Packing techniques and political obedience as scientific issues: 18th-century medicinal balsams, gums and resins from the Indies to Madrid

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Abstract

This paper studies the administrative, legal and scientific instructions issued by the Spanish Ministry of the Indies during the 1780s to furnish the Royal Pharmacy in Madrid, especially it focuses on the transportation of medicinal vegetal products from the American colonies. Transporting such products was a challenging operation in which various colonial authorities were involved: what were the technical, scientific and political challenges faced by this scientific practice enforced by the central government? How did political power relations interrelate to obtain natural objects suitable for the Royal Pharmacy? The successive shipments of plants and the instructions regarding them highlight the problems triggered by the systematization of transportation of medicinal plants pursued by the Ministry of the Indies.

Keywords: natural objects, circulation, instructions, bureaucracy.

Transporting plants and their by-products by long transoceanic voyages was a complex operation which Spanish botanists and reformist bureaucrats attempted to engineer throughout the 18th century. In a crucial effort to discover new drugs, the Spanish Crown endorsed a pharmaceutical approach to botany[1], which transformed pharmacological research on plants from their American colonies. However,

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[1] Francisco Javier Puerto Sarmiento, *La Ilusión Quebrada. Botánica, sanidad y política científica en la España Ilustrada* (Madrid: Serbal/CSIC, 1988), Jean Pierre Clément and Raúl Rodríguez Nozal (1996) "L'Espagne aphoticarie de L'Europe. L'Explotation médico-commerciale des resources végétales américains a la fin du XVIII siècle", *Bulletin Hispanique*, 1996, 98 (1): 137-159, Paula De Vos (2007) "Natural History and the pursuit of Empire in Eighteenth-Century Spain", *Eighteenth-Century Studies*, 2007, 40 (2): 209-239.

achieving this scientific ambition depended on the material state in which these objects reached the metropolis. That is why packaging, identification and preservation of fresh or dry plants became three significant logistic activities which the Crown strived to orchestrate by means of a set of administrative, legal and scientific protocols.

This paper explores the administrative protocols developed by the Spanish Ministry of the Indies during the 1780s to organize the transportation of vegetal medicinal products from the colonies to the Royal Pharmacy in Madrid. These written documents ordered the mobilization of the vegetal products through the long journey by sea; they were protocols used to create a space in between colonies and metropolis. During the 18th century, the Royal Pharmacy, together with the Royal Botanical Garden, was one of the institutions in charge of recognizing and analysing medicinal plants from the Indies[2]. This paper focuses particularly on the administrative arrangements issued by the Ministry of the Indies in 1785 and 1787.

The 1780s was a prosperous period for the reformation of the Spanish colonial empire undertaken by Charles III (1759–1788) in connection with the new international context bequeathed by the Seven Years' War[3]. This reformation was intended to improve the military defense of the American possessions, to centralize the government and tax collection throughout the western Indian viceroyalties and to reformulate transatlantic commerce with the colonies[4]. Hence, consistent with the design of Don José de Gálvez Marquee of Sonora (1720–1787) as Minister of the Indies, the policy of collection of data and natural evidences was extended during the 1780s with the shipment of more scientific expeditions[5] and royal orders[6] to the Indies than during the rest of the 18th century.

The distribution of questionnaires, instructions or royal orders that instructed the colonial authorities in the collection of geographical, botanical or ethnographic

[2] Raúl Rodríguez Nozal and Antonio González Bueno (1995) "Real Academia Médica matritense y expediciones botánicas ilustradas. Una conexión médico-terapéutica", *Dynamis*, 1995, 15: 375-399, on p. 378.

[3] During the war Great Britain gained territories in North America at the expense of the France, in consecuence Great Britain and Spain were transformed into the two principal colonial powers in the Americas.

[4] John Elliott, *Imperios del Mundo Atlántico. España y Gran Bretaña en América, 1492-1830*, (Madrid: Taurus, 2006), p. 443-447.

[5] The period of expeditionary heyday runs from 1771 to 1791. According to the reigns, the expeditions organized were: Philip V, 2; Ferdinand VI, 4; Charles III, 33 and Charles IV, 24. See Ángel Guirao de Vierna, "Análisis cuantitativo de las Expediciones españolas con destino al Nuevo Mundo", in José Luis Peset, *Ciencia, vida y espacio en Iberoamérica*. Vol. 1 (Madrid: CSIC, 1989), p. 68, 90 and 91.

[6] Between 1745 and 1819 natural and vegetal objects were sent from the Indies on 345 shipments in response to the royal orders sent out from Madrid. Almost 60% of these shipments correspond to the reign of Charles III. See Paula De Vos (2007) "Natural History and the pursuit of Empire in Eighteenth-Century Spain", Eighteenth-Century Studies, 2007, 40 (2): 209-239, on p. 217.

information was a typical governmental practice of the Spanish colonial administration of the Indies. During the 18th century, the *Relaciones Geográficas* delivered by the Council of the Indies to investigate the peoples and natural resources of the territories conquered by Hernán Cortés (1485–1547), as well as the questionnaires of the metropolitan academies with the purpose of supplying their shelves[7], were founded upon the political power of the Crown throughout its American and peninsular possessions[8]. The appropriation of a political–bureaucratic mechanism for scientific purposes has been marked by historians of science as an original Spanish contribution to the configuration of scientific practices during Early Modern History. These practices were coupled with the needs of the colonial government and were the consequence of the conquest and permanent colonization of the territories carried out by the Spanish Crown since the 16th century[9].

