

DESTAQUE

Some observations about medical practice and culture at Lisbon's Todos-os-Santos Hospital during the Enlightenment Era

Algumas observações sobre prática médica e cultura no Hospital Real de Todos-os-Santos de Lisboa durante o período iluminista

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ABSTRACT

This article describes and documents the important role and influence of the Todos-os-Santos Royal Hospital in producing trained, licensed physicians and surgeons for service in the Lusophone world. During the seventeenth and the first half of the eighteenth centuries, until to the 1755 earthquake, the Todos-os-Santos Royal Hospital in Lisbon (which offered formal instruction in practical medicine), along with the antiquated medieval curriculum of the Faculty of Medicine of the University of Coimbra, were the only medical training centers structured in Portugal. This had serious implications for conventional medical treatment and practices. Even in Enlightenment era, in Portugal, training for state-licensed healers was, at best, limited and inadequate. The Hospital was the main practical training facility for the medical arts during the late seventeenth and first half of the eighteenth century, and was more open to innovations of surgical technique and applied medicines; it was there that the most innovative official medical teaching in Portugal occurred until the end of the reign of Dom João V. For example, the hospital boasted of a separate ward built and staffed especially for the mentally ill, and experimented with remedies for tropical diseases, often with indigenous medicines imported from the colonial empire.

KEYWORDS

Physicians / Surgeons / Hospital / Illuminism period / Lisbon

RESUMO

O artigo descreve e documenta o importante papel e a influência do Hospital Real de Todos-os-Santos na formação de físicos e cirurgiões licenciados para serviço no mundo lusófono. Durante o século XVII e a primeira metade do século XVIII, até ao terramoto de 1755, o Hospital Real de Todos-os-Santos em Lisboa (que oferecia instrução formal na prática da medicina), em conjunto com o antiquado curriculum medieval da Faculdade de Medicina da Universidade de Coimbra, foram os únicos centros de treino médico estruturado em Portugal. Este facto teve sérias implicações no tratamento e práticas médicas convencionais. Mesmo na época iluminista em Portugal, o treino oficial destes licenciados era, na melhor das possibilidades, limitado e inadequado. O Hospital foi o principal local de treino das artes médicas durante o final do século XVII e a primeira metade do século XVIII, estando mais aberto às inovações em técnicas cirúrgicas e em medicina aplicada; foi aí que ocorreram as mais inovadoras técnicas oficiais de ensino médico em Portugal até ao final do reinado de D. João V. Como exemplos, a construção de uma ala isolada especialmente equipada para doentes mentais, e experiências com medicamentos para doenças tropicais, muitas vezes com base em medicina indígena importada do império colonial.

PALAVRAS-CHAVE

Físicos / Cirurgiões / Hospital / Iluminismo / Lisboa

During the seventeenth and the first half of the eighteenth centuries, the Royal Todos-os-Santos Hospital in Lisbon (which offered formal instruction in practical medicine), along with the antiquated medieval curriculum of the Faculty of Medicine of the University of Coimbra, were the only centers of structured medical training in Portugal¹. Their combined output of university graduates or medical professionals educated through apprenticeships was rarely more than a dozen or so students per year, a circumstance that had serious implications for conventional medical treatment and practices within the Lusophone world.

Thus, even in Enlightenment-era Portugal, training for state-licensed healers was, at best, limited and inadequate. Until the very end of the early modern period, medical instruction at Coimbra was profoundly encumbered by a medieval scholastic sensibility that focused on the traditional Galenic system of medical instruction². As late as the second quarter of the eighteenth century, many professional physicians trained at Coimbra, if they did not follow medical developments abroad, simply had little exposure to new ideas from outside this antiquated tradition, whether those innovations came from the Asian colonies or from empirical scientists like Harvey, Malpighi, Van Leeuwenhoek, Haller and Boerhaave, who worked mostly in the north of Europe³. Furthermore, Coimbra-trained doctors were also frequently Old Christians in the employ of the Inquisition, an organization that was notoriously resistant to change and which distrusted ideas originating beyond the frontiers where Catholic orthodoxy reigned. Innovative medical techniques contended with an Old Christian mentality which saw any experimental changes in methodology as having a suspicious «*estrangeirado*» (foreign influenced) taint or, worse, carrying the stigma of being «Jewish medicine»⁴.

Even at the Todos-os-Santos Royal Hospital in relatively cosmopolitan Lisbon, a teaching hospital which during the eighteenth century was somewhat more open to innovations of surgical technique and applied medicines, there is little indication that doctors there succeeded before the 1760s in instituting any profound qualitative changes across the medical profession in Portugal, particularly among those physicians who, following their training, would be practicing in the rural provinces⁵. Nor is there much documentation showing that doctors and surgeons there made much use of information about potential cures sent back from Portuguese colonies in Asia or South America⁶. However, increasingly throughout the eighteenth century, medical practitioners within Portugal began to look for texts that would convey more effective medical techniques than could be learned from the ancient authorities and theoretical lectures of the Coimbra Faculty of Medicine.

