried to acclimatize in botanical gardens and tested in pharmaceutical and hospital laboratories.
Many of the plants utilized by the Amerindians for curative purposes continue to be used by the pharmaceutical industry for the same ends:

<table>
<thead>
<tr>
<th>Plant Name</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aloe (<em>Aloe vera</em>)</td>
<td>used in dermatological remedies</td>
</tr>
<tr>
<td>Arnica (<em>Arnica montana</em>)</td>
<td>used for muscular aches, and as an antiseptic and anti-inflammatory agent</td>
</tr>
<tr>
<td>Agrimony (<em>Agnmonia gyposepala</em>)</td>
<td>stimulates the working of the gall bladder</td>
</tr>
<tr>
<td>Cucumber (<em>Cucunis sativus</em>)</td>
<td>used for its diuretic action</td>
</tr>
<tr>
<td>Foxglove (<em>Digitalis purpurea</em>)</td>
<td>used as a cardiac stimulant</td>
</tr>
<tr>
<td>Heal-all (<em>Prunella vulgaris</em>)</td>
<td>used for treating diarrhea</td>
</tr>
<tr>
<td>Passionflower (<em>Passiflora incamata</em>)</td>
<td>used for its calming effects</td>
</tr>
<tr>
<td>St. John's wort (<em>Hypericum perforatum</em>)</td>
<td>used to treat mild depression and as a mood enhancing agent</td>
</tr>
<tr>
<td>Thyme (<em>Thymus serpyllum</em>)</td>
<td>used against intestinal parasites</td>
</tr>
<tr>
<td>Vervain (<em>Verbena officinalis</em>)</td>
<td>used in dermatology to soothe itches</td>
</tr>
<tr>
<td>Wild chamomile(<em>Matricaria chamomilla</em>)</td>
<td>used for its spasmodic action and in preparations</td>
</tr>
</tbody>
</table>


12 Riera Palmero, Juan, “La medicina precollombiana, p. 19

13 Martín Martín, Cármen; Valverde, José Luis, *La farmácia en la America Colonial: el arte de preparar medicamentos*, p. 24.

14 Granjel; Luís S., “Las repercusiones medicas del Descubrimiento, p. 41.


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23 A anhuma is a bird belonging to the anhimidae family, whose horn was attributed with the virtue of being a powerful antidote against poisons (Ribeiro, Márcia Moisés, A ciência dos trópicos. A arte médica no Brasil do século XVIII, p 63).
24 In this classification, I took into consideration the study developed by the naturalist Alexandre Rodrigues Ferreira as presented by Porto, Ângela, 'Das febres reinantes: a contribuição de Alexandre Rodrigues Ferreira ao estudo das enfermidades no Brasil Colônia" in Actas do I Congresso Luso-Brasileiro de História da Ciência e da Técnica, Évora, University of Evora, 2001, pp.226 and ss.
25 Peset Reig, José Luís, "La enfermedad y los medicos" in Historia de la ciencia y de la tecnica en la corona de Castilla, siglo XVIII, edited by Peset Reig, José Luís, Junta de Castilla y León, Consejería de Educación y Cultura, 2002. p. 215.
26 Pita, João Rui, "A quina e as outras drogas americanas na produção medicamentosa do Hospital da Universidade de Coimbra nos finais do século XVIII" in Mare Liberum, nº 17, June 1999, pp. 200-202.
28 Fajardo Ortiz, Guillermo, "Los caminos de la medicina colonial en Iberoamerica y las Filipinas, Mexico", Universidad Autónoma de Mexico, 1996, p. 129; Puerto Sarmiento, Francisco Javier, "Empirismo, arte y creencia, en la época de la razón: la terapeutica farmacológica ilustrada" in Historia de la ciencia y de la tecnica en la corona de Castilla, siglo XVIII, p. 163
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