As historians of science have remarked in recent years, the transportation of scientific evidences was related to a body of technical and administrative proceedings that went beyond the narrow limits of the metropolitan academies[10]. Consequently, historiography underscores the study of political, religious or economic corporations as well as the institutional protocols, which were designed to build a channel through which agents, orders and data flowed according to the requirements of the metropolis[11]. Historiography is also interested in exploring the interactions among the agents in the transportation of scientific data and the tension caused by the commercial and coercive nature of the mobility[12]. Finally, historiography studies the

[7] Francisco de Solano, Cuestionarios para la formación de las relaciones geográficas de Indias, siglos XVI-XIX, (Madrid: CSIC, 1988), Sylvia Vilar (1970) "La trajectoire des curiosités espagnoles sur les Indes. Trois siècles D' Interrogatorios et Relaciones", Melanges de la Casa de Velázquez, 1970, VI: 247-308, Sylvia Vilar (1971) "Últimas proyecciones coloniales de la España Ilustrada: Dos Interrogatorios de Indias inéditos (1760-1812)", Hispania, 1971, XXXI (119): 617-655, Antonio Barrera (2006), "Empire and knowledge: Reporting from the New World", Colonial Latin American Review, 2006, 15 (1): 39-54.

[8] The *Relaciones Geográficas de Indias* of 1573 had their peninsular correlate in the *Relaciones Topográficas* of Philip II, which were used between 1575 and 1578 in the towns of New Castilla with the same aim as their American predecessors: to survey the peoples subjected to the Castilian Crown for tax purposes. See Alfredo Alvar Ezquerra, *Relaciones Topográficas de Felipe II*, (Madrid: Comunidad de Madrid/CSIC, 1993).

[9] Juan Pimentel (2000) "The Iberian vision: Science and Empire in the framework of a universal monarchy, 1500-1800", *Osiris*, 2000, 15: 17-31, Jorge Cañizares-Esguerra (2005) "Iberian colonial science, *Isis*, 2005, 96 (1): 64-70".

[10] Marie-Noëlle Bourguet, Christian Licoppe and Otto Sibum, *Instruments, travel and science. Itineraries of precision from the seventeenth to the twentieth century*, (London and New York: Routledge, 2002), on p. 3, 4, 5.

[11] S. J. Harris (1998) "Long-distance corporations, big sciences, and the geography of knowledge", Configurations, 1998, 6 (2): 269-304, on p. 276, Antonio Lafuente and Nuria Valverde, "La producción de objetos y valores científicos: tecnología, gobierno e ilustración", in Agustín Guimerá Ravina and Víctor Peralta Ruiz, El equilibrio de los imperios: de Utrecht a Trafalgar. Actas de la VIII Reunión Científica de la Fundación Española de Historia Moderna. Vol. 2, (Madrid: Fundación Española de Historia Moderna, 2005), on p. 336-337.

[12] Emma Spary, "Of nutmegs and botanists. The colonial cultivation of botanical identity", in Londa Schiebinger and Claudia Swan, *Colonial Botany. Science, commerce, and politics in the early modern world*, (Philadelphia:

connection between mobility and precision caused by the overlapping of the scientific and political institutions that participated in the transportation[13].

By contrast with other studies devoted to the collection policies of the Royal Botanical Garden[14], this paper explores the policies followed by the Ministry of the Indies to supply the Royal Pharmacy, which never lost its traditional prerogative to carry out chemical and pharmacological analyses on the drugs sent to the Court, despite disputes with the Royal Botanical Garden over the analysis of medicinal plants from the Indies. This paper pays special attention to the administrative orders delivered during the years 1785 and 1787 by the Ministry of the Indies with the purpose of regulating the packaging and transportation of the shipments destined for the Royal Pharmacy. These documents prompt the following questions: what were the technical, scientific and political challenges faced by this scientific practice enforced by the government? How was the packaging of the plants shipped by the colonial officials engineered? How did political power relations interrelate to obtain natural objects suitable for analysis?

The documentary corpus is made up of instructions, mailshots, inventories and registers of experiments kept in the Palace General Archive (Madrid), the General Archive of the Indies (Seville) and the National General Archive (Buenos Aires). The successive shipments of plants and mailshot orders highlight the problems and tensions triggered by the systematization of packaging and transportation of medicinal products that were pursued by the Ministry of the Indies. That is why the balsams, gums and resins as well as the parts of plants from which they had been produced were both a commodity and a scientific object[15], which the Bourbon reformist policy turned into key pieces of the sanitary and commercial reform it had undertaken. The medicinal products that the royal mailshot orders and

University of Pennsylvania Press, 2005), on p. 187, Harold Cook, *Matters of Exchange. Commerce, Medicine, and Science in the Dutch Golden Age*, (New Haven and London: Yale University Press, 1999), on p. 3.

[13] François Regourd, "Diffusion et assimilation des techniques académiques de collecte et d'expertise dans l'espace caraïbe français (XVIIe-XVIIIe s.)", in P. Hrodej and S. Llinares, *Techniques et colonies (XVIIe-XVIIIe siècles)*, (Paris: Publication de la Société Française d'Histoire d'Outre-Mer, 2005), on p. 37, Marie-Noëlle Bourguet, "Measurable difference. Botany, climate and the gardener's thermometer in eighteenth-century France", in Londa Schiebinger and Claudia Swan, *Colonial Botany. Science, Commerce, and Politics in the Early Modern World*, (Philadelphia: University of Pennsylvania Press, 2005), on p. 271.

[14] Francisco Javier Puerto Sarmiento, *La Ilusión Quebrada. Botánica, sanidad y política científica en la España Ilustrada* (Madrid: Serbal/CSIC, 1988), Daniela Bleichmar, "Atlantic competitions. Botany in the eighteenth-century Spanish empire", in James Delbourgo and Nicholas Dew, *Science in the Atlantic World*, (New York and London: Routledge, 2008).

[15] Igor Kopytoff, "The cultural biography of things: commoditization as Process", in Arjum Appadurai, *The social life of things. Commodities in cultural perspective*, (Cambridge: Cambridge University Press, 1995), on p. 66.

the instructions ordered to package them were mutable objects[16], the material and conceptual collection and stabilization of which were intended to be accomplished by the Crown by means of the systematization of their packaging and transportation. Both practices aimed at transforming unknown and unstable objects into familiar and stable products[17], suitable for sanitary, scientific and commercial use.