To cite just one example, a contemporary Portuguese physician, José Ferreira da Moura, born in 1671 in Torres Novas, produced significant medical discourses in his lifetime⁷. Significantly, José Ferreira da Moura trained in surgery at the Todos-os-Santos Hospital before serving as a Portuguese army regimental surgeon during the War of Spanish Succession. Afterwards, he settled into a practice in Lisbon, where he produced a massive 656-page tome on theoretical and practical surgery. The first 568 pages of this volume were a translation of a Spanish text originally published in Latin by Juan de Vigo, but Ferreira da Moura augmented this work with professional materials of his own. He included his personal observations about «modern cures for illness and injury» which

¹ LEMOS, Maximiano de – *História de medicina em Portugal: doutrinas e instituições*. Lisboa: Editora Dom Quixote, 1991. vol. 1, p. 145-180.

² LEMOS, Maximiano de – *História de medicina em Portugal...* vol. 2, p. 145-168. See also GUIMARÃES, Feliciano Augusto da Cunha – A Faculdade de Medicina de Coimbra. *Actas Ciba*. Nº 14 (1950), p. 555-556.

³ DIAS, José Sebastião Silva – Portugal e a cultura europeia: séculos XVI a XVIII. *Biblos*. Coimbra: Universidade de Coimbra. XXVIII (1952), p. 280-281 and 368.

⁴ WALKER, Timothy D. – The role of licensed physicians in the Inquisition and at Court during the reign of João V. *Journal of the Mediterranean Studies Association*. V. 9 (2000), p. 146; 164-167.

⁵ CARMONA, Mário – O Hospital Real de Todos-os-Santos. *Boletim Clínico dos Hospitais Civis de Lisboa*. V. 18 Nº 3-4 (1954), p. 535-560. See also LEMOS, Maximiano de – *História de medicina em Portugal...* vol. 2, p. 133-144 and 169-180.

⁶ *Ibidem*.

⁷ ANTT, Chancelaria do Dom João V, *livro 40*; CARVALHO, Augusto da Silva – *Dicionário dos médicos e cirurgiões portugueses ou que estiveram em Portugal*. Lisboa: Academia das Ciências de Lisboa, [1949?]. vol. 3, p. 113-114. Unpublished 32-volume typescript with manuscript notations.

he had learned through his experience as a military practitioner. Mostly, these concerned poisons and venereal disease – and the effects of mercury used as a «panacea». Following this material was a catalogue of medicinal preparations: recipes for new medicines and prescriptions for their application⁸.

How does the life and works of physician José Ferreira da Moura exemplify in some ways the experience of medical practitioners at Lisbon's main central hospital during the Age of Enlightenment? To answer this question, first we must consider the general circumstances of contemporary medical training found there.

AN OVERVIEW OF THE ROYAL TODOS-OS-SANTOS HOSPITAL IN LISBON

As Lisbon expanded during the late medieval period, the lower town, known as the *Baixa*, situated below and to the west of the fortified castle hill with its old Roman-Moorish neighborhoods, developed organically with little formal planning into a tangled maze of streets, courtyards, and alleyways⁹. Essentially, the *Baixa* was built on a narrow sloping plain between two of Lisbon's hills, with the *Bairro Alto*, or «high neighborhood» (known to contemporaries as «*Vila Nova d'Andrade*») on the western side and the São Jorge Castle hill (with the venerable *Alfama* and *Mouraria* neighborhoods) on the other¹⁰. At the north end of this plain, furthest from the river, the large square called the *Rossio* – site of the Royal Todos-os-Santos Hospital, the Palace of the Inquisition, and several churches – constituted an important public focal point in the urban topography¹¹.

Public squares in the *Baixa* typically provided approaches that framed views of magnificent ecclesiastical building façades with their broad monumental doorways, meant to impress and overawe the population. Examples included the churches of the Todos-os-Santos Hospital and the *São Domingos* Convent in the *Rossio* Square¹². Following the 1755 earthquake and tsunami, however, reconstruction of the Manueline-style Todos-os-Santos Hospital church, once the dominant centerpiece façade overlooking the late medieval *Rossio*, was not even attempted; instead, the new royal hospital was situated on higher, «more healthful» ground above the *Rossio*, becoming the Royal Hospital of São José (the chosen name purposely to evoke that of the then-reigning monarch), a model of civic-minded benevolence¹³. Adjacent to the *Rossio*, the eighteenth-century *Baixa* reconstruction design called for the opening of another smaller square, called *Praça da Figueira* [Fig Tree Square] to encompass the area that the wards of the Todos-os-Santos Royal Hospital previously occupied¹⁴.

Before the earthquake, though, the Todos-os-Santos Royal Hospital, propitiously located in the *Praça do Rossio* in central Lisbon, played an important role in training surgeons and physicians for service across the nation and throughout the Portuguese colonial network. Particularly for medical professionals coming from the environs of Lisbon, but also for novices sent from the provinces (often supported by scholarships provided by the municipal councils of their communities or the crown), the Hospital of All Saints was the main practical training facility for the medical arts in Portugal during the late seventeenth and first half of the eighteenth century. Perhaps sixty percent of the physicians practicing in and around Lisbon during the middle half of the eighteenth century had

⁸ *Ibidem*.

⁹ MURTEIRA, Helena – Lisboa antes de Pombal: crescimento e ordenamento urbanos no contexto da Europa moderna (1640-1755). *Monumentos*. 21 (2004), p. 50-57.

¹⁰ ROSSA, Walter – *Além da Baixa: indícios de planeamento urbano na Lisboa setecentista*. Lisboa: IPPAR, 2000. p. 9-10.

¹¹ Museu da Cidade, TINOCO, João Nuno – *Planta da Cidade de Lisboa I [1650]*, desenho aguarelado, 1850. Nº Inventário: MC. DES. 1084.

¹² Museu da Cidade, TINOCO, João Nuno – *Planta da Cidade*. Nº Inventário: MC. GRA. 489.

¹³ Arquivo Municipal de Lisboa (AML), CARVALHO, Eugénio dos Santos; MARDEL, Carlos – *Planta topográfica da cidade de Lisboa arruinada também segundo o novo alinhamento dos architectos*, 12 Junho 1758; copy, 1947. These designs were drawn up by the military architects and engineers who prime minister Pombal appointed in 1756; they worked under Pombal's authority and close supervision.

¹⁴ ROSSA, Walter – Do plano de 1755-1758 para a Baixa-Chiado. *Monumentos*. 21 (2004), p. 22-43; ROSSA, Walter – *Além da Baixa...*, p. 39.

trained at Todos-os-Santos, with the balance having learned the skills necessary to pass their licensing exams either at the University of Coimbra or through a private apprenticeship with a licensed surgeon or doctor¹⁵.

Typically, medical trainees would complete what can appropriately be called a residency, lasting from one to two years in the wards of Todos-os-Santos, wherein they would have a chance to practice such skills as surgery and diagnostic medicine. Coimbra graduates, too, would occasionally attend for shorter periods to gain some practical clinical experience before being examined in the capital by a panel of physicians chosen and supervised by the chief physician and chief surgeon of the realm (respectively, the *Físico-Môr do Reino* and *Cirurgião-Môr do Reino*). Only upon passing this exam – and paying a substantial fee – would a prospective physician or surgeon receive an official *cartão do médico* (medical license) allowing him to begin a private practice within Portugal. Such a system, of course, was woefully susceptible to corruption¹⁶.

By the standards of the day, then, Todos-os-Santos can accurately be called a teaching hospital, and its position as such was unique in the nation. Further, it was there that the most innovative official medical teaching in Portugal occurred until the end of the reign of Dom João V. Modest as those efforts were, the All Saints Royal Hospital in Lisbon did have some strikingly forward-looking attributes, resulting primarily from its position as the crown's premier hospital in what was, despite the closed nature of Portuguese intellectual life, still a wealthy cosmopolitan European imperial capital. These attributes included a permanent association with the chief surgeon and physician of the kingdom, each of whom usually served on the hospital staff (in addition to their respective duties of tending to the royal family and the king's person). In addition, the Royal Hospital of All Saints benefited from the residency of a series of exceptionally skilled foreign-born medical practitioners who had been brought to Portugal by members of the royal family or the diplomatic corps precisely because of their superior knowledge of the healing arts. Also – and this was quite an enlightened attribute for the time – the hospital boasted of a separate ward built and staffed especially for the mentally ill¹⁷.

Although much of the Todos-os-Santos Hospital was destroyed by fire in 1750 and again following the disastrous earthquake of 1 November 1755, earlier in the century Dom João V had taken steps to improve healing facilities in the premier medical institution of the nation's capital. In so doing, the king followed the marked inclination toward innovation that he displayed as a young monarch. However, one must bear in mind that this ambitious program to improve Todos-os-Santos was begun when Lisbon was newly awash with a veritable flood of gold from Brazil; the eventual quotidian reality fell far short of the hospital's planned renovation¹⁸.