In relation to this, it can be claimed that the aim of these orders were: to supply the Royal Pharmacy with quality vegetal products; to produce material evidence which would be suitable for pharmacological analysis; to instruct colonial officers in this practice; and to fine officers who would not comply with these political–administrative measures.

The Royal Pharmacy, provision of the Court, vegetal therapeutic research and the reformation of colonial commerce throughout the Spanish Empire

During the 18th century the Royal Pharmacy was one of the institutions devoted to the pharmacological research of American Indian plants[18], together with the Royal Botanical Garden and the Madrilenian Medical Academy. Even though the Royal Botanical Garden had the exclusiveness the pharmacological research of the plants discovered by the scientific expeditions sent out to America[19] since 1780, the Royal Pharmacy continued to develop research on vegetal therapeutics.

The Royal Pharmacy had been created in 1593 by Philip II to cater for the health of the king and his family[20]. In fact, the pharmacy was responsible for analyzing and certifying the quality of the plants shipped to the court. This seems to be one of its inherent purposes besides supplying, storing, keeping and administrating the medicines destined for the Royal family. So, during the 18th century, when the use

[16] Nicholas Thomas, *Entangled objects. Exchange, material culture, and colonialismo in the Pacific*, (USA: Harvard University Press, 1991), on p. 28, Lorraine Daston, *Things that talk. Objects lessons from Art and Science*, (New York: Zone Books, 2004), on p. 16.

[17] Simon Schaffer, "Una ciencia para explotar. Las pompas de jabón como mercancías en la física clásica", in Simon Schaffer, *Trabajos de cristal. Ensayos de historia de la ciencia, 1650-1900*, (Madrid: Marcial Pons, 2011), on p. 435.

[18] Raúl Rodríguez Nozal and Antonio González Bueno (1995) "Real Academia Médica matritense y expediciones botánicas ilustradas. Una conexión médico-terapéutica", *Dynamis*, 1995, 15: 375-399, on p. 378, 379.

[19] In 1780 the Crown reformed the Royal Court of Protomedicato, which expanded the prerogatives for teaching and research at the Royal Botanical Garden. See Francisco Javier Puerto Sarmiento, "El Real Jardín Botánico de Madrid durante el reinado de Carlos III", in Manuel Sellés, José Luis Peset and Antonio Lafuente, *Carlos III y la ciencia de la Ilustración*, (Madrid: Alianza, 1988).

[20] María Esther Alegre Pérez (2001) "Los orígenes de la Real Botica y su actuación al servicio de los Austrias", *Arbor*, 2001, CLXIX, 66: 239-265, on p. 244.

of Indian medicinal drugs increased[21], the Royal Pharmacy continued doing research and advising the king about their pharmacological and commercial quality.

The Royal Pharmacy was part of the Royal Chamber, which was subordinate to the *Sumiller de Corps* who, in turn, was responsible for guarding the king[22]. The pharmacy was in charge of catering for the pharmaceutical treatment of the king, the royal family, the members of the court and the body of servants as well as for the administration of a storehouse for Peruvian bark (*Cinchona pubescens*) established in 1768[23]. Furthermore, it counseled the king by means of reports dealing with different botanical, therapeutic and economic topics concerning the Indian plants and drugs. Since its functions and administrative location were in the realm of the *Casa Real* (Royal Palace), its tasks were mainly domestic; hence the *Boticario Mayor* (Chief Apothecary), as other employees who worked there, was considered a servant of the king[24].

The supply of plants and medicinal drugs and the certification of their pharmacological quality were administered by the Royal Pharmacy. These processes were closely related to their colonial collection and metropolitan investigation. That is why the Royal Pharmacy went beyond its domestic functions and became connected with other places, such as the American viceroyalties and the royal hospitals near Madrid. Thus the pharmacy became involved in the collection, research and recording of the geographical location of the Indian plants as it followed royal mailshot orders sent out by the Ministry of the Indies. These activities were related to its scientific, sanitary and administrative functions. This is illustrated in a document produced by the Royal Pharmacy, *Razón de los Géneros Medicinales que producen nuestras Américas…*[25], which records the qualities of various plants and their geographical location, and which demonstrates that the colonial collection of drugs

[21] José Luis Valverde (1982) "La experimentación farmacológica de drogas americanas", *Ars Pharmaceutica*, 1982, 23 (2): 151-192, on p. 176, Pilar García de Yébenes Torres, *La Real Botica durante el reinado de Felipe V (1700-1746)*, Unpublished Ph D (Ph.D.) dissertation, Universidad Complutense de Madrid, 1994, on p. 162.

http//eprints.ucm.es/tesis/19911996/D/1/AD1022301.pdf

[22] Carlos Gómez centurión Jiménez (2003) "Al cuidado del cuerpo del Rey: Los sumilleres de corps en el siglo XVIII", *Cuadernos de Historia Moderna*, 2003, II: 199-239, on p. 211.

[23] Eduardo Valverde Ruiz, *La Real Botica en el siglo XIX*. Vol. I. Unpublished Ph.D. dissertation, Universidad Complutense de Madrid, 1999, on p. 38. http://eprints.ucm.es/tesis/19972000/D/1/D1056501.pdf

[24] Pilar García de Yébenes Torres, *La Real Botica durante el reinado de Felipe V (1700-1746)*, Unpublished Ph D dissertation, Universidad Complutense de Madrid, 1994, on p. 27-29. http//eprints.ucm.es/tesis/19911996/D/1/AD1022301.pdf

[25] Archivo General de Indias, Sevilla (hereafter AGI-S) Indiferente General, 1547. *Razón de los géneros medicinales que producen nuestras Américas y que para ahorro de la Real Hacienda convendría se mandasen hacer benir para la servidumbre de la Real Botica.*

and plants was essential. *La Razón…* was a scientific and administrative document based upon policies of botanical and pharmacological data collection. The document is divided into four columns, each with precise facts: the first holds the amount of plants required by the Royal Pharmacy; the second states the local plant names; the third reviews the parts of the plant which were used and the proportion of intake; and the fourth identifies the environments in which they grew. *La Razón…* classified 40 plants, and their respective by-products, which were distributed throughout Spanish overseas territories, such as to California, Patagonia and as far as the Philippines.