Just a few years into his reign, in 1715, João V's government promulgated a *Regimento do Serviço dos Médicos*, which increased the authorized number of interned patients of all types at Todos-os-Santos to six hundred, allowed for the construction of new buildings to contain them and, for their care, significantly augmented the number of trained nurses (*enfermeiros* and *enfermeiras*) permanently attached to the staff. According to the new *Regimento*, patients were to be divided into wards according to their respective illnesses; there were wards specifically designated to care for wounds, fevers, skin diseases, and the insane. In addition, one corridor was set aside especially for illnesses particular to women, while another dealt exclusively with male

¹⁵ This unscientific impression was gained from a lengthy, thorough examination of CARVALHO, Augusto da Silva – *Dicionário dos médicos e cirurgiões portugueses ou que estiveram em Portugal*. Lisboa: Academia das Ciências de Lisboa, [1949?].

¹⁶ DUTRA, Francis A. – The practice of medicine in early modern Portugal: the role and social status of the *físico-mor* and the *surgião-mor*. In KATZ, Israel J., ed. – *Libraries, history, diplomacy, and the performing arts: essays in honor of Carlton Sprague Smith*. Stuyvesant; New York: Stuyvesant: Pendragon Press, 1991. p. 162-166. See also BETHENCOURT, Francisco – Portugal: a scrupulous inquisition. In ANKARLOO, Bengt; HENNINGSEN, Gustav, ed. – *Early modern witchcraft: centres and peripheries*. Oxford: Clarendon Press, 1990. p. 410.

¹⁷ CARMONA, Mário – O Hospital Real de Todos-os-Santos... p. 498-507. See also PIRES, Maria Teresa; VAZ, Maria de Fátima – A medicina em Portugal no século XVIII. In CONGRESSO INTERNACIONAL PORTUGAL NO SÉCULO XVIII: DE D. JOÃO V À REVOLUÇÃO FRANCESA, Lisboa, 1989 – *Comunicações*. Lisboa: Universitária Editora, 1991. p. 168; and *Regimento do Santo Officio da Inquisição dos Reynos de Portugal. Ordenado por mandado do Illustrissimo e Reverendissimo Senhor Bispo Dom Francisco de Castro, Inquisidor Geral do Concelho de Estado de Sua Magestade*. Lisboa: Manoel da Sylva, 1640. Livro II, Título XVII, § 1-2.

¹⁸ CARMONA, Mário – O Hospital Real de Todos-os-Santos... p. 498-507.

maladies. Each was to have its own specialized nursing staff person. Further, certain members of the staff were designated to promote preventative medicine (*enfermeiras de prevenção*), along with those who worked with the general *convalescentes*¹⁹.

Alongside João V's document, medical treatment at the Todos-os-Santos Hospital, and indeed across all of metropolitan Lisbon, was also governed by a collection of *regimentos* compiled and maintained by the city Senate, a comprehensive regulatory body, under the title *Livro dos regimentos dos oficiais mecânicos da cidade de Lisboa reformados por ordem do Senado*²⁰. This compilation of rules and ordinances commenced official public use in 1572, and was continued, due to its great utility, until 1808, the year of the French military occupation of Lisbon and the relocation of the royal court to Rio de Janeiro. In this fundamental government volume, one could find the guidelines and bylaws by which all the important technical – «mechanical» – professions of the capital city were supposed to practice their trades. As such, rules governing critical royal hospital support staff and workers were included (for example, apothecaries, barber-surgeons, midwives, and phlebotomists), as well as hospital suppliers, like bulk merchants of medicinal drugs, or dealers in foodstuffs, linens, and bedding²¹.

Todos-os-Santos could boast of two other unusual innovations for the time. The hospital had a ward devoted to fevers and other maladies which Portuguese colonial administrators, soldiers and merchant travellers had picked up in the tropics (though treatment remained largely based on European and not colonial practices). Another ward, heralded for its novelty and utility, specialized in treating the dementia of patients suffering from advanced syphilis. To keep its patients isolated from the rest of the inmates, this facility was apparently built well apart from the main hospital buildings²².

A number of distinguished, physicians and surgeons served on the staff of the Todos-os-Santos Hospital, beginning quite early on in the seventeenth century, at the dawn of the age of empirical science. Notable among them was doctor Miguel Cabreira, a physician appointed to serve the King and the city of Lisbon, duties for which he performed through his posting to the royal Todos-os-Santos Hospital. He was also a knight of the Order of Christ, and during the first decade of the 1600s served on Lisbon's Board of Health, where his duties included overseeing the quality of Lisbon's apothecary shops, and visiting the sick at the municipal infirmary (the *Casa da Saúde*) during times of plague or other epidemic illness²³. Another was Cabreira's contemporary at the royal hospital, Jorge de Castro, surgeon to the King and royal family. He also held an appointment at the *Hospital Real de Todos os Santos*. De Castro appears to have taken an interest in the plight of Lisbon's orphans, having supported the appointment petition of a functionary charged with administering to the needs of abandoned or parentless children²⁴.

One of the foreign-born medical experts who came to Lisbon after receiving superior medical training abroad was an Italian physician named Bernardo Santucci. A native of Cortona, in Tuscany, Santucci had studied medicine in Rome before being attracted to Portugal by a royal salary in 1732. Dom João V invited Santucci to Lisbon specifically to teach anatomy and surgery at the Todos-os-Santos Royal Hospital. During his residence in Lisbon, Santucci produced a human anatomy textbook of the first quality²⁵.

¹⁹ PIRES, Maria Teresa; VAZ, Maria de Fátima – A medicina em Portugal.... p. 168.

²⁰ AML, Casa dos Vinte e Quatro, Livro dos regimentos dos oficiais mecânicos da cidade de Lisboa reformados por ordem do Senado, docs. 1-99, f. 1-322v.

²¹ *Ibidem*.

²² PIRES, Maria Teresa; VAZ, Maria de Fátima – A medicina em Portugal.... p. 168.

²³ AML, Quitações e desistências, Livro 1 (tomo I) [copy], f. 25v-34.

²⁴ AML, Provitimento de officios, 1429-1739, Livro 3 [copy], f. 46v-49.

²⁵ SANTUCCI, Bernardo – *Anatomia do corpo humano, recopilada com doutrinas medicas, chemicas, filosoficas, mathematicas, com indices, e estampas, representantes todas as partes do corpo humano...* Lisboa Occidental: António Pedrozo Galram, 1739.

Santucci's appointment to Todos-os-Santos was made in the wake of a major yellow fever epidemic in Portugal that, in 1730, had severely over-taxed the capital's medical resources. There had not been enough qualified physicians to treat the hundreds of ill citizens who flocked to Lisbon's Royal Hospital for care. So many sick individuals arrived at Todos-os-Santos that year (34,000, as compared to the usual annual average of less than five thousand patients) that treatment was provided based on a lottery system. The following year, therefore, in response to this crisis, crown patronage created a formal course at Todos-os-Santos to train new surgeons²⁶.

A respected surgeon and court favorite named Isaac Elliot, thought to have been an Englishman, was provided with a royal stipend to train young men by instructing them in a practical course of surgery which was to meet twice a week. This was the first program organized in Portugal and represents a marked departure from the scholastic methods employed at Coimbra²⁷. Shortly thereafter, however, Elliot was involved in a sensational trial for the murder of his young wife²⁸. In this extraordinary case, the royal influence of an important court medical doctor was not sufficient to keep him beyond the reach of the law, though the physician in this case was not an employee of the Inquisition. *Médico* Isaac Elliot was João V's personal physician and a member of the Order of Christ.

Santucci was summoned to take Elliot's place; the surgery course, along with a stipend of 300,000 *reis*, was entrusted to him. For a sense of just how valuable this emolument was, consider that regular staff surgeons of the Lisbon hospital earned one hundred *reis* per day in the 1730s and 1740s, paid by the king. In return, they were obliged to give an account of their clinical experiences in special seminars, wherein they were to describe their most effective cures²⁹. This system was designed to enlarge and disseminate an institutional memory of effective healing methods, for the overall improvement of hospital care.

Bernardo Santucci served the Portuguese crown until 1747. During his tenure he influenced scores of young surgeons and physicians who interned with him. As a testament to his skill, a royal provision issued in 1738 required that no one who had trained in surgery at Todos-os-Santos could be certified to practice their profession in Portugal without first being certified by Santucci or one of his associates³⁰.

Medical practices in eighteenth-century Lisbon owed some changes to the influence of the Portuguese ambassador to England, Sebastião José de Carvalho e Melo, better known to history as the Marquês de Pombal. Carvalho e Melo's tenure in London began in 1739; in the six years of his residence, he and the illustrious expatriate Jewish physician Jacob Henriques de Castro Sarmiento had ample time together to discuss Portugal's need for medical reform. Carvalho e Melo in London was a man steeped in experiences that honed his Enlightenment sensibilities. He became a member of the Royal Society in 1740, consorted with exiled *converso* reformers and other intellectuals and possessed in his library books that the Inquisition had banned at home. In short, he became a thoroughgoing rationalized *estrangeirado*, with ideas shaped by his time abroad. Moreover, he became convinced that the only way for Portugal to become a stronger State internally was to modernize all aspects of society through a program of enlightened reform³¹.

Carvalho e Melo left London in 1745 to serve in Vienna as ambassador to the Austrian Habsburgs,³² but there is ample evidence that he carried the effect of his conversations with Castro Sarmiento with him. He continued

²⁶ SERRÃO, Joaquim Veríssimo – *História de Portugal*. Lisboa: Verbo, 1996. vol. V, p. 420.