In addition, the certification of the pharmacological quality of the plants was done in three stages. In the same way as with the Peruvian bark, the first and second stages were developed at the Royal Pharmacy, while the third was carried out at the Royal hospitals[26]. When the plants reached the customs office in Cadiz, the Arrivals Judge informed the Sommelier de Corps about the shipment of the crates to the court. This was then communicated to the Senior Apothecary, who was in charge of receiving the shipments at the Royal Pharmacy. When the Indian drugs and the plants were received at the court, the Senior Apothecary undertook the task of going over the crates and comparing their contents with the corresponding bill of landing. The first stage was related to visual observation and the botanical description of the plants dispatched. The second stage used chemical analyses, which were recorded in writing by the apothecaries. The third stage consisted in clinical experimentation, which Madrid doctors carried out on their hospital patients. Generally speaking, these studies were done with new medicinal drugs. The purpose was to certify the qualities attributed to these products with a written report[27]. However, it must be stated that occasionally these clinical studies were also carried out at the court where the Royal chamber doctors experimented on the servants. At the end of this sequence, the *Boticarios Reales* had evidence with which to write out reports that were finally sent to counsel the king.

[26] María Esther Alegre Pérez and María Luisa de Andrés Turrión, "Estudios sobre la clasificación, calidad y pruebas clínicas de productos vegetales ultramarinos para la corona española, en el siglo XVIII", in Juan Esteva de Sagrera and Antonio González Bueno, *Cordialero de libros y medicamentos. Homenaje al Dr. José María Suñé Arbussà*, (Madrid: Sociedad de Docentes Universitarios de Historia de la Farmacia de España, 2009), on p. 160, María Luisa de Andrés Turrión and María Rosario Terreros Gómez (1996) "First hospital experiences with cinchona ordered by Spanish court (ca. 1770)", *Revue d'histoire de la pharmacie*, 1996, 312: 363-367, on p. 365.

[27] Among the plants and drugs whose therapeutic qualities were studied by the Royal Pharmacy jointly with the royal hospitals, the following can be mentioned: the Angel's Hair herb (cuscuta corymbosa), which grew in Montevideo and which had been sent to the viceroyalty of Río de la Plata in 1787. This herb was sent to the general hospital of the court in 1789 by the Sommelier de Corps to certify its effectiveness against blood loss, as the report sent from Buenos Aires asserted. AGI-S. Indiferente General, 1545. Palacio, 17 September, 1789.

The supply and certification of the pharmacological quality of the Indies medicinal plants and drugs allowed the Royal Pharmacy to go beyond the limits of the court and to participate in the reformation policies developed by Charles III (1759–1788). For the reformists of the second half of the 18th century, commercial exploitation of the Indies was to be the foundation of the empire instead of the evangelizing endeavour, as it had been since the 16th century[28]. Pedro Rodríguez de Campomanes (1723-1802), who was one of the publicists of the reformation of Spanish colonial commerce, had an neo-mercantilist imperial notion that purported reformations such as: the abolition of the monopolist system of a single port created in the time of the Habsburgs; the opening of new ports in American and peninsular possessions to strengthen commerce; the promotion of agriculture, manufacture and navigation, and the encouragement of population growth[29]. The Spanish Crown aspired to transform the colonies of the Indies into producers of raw materials and consumers of merchandise manufactured by the metropolis.

Therefore, in the sanitary as well as in the commercial sense, the therapeutic examination of plants enabled the discovery, or discarding, of new drugs, which could then be transformed into commodities. The reformation of Spanish colonial commerce was linked to the discovery and the production of commodities which Spain and her colonies purchased from other European powers. Hence, the research into useful plants from the Indies became a primary imperative. The study of the American flora enabled the discovery of native varieties to substitute expensive Asian commodities and new or unknown products in Europe.

The commercial interest of the Crown transformed the Indian plants into commodities privileged by the reformation of Spanish colonial commerce, even though metals were still the main export during the period between 1778 and 1796. Within 56% of the total, natural commodities expanded to 44%[30]. The 1778 *Reglamento de Libre Comercio* sanctioned 13 Spanish ports and 24 American ones. Article 43 included medicinal plants, highlighting the noteworthy interest of the Spanish Crown to foster commerce and investigation of exotic plants. On the one

[28] José Manuel Portillo Valdéz (2008) "La crisis imperial de la monarquía española", *Secuencia*, 2008, (Número conmemorativo: Soberanía, lealtad e igualdad: las respuestas americanas a la crisis imperial hispana, 1808-1810): 25-42, on p. 28.

[29] Pedro Campomanes, *Reflexiones sobre el comercio español a Indias* (1762), (Madrid: Instituto de Estudios Fiscales, Ministerio de Economía y Hacienda, 1988), on p. 3 and 10.

[30] José Luis Valverde (1983) "El comercio de drogas americanas en el siglo XVIII y el aprovisionamiento de la Real Botica", *Anales de la Real Academia de Farmacia*, 1983, 49: 309-334, on p. 325, John Fisher, "Estructuras comerciales en el mundo hispánico y el reformismo borbónico", in Agustín Guimerá, *El reformismo borbónico*, (Madrid: Alianza, 1996), on p. 112, 118 and 119.

hand, it exempted taxes on the plants that came to Spain from the Indies and assessed their departure towards other 'dominions'; on the other, it encouraged the discovery of new commodities by exempting taxes on 'all the other native productions of the Indies, and Philippines which until now have not been brought to these kingdoms'[31].