²⁷ SERRÃO, Joaquim Veríssimo – *História de Portugal*.... vol. V, p. 420.

²⁸ DONAVAN, Bill M. – Crime, policing and the absolutist State in Early Modern Lisbon. *The Portuguese Studies Review*. V. 5 Nº 2 (1997), p. 65-66.

²⁹ SERRÃO, Joaquim Veríssimo – *História de Portugal*.... vol. V, p. 420.

³⁰ ANTT, Chancelaria do Dom João V, *livro* 131, f. 132. In CARVALHO, Augusto da Silva – *Dicionário dos médicos*... vol. 5, p. 189.

³¹ MAXWELL, Kenneth – Eighteenth-century Portugal: faith and reason, tradition and innovation during a golden age. In LEVENSON, Jay A., ed. – *The age of the Baroque in Portugal*. New Haven: Yale University Press, 1993. p. 108. See also MAXWELL, Kenneth – *Pombal: paradox of the enlightenment*. Cambridge: Cambridge University Press, 1995. p. 10-20 and 87-109.

³² MAXWELL, Kenneth – *Pombal: paradox of the enlightenment*... p. 8.

to correspond with Castro Sarmiento and other *estrangeirados* on topics of scientific innovation, and during his tenure in Vienna he attracted talented physicians to his retinue. One of these, a Swiss-born doctor whom the Portuguese called Pedro Defau, was so valuable that Carvalho e Melo brought him to Lisbon as his personal physician when he returned in 1749. Defau was named to the Chair of Anatomy at the Todos-os-Santos Hospital; while in Lisbon he went on to publish two learned and influential treatises on human bone structure³³.

INTERCONNECTIONS: LICENSED PHYSICIANS AND SURGEONS IN THE TODOS-OS-SANTOS HOSPITAL, IN THE INQUISITION, AND AT COURT DURING THE REIGN OF DOM JOÃO V

During the seventeenth century, a strong professional bond developed that linked three important social institutions in Portugal: the crown, the Holy Office, and the learned medical community. How did this association occur, are its implications historically? Let's begin with an example:

In 1670, the Coimbra-trained surgeon António Ferreira first published his medical treatise entitled *Luz Verdadeira, e recopilado exame de Toda a Cirurgia* (True Light, a brief examination of All Surgery). He dedicated the 1705 edition of this work, which had become widely known across Portugal and helped to establish Ferreira's reputation as one of that country's most skilled and recognized medical professionals of the seventeenth century, to the «august and royal majesty, the King Dom Pedro II». That he should do so comes as no surprise, as the king was his immediate patron and benefactor. The 1705 title page of his treatise identifies the author as a university graduate (*licenciado*), surgeon both of the king's chambers and to his elite guard, as well as a surgeon of the Royal Hospital of Todos-os-Santos in Lisbon³⁴. Without a pause, the description goes on to say that Ferreira was a surgeon of the prisons of the Holy Office and *familiar* of that institution, and a surgeon of the *Tribunal da Relação*, one of the supreme judicial councils of the royal court. Final among his enumerated laurels was his membership as a «professed Knight of the Order of our Lord Jesus Christ». Ferreira had risen into very privileged ranks, indeed.

The experience of surgeon António Ferreira was by no means unique. Though he is a relatively early example of the trend, he typifies what in the eighteenth century would become a common occurrence. Increasingly, university-trained physicians and surgeons simultaneously held important posts at court, took up influential positions within the Inquisition, and maintained ties with an elite class of surgeons and doctors with whom they practiced and discussed ideas for change within the medical profession. During the reign of Dom João V, a handful of broadly connected medical men assumed key positions of far-ranging authority and simultaneous tri-lateral influence. These circumstances help to explain two concurrent eighteenth-century themes in Portuguese history: the effort to bring about substantive modernization of the medical profession, and the Inquisition's markedly increased persecution, using centuries-old statutes against the practice of witchcraft, of unlicensed popular healers. These circumstances are not mere coincidence.

The following passages will document the expanding role and influence of trained, licensed physicians and surgeons within the Portuguese Inquisition and at the royal court during the reign of João V (1706-1750). The period in question saw a significant influx of university-trained doctors and surgeons into the paid ranks of the Inquisition, where they worked as *familiars* – non-ecclesiastic employees, informants and lower echelon functionaries – and as resident physicians and surgeons in the Inquisition's prisons (where one of their concurrent functions was the supervision of interrogation sessions conducted with the use of torture). Particularly telling are the cases which originated from the Faculty of Medicine at the University of Coimbra and the Royal Hospital of Todos-os-Santos in Lisbon, where doctors trained at or even teaching medicine in those institutions maintained very close links

³³ CARVALHO, Augusto da Silva– *Dicionário dos médicos...* vol. 3, p. 41-42.

³⁴ A facsimile of the title page is found in DUTRA, Francis A. – *The practice of medicine...* p. 162.

with the Inquisition, often holding important positions within both organizations simultaneously. During the same period, professional physicians from Coimbra or the Todos-os-Santos Hospital held significant, potentially influential positions at the monarch's court, serving as personal doctors or surgeons to the royal family or to specific noble houses. These physicians, too, were also frequently in the employ of the Inquisition.

It is for this reason that a modestly-sized group of elite medical professionals could come to exercise a significant influence over several key Portuguese institutions just before and during the reign of João V; many of the same surgeons and physicians simultaneously held posts in the Inquisition, at court, in the Todos-os-Santos Royal Hospital in Lisbon (important as a teaching hospital), and in the Faculty of Medicine of the University of Coimbra. Moreover, because such posts were often lifetime appointments, these men held their positions typically for decades at a time, throughout the most important, productive years of their careers. Hence, this central corps of medical professionals exercised an influence at the core of the Portuguese *ancien regime* that was marked by great consistency and continuity. Many of the key faces stayed the same for much of King João V's reign, through the first half of the eighteenth century.

What were the duties of these medical professionals, regarding their service to the Holy Office? If a convict or one of the accused became mentally unstable while incarcerated, the chief jailer and inquisitors would call upon the prison medical staff to address the prisoner's madness. Judging from the explicitness with which «insanity» was addressed in the 1640 Holy Office *Regimento*, this problem, whether feigned or real, was not uncommon. And no wonder: then as now, being judged mentally deficient worked to the accused's advantage. Legal proceedings against the suspect were suspended and the prison physicians were ordered to restore the inmate to his senses with «all possible means», including whatever medicines they thought necessary. If in the physicians' opinion the prescribed remedy could not be administered effectively within the Inquisition *cárceres*, the prisoner would be interned at the Todos-os-Santos Hospital in Lisbon, which had a special ward to treat madness. The 1640 *Regimento* further provided that, should the patient still not regain his senses, he would be released to the care of his relatives until such time as he was judged able to stand trial, if at all³⁵.

Research for this article has turned up literally several scores of doctors and surgeons who, during the first six decades of the eighteenth century, held important positions at the royal court while serving simultaneously as paid functionaries of the Inquisition, sometimes simply as *familiares*, but often holding far more elevated posts. The following examples, proceeding chronologically from a long roster of apt candidates, illustrate the broad influence and connections of these court medical practitioners. They also provide insight to the influential place of the Todos-os-Santos Hospital in contemporary Portuguese elite culture.

António de Figueiredo was born in the village of Farminhão, near Viseu in north-central Portugal, in about 1644. He established himself in Lisbon, interning as a surgeon at the Royal Hospital of Todos-os-Santos. Apparently a very capable student, he subsequently began to teach surgery at Todos-os-Santos and, as his reputation grew, he was named successively as the chief surgeon of the Royal Hospital, and of the *Senado* of the *Câmara*, one of the sovereign's primary advisory councils. On 7 April 1698, Figueiredo became the surgeon of the Inquisition prisons in Lisbon. These latter positions he held until his death on 3 August 1717³⁶. All told, António de Figueiredo spent nearly forty years tending to the ailments of persons in high power, and had himself risen to a place of no mean influence.

António Silva served for two years as a physician of the *Santa Casa da Misericórdia* in Lisbon before moving to the Todos-os-Santos Royal Hospital in 1710. He practiced medicine there until his death in 1737. During that time, however, he also served as *médico* of the Inquisition prisons in Lisbon, and was the long-time personal physician

³⁵ *Regimento do Santo Officio* (1640), *Livro II, Titulo XVII*, § 1-2.

³⁶ CARVALHO, Augusto da Silva – *Dicionário dos médicos...* vol. 3, p. 122-123.

of Prince Dom António, one of King João V's legitimized sons born to him by a French mistress. In 1730, Silva gained additional royal favor when he was officially recognized for assisting in the treatment of an illness that threatened the life of Prince Dom Carlos, Dom António's younger half-brother³⁷.