'Embarrassments are always to be feared at such a distance'[32]

Colonial officers in remote overseas territories undertook the collection of plants and medicinal products. So, distance constituted a major obstacle, which Spanish bureaucrats and botanists attempted to overcome by developing mechanisms such as the royal mailshot orders and special instructions. Packaging and transporting plants and their by-products were two further concerns they tackled and these processes became crucial matters for scientific policies of botanical data collection at imperial scale. The development of scientific–administrative discourse and practices which guaranteed the transportation of facts to metropolitan institutions[33], as well as the governmental interest in that the colonial officers would assimilate these practices, were two closely related concerns, particularly if we consider that the therapeutic efficacy of a plant depended exclusively on the care put into its transportation[34].

The Marquee of Valdecarzana (1739-1810) was Sommelier de Corps between 1783 and 1792. For him, supplying the Royal Pharmacy and the kingdom with quality Indian plants and drugs was a crucial matter. This was related to the experiments carried out to certify the use of these elements; the collaboration of the local agents in charge of the collection and shipment from America; and the 'political talent' necessary to conduct the operation as a whole[35]. Valdecarzana's report, which was written to counsel the king about the Peruvian bark that José Celestino Mutis (1732 –1808) had discovered in the viceroyalty of New Granada, had discredited the experiments carried out at the Royal Pharmacy, contrary to the positive assessment of Italian, English and French botanists and apothecaries. This report highlights the

[31] Reglamento y aranceles reales para el comercio de España e Indias de 12 de octubre de 1778 (Madrid: Casa Editorial de Pedro Marin, 1778), on p. 50, 51 and 52.

[32] Archivo General de Palacio, Madrid (hereafter AGP-M) Fondo Farmacia, Caja 4540, Legajo 33. Informe del Marqués de Valdecarzana a Don Antonio Porlier, Palacio septiembre de 1789. f. 10.

[33] Antonio Lafuente and Nuria Valverde, "Linnean Botany and Spanish imperial biopolitics", in Londa Schiebinger and Claudia Swan, Colonial Botany. Science, commerce, and politics in the early modern world, (Philadelphia: University of Pennsylvania Press, 2005), on p. 136.

[34] Antonio Lafuente and Nuria Valverde, "Linean Botany and Spanish imperial biopolitics", p. 136.

[35] A.G.P-M, Fondo Farmacia, Caja 4540, Lagajo 33. Informe del Marqués de Valdecarzana a Don Antonio Porlier, Palacio septiembre de 1789. f. 10.

importance of having vegetal samples in good material condition for their experimentation. The Marquee of Valdecarzana advised to avoid the fraud of the 'mixture and adulteration with other barks'; to control and make sure that the 'parcels', in which the plants were transported, were 'closed, tied and sealed', as was the practice with 'cinnamon, musk and tea', in order to preserve them and determine their therapeutic and commercial value; and to establish a representative of the Crown, who would contact the local authorities, and two botanists, who would investigate the plants of the region, at the collection sites[36].

Furthermore, according to Hipólito Ruiz (1754-1816), who conducted the Botanical Expedition of the Viceroyalty of Peru between 1777 and 1788, preserving the good material condition of the plant samples was an essential premise since it conditioned the investigation and the discovery of the healing principles attributed to the plant under analysis. Ruiz considered the transportation of plants in *Memoria sobre la legítima Calaguala*...[37] which he wrote in 1796 to announce the medical virtues of the Peruvian plant whose qualities had been questioned in Europe[38]. According to Ruiz, this discredit was related to the deficient methods of collection and transportation deployed. When the plants were collected, they were irresponsibly jumbled with other plants and they were often insufficiently dried. What's more, the samples were packaged inefficiently in damp leather sacks and the storeroom on the ships that transported the plants was also damp and poorly ventilated, among other deficient practices. These are some of the reasons why the genuine calaguala roots (*Polypodium calaguala*) reached Cadiz corrupted and turned into 'a noxious drug instead of a remedy'[39], also many of the roots sold in Spain as calaguala were illegitimate.

Furthermore, while the fresh calaguala was effective in Peru because it was packed in a right way, its dry roots did nothing in Spain. This situation was more closely related to the deficiencies in the transportation and less to its pharmacological

[36] A.G.P-M, Fondo Farmacia, Caja 4540, Lagajo 33. Informe del Marqués de Valdecarzana a Don Antonio Porlier, Palacio septiembre de 1789. f. 3 and 11.

[37] Hipólito Ruiz, *Memoria sobre la legítima calaguala y otras dos raíces que con el mismo nombre nos vienen de la América Meridional* (1796), (Madrid: en la Casa Editorial de D. José del Collado, 1805), on p. 21.

[38] For Hipólito Ruiz the European doubts about the therapeutic quality of the Calaguala were due to the experiments carried out upon samples mixed with other roots, such as the case of the experiments carried out by Caminati in 1791, which Ruiz disparaged. See José Oriol Ronquillo, *Diccionario de materia mercantil, industrial y agrícola que contiene la indicación, la descripción y los usos de todas las mercancías*. Vol. I, (Barcelona: Casa Editora de Dn. Agustín Gaspar, 1851), on p. 532.

[39] Hipólito Ruiz, *Memoria sobre la legítima calaguala y otras dos raíces que con el mismo nombre nos vienen de la América Meridional* (1796), (Madrid: en la Casa Editorial de D. José del Collado, 1805), on p. 21.

efficacy as a dried root[40]. According to Ruiz the solution to the adulteration and decomposition of the legitimate calaguala was to be found in the systematization of the gathering and transportation ordered by the Crown, that is, with the organization, guidance and control of the packaging process[41] in order to avoid 'such a harmful damage to humankind'[42]. Therefore, packaging and transportation of the plants and their by-products were two technical and political–administrative operations that controlled the provision of the Royal Pharmacy, the experimentation and certification of the therapeutic quality of the drugs and plants, as well as the pharmacological and commercial use given to them by the Spanish Crown.

Royal mailshot orders and instructions: transportation of medicinal products, packaging techniques and political obedience

The Royal mailshot order of 22 July 1785, the reserved instruction of 17 November 1785 and the post of 27 April 1787 were three dispositions sent out by the Minister of the Indies, the aim of which was to regulate the transportation and packaging of medicinal products and shipment to the Royal Pharmacy. These arrangements constituted the political and administrative framework created by the Ministry to guarantee the shipment of the products ordered in 1783.

These documents highlight the Crown's interest in studying and supplying the Royal Pharmacy with Indian pharmacological products, as well as the underlying political and administrative basis of the scientific works developed therein. The dispositions of the Ministry of the Indies were the result of the political and administrative centralization that characterized the Bourbon reformism in general and which reached its prime during the ministry of José de Gálvez in 1776 and 1787[43]. Similarly, they show the limitations which restricted the political and administrative procedures of data and evidence collection deployed by the Spanish Crown, since the

[40] Hipólito Ruiz, *Memoria sobre la legítima calaguala y otras dos raíces que con el mismo nombre nos vienen de la América Meridional*, p. 20.

[41] Hipólito Ruiz, Memoria sobre la legítima calaguala y otras dos raíces que con el mismo nombre nos vienen de la América Meridional, p. 37.

[42] Hipólito Ruiz, Memoria sobre la legítima calaguala y otras dos raíces que con el mismo nombre nos vienen de la América Meridional, p. 22.

[43] The policies followed by José de Gálvez from the Ministry of the Indies were characterized in America by the urge for political, administrative and tax centralization. His job as 'general visitor' of New Spain in the 1760s brought him into contact with the Indian reality and allowed him to design an intervention plan in the Indies that was characterized by American territorial reorganization by means of the creation in 1776 of the Viceroyalty of Río de la Plata to stop the Portuguese and English advances into the estuary of the Río de la Plata and Patagonia, etc; the creation of the system of quartermasters in 1782, which, as in the Spanish peninsula, aspired to accomplish political centralization by this means; and the reform of colonial commerce by means of the Free Trade Rules of 1778. See John Lynch, *La España del siglo* XVIII, (Barcelona: Crítica, 1991).

shipment of the royal mailshot orders during the 1780s shows the problems caused by this governmental method of doing long-distance science.

The royal mailshot order of 22 July 1785 was sent out to the viceroys of New Spain, Peru, Río de la Plata, New Granada, and to the governors of Guatemala, Quito, Caracas, Yucatan, and the Philippines. This document and the instructions that accompanied it set up a protocol to organize the packaging and transportation of the medicinal products shipped to Madrid. The royal order praised the compliance of the colonial officers with the earlier requirements for the shipment of medicinal products. However, it also expressed that this obedience would be complete only if the colonial officers packaged the medicinal products according to their material and therapeutic value:

> *Although the royal shipment orders of Balsams, Gums and medicinal Plants to Spain in order to supply the Royal Pharmacy are obeyed, they are of no use if due care and precaution are not taken so that they arrive accordingly, and far from producing a benefit on public health, which should result from these collections, the Royal Estate is assessed without pursuing the desired result, because the jugs and Bottles arrive damaged and broken, and in such a state that it is necessary to throw them away […]*[44]

The packaging and transportation of medicinal products was then a crucial feature related to the provision of the Royal Pharmacy, to the policies of sanitary and commercial reformation developed by the Crown and the efficient use of public funds. Hence, packaging techniques and political obedience were two closely related issues that directed the collection of medicinal products and their subsequent therapeutic studies.

The royal order of the Ministry of the Indies had two aims: to instruct the colonial authorities in the packaging and shipment of medicinal products 'so that henceforth unawareness cannot be alleged', and to include practices of collecting natural objects to the set of preexisting functions that colonial officers had had before the 1780s, when the Crown re-launched its policies of data collection and scientific information. In fact, the royal order demanded that the dispositions be followed with 'utmost rigor and precision' since contravention could result in 'the most severe measures' to offenders.

In any event, long distance scientific practices demanded the inclusion of middlemen who, like the Spanish colonial officers, were responsible for collecting and

[44] AGI-S. Indiferente General, 1553. San Ildefonso 22 de julio de 1785. f. 243.

transporting natural evidences. That is why the metropolitan organization attempted to institutionalize those practices according to their own criteria of precision[45]. The instruction which accompanied the royal mailshot order is a plain text, without an explicit author, in accordance with the administrative context in which it was produced. The instruction indicated in a simple manner the way in which the solid and liquid vegetal balsams, gums and resins were to be packaged.

Concerning the solid balsams, the instruction advised to ship them in separate crates according to each type. Inside the crates the balsams were to be packaged in 'tin jars, or well lidded and unbreakable jugs'[46]. These containers were to be not only securely contained but also separate in the crate by 'crossing boards so well adjusted' so that the contents would not get mixed in case of breakage or melting.

In relation to liquid balsams and oils, the instruction advised to ship them in well-labeled crates. These liquids were to be packaged in 'glass bottles', which should also be separated by boards forming niches in which to place each of the bottles. To avoid the 'danger' of the movement, these niches were to be filled with 'paper' or 'cotton' and the necks of the bottles were to be tied or attached to the cover of the crate, which would 'make it unusual for anyone to break on the way to Spain'[47].

The instruction also explained the way in which the cocoa butter was to be packaged in hollowed 'coconuts' or 'glazed earthenware' since the cocoa butter could 'melt during the voyage [...] with the slightest degree of heat'[48].Finally, the instruction also indicated that each crate should include a detailed list of the products shipped as well as the 'individual reports of the virtues of the balsams, oils, their medicinal effects and manner of using them'[49].

The reserved instruction of 17 November 1785 completed what had been ordered by the royal mailshot order and the instruction mentioned above. This further instruction signed by Minister of the Indies Gálvez took two issues into account. On the one hand it stipulated that all the 'crates with medicines and products of Natural History'[50] shipped to the royal estate were to be addressed to him as

[45] Simon Schaffer, Lissa Roberts, Kapil Raj and James Delbourgo, *The brokered World. Go-betweens and global intelligence, 1770-1820*, (USA: Watson Publishing International LLC, 2009), on p. XXIV.

[46] AGI- S. Indiferente General, 1553. Instrucción. f. 245.

[47] AGI-S. Indiferente General, 1553. Instrucción. f. 245 v.

[48] AGI-S. Indiferente General, 1553. Instrucción. f. 245 v.

[49] AGI-S. Indiferente General, 1553. Instrucción. f. 246.

[50] Archivo General de la Nación, Buenos Aires (hereafter AGN-Bs. As.), sala IX. San Lorenzo, 17 November 1785. f. 330 v.

Secretary of State in charge of the Universal Dispatch of the Indies. These crates should not carry any indication of their final destination, since it was the responsibility of the Secretary of State to determine whether they would be sent to the Royal Cabinet of Natural History or to the Royal Pharmacy, unless they were natural products or objects that had been specially required by either institution. On the other hand, the instruction reinforced by repetition that each crate should include a written report of the 'place' from which the natural objects came and information about their 'uses and virtues'[51].

The reserved instruction highlights the political and bureaucratic character of the colonial recollections. The provision of the Royal Pharmacy and the Royal Cabinet of Natural History, besides their inclusion in a domestic or public domain, reveals the imbrications of political and scientific institutions involved in the policies of collection of scientific data and information. In fact, the provision of the Royal Pharmacy was the responsibility of the Secretary of State who could purchase the medicines from the druggists of Madrid or defray their transportation from the Indies. The systematization of the recollection and transportation of American natural objects designed by the Ministry of the Indies was closely related to the centralization of government, which the Bourbon dynasty propitiated and which was expressed in the political macro-plane of the sanitary reformation, as well as in the political micro-plane of the provision of the King's pharmacy.

The document issued by the Ministry of the Indies on 27 April 1787 was sent to the viceroys and governors of the Indies to re-state what had been stipulated by the royal mailshot order of July 1785, which had been sent to give 'exact and punctual information upon how the balsams, gums and medicinal goods should be sent to Spain so that they arrive accordingly and so that the Royal Estate will not be assessed unnecessarily'[52]. However, this document introduced new dispositions, which determined with greater precision the administrative procedure that was to be followed in the packaging and transportation of the medicinal products. On the one hand, it was ordered that the letter, which should be sent by ordinary mail to inform of the shipment of each crate, was to be done in triplicate and placed inside the crate with the jars and a detailed list of the shipment. Thus, the intention was to avoid the confusion that reigned in Cadiz when the crates were opened, as the letter sent by ordinary mail arrived before the crates. On the other hand, the penalty that would be

[51] AGN-Bs. As., sala IX. San Lorenzo, 17 November 1785. f. 330 v.

[52] AGI-S. Indiferente General, 1553. Aranjuez 27 April 1787. f. 278.

imposed upon offenders was specified as a pecuniary 'fine of two hundred pesos'[53]. So, the relation between order and obedience which made the collection and shipment of colonial medicinal products possible was established by sanctions on the officers who did not comply to the king's will.

It can be claimed that the obligation established by the aforementioned documents constituted an innovation for the colonial officers since, even though since the 16th century there had been an obligation to answer the official questionnaires sent by the Council of the Indies in writing, the physical and material character of the analysis of nature during the 18th century introduced the innovation of sending material objects in good condition (De Vos, 2001, p. 219). For the royal officers of the port of Veracruz in the viceroyalty of New Spain, for instance, this demand was a novelty because before the royal mailshot order of July 1785, they did not have

> *record […] that prevention had ever been taken concerning particular indications, nor that medicine had been gathered to be sent to Spain on account of His Majesty, since they were required on the occasions of their lack in Havana, [and] they were provided […] without us having to do more than verify their shipment […]*[54].

The reaction of the royal officers of Veracruz reveals the issues presented to the colonial officers as a result of the renewed policies of recollection of natural products displayed by the Crown during the 1780s. The new recollection standards introduced by the Crown were conducive to the accomplishment of collecting scientific data with greater precision. From then on, complete samples would be required so that the apothecaries of the Royal Pharmacy could not only experiment with a certain medicinal product but also describe the plant from which it was made.

This is the case of the Aguaribay balsam (*Schinus areira*), which had been shipped from the viceroyalty of Río de la Plata in compliance with the royal mailshot order of 14 April 1783, before the dispositions of 1785. This balsam had been received at the Royal Pharmacy on 17 October 1784 and the first analyses revealed its usefulness to cure fever. However, in order to certify its therapeutic quality with precision it was necessary to have the parts of the plant from which this balsam was produced. That is why on 28 July 1785, a few days after the royal mailshot order of

[53] AGI-S. Indiferente General, 1553. Aranjuez 27 April 1787. f. 278 v.

[54] AGI-S. Indiferente General, 1553. Veracruz 21 December 1785. f. 274 y 274 v.

22 July had been issued to the viceroyalties, the Royal Pharmacy required the mayor of Buenos Aires

> *[…] to send […] the leaves, flowers and fruit of the so-called Pepper tree, with the other reports which Your Highness could collect about the way in which said balsam is made, so that a safe judgment can be issued here about the usefulness brought about by its consumption and in which terms and on what occasions it should be supplied*[55].

Nevertheless, the precision required of the colonial officers by means of the protocols of 1785 was difficult to attain. The Aguaribay balsam was finally shipped in 1787 and analysed by the royal apothecaries at the beginning of 1789. Although the product had arrived well packaged—according to the dispositions issued during the 1780s—in a crate in which the '[…] jars of wood and clay [had been] well sealed […] covered with parchment and blister and a label that says Aguaribay Balsam made in the town of Santa Ana and on […] a list [which] says Aguaribay Extract'[56], a sliver and parts of the required plant were still missing. Instead, what was sent was an incomplete written description of the leaves and flowers of the tree that produced the balsam, which enabled the apothecaries to 'presume that it was ordinary mastic'. The lack of 'intelligents', that is agents, who had the skills required for the kind of collection of data and material evidence demanded by the royal decrees and the instructions, was an inconvenience frequently communicated by the colonial officers in charge of conducting the collections[57]. Thence, the pedagogical function intended by the royal orders and instructions was not always satisfactory to a great extent. In this sense, the incomplete evidence of the missing parts of the Aguaribay plant did not prevent the royal apothecaries from subjecting the balsam to clinical experimentation, which had proven that it did not have 'such prodigious effects'[58]. So, instead, the balsam was disparaged because it lacked pharmacological and commercial value[59].

[55] AGI-S. Indiferente General, 1553. San Ildefonso 28 July 1785. f. 131.

[56] AGI-S. Indiferente General, 1553. Informe del Boticario Reales Luis Blett y Castor Ruiz del Cerro, Madrid 10 February 1789. f. 432 v.

[57] A.GI-S. Indiferente General, 1553. Gobernador Pedro Melo de Portugal, Asunción, 13 November 1783. f. 175 v.

[58] AGI-S. Indiferente General, 1553. Informe del Boticario Reales Luis Blett y Castor Ruiz del Cerro, Madrid 10 February 1789. f. 433.

[59] AGI-S. Indiferente General, 1553. Informe del Boticario Mayor Juan Díaz, Madrid 5 March 1789.

Conclusion

The royal mailshot orders and instructions issued by the Ministry of the Indies between 1785 and 1787 with the purpose of systematizing the packaging and transportation of vegetal products destined to supply the Royal Pharmacy are a good example of the governmental policies ruling the collection of scientific data and evidences deployed by the Spanish Crown throughout the 18th century. The royal mailshot orders were a scientific device, which had been created in the 17th century in relation to the needs of the colonial government of the Indies and which was later perfected during the 18th century to collect the material evidence demanded by the scientific study of nature.

For de Gálvez, the Minister of the Indies, the shipments of vegetal products were '[…] of great interest to the humanity and health of the subjects of Your Highness […]'[60]. However, the innovations introduced by the protocols of collection during the 1780s faced the atavistic procedures of colonial bureaucracy that restricted the effectiveness of the dispositions, the high costs of transport by sea, and the effects of the distance on the practices of collection, packaging and transportation of natural objects.

Although the remission of instructions carried out by the Spanish Crown was acknowledged throughout the 18th century as an instrument for data and material evidence collection, their effectiveness was often questioned.

The Baron of Bourgoing[61], who stayed in Madrid during the last quarter of the century, remarked after his visit to the gardens and cabinets of Madrid that

> *[…] the king has the means to obtain, above all in the plant kingdom, the most valuable collection of the world, thanks to the variety of climates in his numerous states.*
> *For only twenty years has this been taken advantage of. From the Ministry of the Indies, Gálvez commissioned all the civilian, military and ecclesiastic employees of the colonies to send to Spain samples of the three natural kingdoms which they judge worthy of being sent and if possible shipped, however pricy. His intentions have been fulfilled, at least as far as the plant kingdom is concerned. Not a year goes by without some new plants, seeds and bulbs arriving from the Spanish Indies […]*[62]

[60] AGI-S. Indiferente General, 1553. José de Gálvez, San Ildefonso 28 July 1785. f. 62.

[61] Baron de Bourgoing, Un paseo por España durante la Revolución Francesa, 1777-1795, in Juan García Mercadal, *Viajes de extranjeros por España y Portugal*. Vol. V (España: Junta de Castilla y León, Consejería de educación, 1999).

[62] Bourgoing, Un paseo por España durante la Revolución Francesa, 1777-1795, p. 480.

Similarly, Pedro Franco Dávila (1711–1786), who was director of the Royal Cabinet of Natural History of Madrid between 1771 and 1786 and author of an instruction for the shipment of natural objects from the Indies, considered that it was more useful and economical to purchase natural collections in Europe than to commission them by means of mailshot orders to the viceroys because

> *[…] although by the mailshot order sent by Your Majesty to the Viceroys and governors of America to inform that a great amount of these productions was expected, it has been almost three years that this order was informed and what has arrived, besides being little, has come in useless conditions and running such useless shipments will always cost more than what these very collections cost in Holland where the animals are very well made and preserved.*[63]

Consequently, the dispatch of the royal orders and instructions was an expensive method of collection, subjected to the fluctuations of the will and obedience of colonial officers, which, in addition, did not always allow the collection of data and material evidence of scientific quality, despite the systematization it was subject to. Even in 1806 the Gazeta of Madrid published, on 15 August, the complaint of botanist Juan Tafalla (1755-1811) about the imprecise methods that were still being used to package, transport and preserve the Peruvian bark, which reached the Royal Pharmacy in a 'muddled'[64] condition.

The systematization of packaging and transportation of vegetal products explored here was driven by the need to supply the Royal Pharmacy with medicines and to collect vegetal evidences that would allow the development of pharmacological and clinical experiments. In effect, the good material state of the vegetal products received in Madrid conditioned the work of the royal apothecaries in charge of supplying the Royal Pharmacy with quality medicine while they discovered other new ones. Hence the royal mailshot orders and instructions sketched the figure of the objects in an economic and scientific plane, according to the expectations of the institutions that collected them[65], and they included the responsibilities that the colonial officers should follow for the meticulous packaging of the commodities and the scientific specimens. In this sense this administrative practice was turned into a

[63] AHH-M. Estado, Libro 1031, volumen 2. Reptiles and animales que deben ser enviados a Holanda por el Gabinete. Madrid, 11 March 1779. f. 347.

[64] AGP-M. Fondo Farmacia, caja 4540, legajo 25. Gazeta de Madrid, Friday 15 August 1806 N° 67. f. 701.

[65] Lorraine Daston, *Biographies of scientific objects*, (Chicago: University of Chicago Press, 1999), on p. 9 and 10.

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kind of scientific practice inherent in the development of the long-distance science, which the Spanish Crown impelled during the 1780s upon the foundations of the power relations and obedience of the colonial administration of the Indies.

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