Another notable physician during the reign of João V was Manuel Lopes. Born near Braga in the north of Portugal in 1715, Lopes came to Lisbon in the late 1720s already having some medical training: he served as a adjutant to the surgeon Manuel Vieira at Crown Prince Dom José's wedding in 1729. He continued to train to become a certified «anatomical surgeon», working at the Todos-os-Santos Hospital with the renowned Italian anatomist Bernardo Santucci. According to the practice of the time, he was examined by the chief surgeon of the realm and *Físico-Môr* Doctor Francisco Xavier, who on 8 February 1739 granted Lopes his license to practice medicine. Lopes became a surgeon of the royal chambers, personally attending to the needs of members of the royal family, and continued in this capacity after the death of King João V in 1750. In 1754, when the position of surgeon and phlebotomist for the Holy Office prisons became vacant, Lopes sought this post. Accordingly, he was made a *familiar* of the Inquisition on 17 October 1755 and immediately assumed his duties. Lopes's greatest merit, though, lay in publishing: in 1760 he authored a masterful treatise on bone anatomy and the treatment of skeletal afflictions. Portuguese medical historian Augusto da Silva Carvalho has termed this work «among the most important books for the history of surgery in Portugal during the eighteenth century»³⁸.

MEDICINES EMPLOYED AT THE TODOS-OS-SANTOS HOSPITAL: THE MARKET AND COMMERCE OF IMPORTED MATERIA MEDICA IN LISBON DURING THE EARLY MODERN PERIOD

Many of the most important cognitive breakthroughs in tropical medicine came to the Portuguese during the sixteenth century, too early to be appreciated by later European science – so early, in fact, as to be ignored or forgotten by later generations of medical scholars. Several Portuguese discoveries in applied medical technology predated systematic recognition by rationalized science in northern Europe by such a broad span of years that the historical memory of those events has since been superseded by later medical observers of different nationalities. Recent Portuguese historians of medicine have written revisions with justifiable indignation, attempting to restore to their countrymen their rightful place as innovators in medical science³⁹. The epoch of the discoveries, they argue, were prolific times of innovation in the domain of botany, toxicology and pathology, as the Portuguese encountered a great number of exotic illnesses for the first time, and pioneered the field of tropical medicine with their attempts to find cures for these maladies, with experimental treatments often effected at the Todos-os-Santos Hospital.

To understand how medicinal substances from Portuguese colonial territories were distributed in continental Portugal, let us turn our attention briefly to the dynamics and structure of the home market for pharmaceuticals, especially in the imperial metropole.

In continental Portugal at the end of the seventeenth century, the great majority of pharmacies were in the hands of that nation's numerous monasteries and operated by the often highly trained brothers of these institutions, be they Jesuit, Augustinian, Benedictine, Carmelite, or of some other order⁴⁰. These pharmacies typically

³⁷ ANTT, Chancelaria de Dom João V, *livro* 31, f. 132; *livro* 42, f. 69. Also SERRÃO, Joaquim Veríssimo – *História de Portugal...* vol. V, p. 448.

³⁸ ANTT, Chancelaria de Dom João V, *livro* 97, f. 18v; Habilitações do Santo Ofício, *maço* 166, no. 1737; CARVALHO, Augusto da Silva – *Dicionário dos médicos...* vol. 4, p. 153-154.

³⁹ FRADA, João – Contributos portugueses do período expansionista e da época colonial para as ciências médicas. *Medicamento, história e sociedade*. Ano 4 Nº 6 (Julho 1995), p. 9-11.

⁴⁰ DIAS, Pedro Sousa; PITA, Rui – *A botica de S. Vicente e a farmácia nos mosteiros e conventos da Lisboa Setecentista*. In *A botica de São Vicente de Fora*. Lisboa: Associação Nacional das Farmácias, 1994. p. 19.

provided medical preparations for people living in the vicinity of the monastery, as well as for the resident friars themselves. Only in the larger cities, like Lisboa, Porto, Coimbra or Évora, were secular pharmacies to be found. These, however, were generally modest concerns; secular pharmacists complained frequently that they could not compete with the monopolistic practices of the great monastic orders, whose purchasing power, established trade and procurement networks throughout the overseas empire, and superior professional reputations combined to impoverish lay pharmacies⁴¹.

Physicians and surgeons working in the Todos-os-Santos Hospital would have drawn their medicines from multiple sources, and these certainly included secular and ecclesiastical apothecaries operating in Lisbon. The privileged position enjoyed by the capital city's principal Royal Hospital may have allowed for the direct importation of dedicated consignments of drugs for the exclusive use of Todos-os-Santos staff to treat their patients.

However, a large proportion – indeed a virtual monopoly – of the very lucrative trade in medicinal substances in continental Portugal, therefore, was controlled by monastic institutions and the schools (*colégios*) associated with them. In the case of medicines arriving from Brazil and the *Estado da Índia*, the druggists (*boticários*) of the Society of Jesus enjoyed a clear advantage, as they could rely on their co-religionist associates in Salvador de Bahia, Goa, and Macau to procure and ship consignments of precious medicinal plants or prepared medications using South American or Asian ingredients, such as the prized substances jalapa, rhubarb, or opium, especially for the stockrooms of their brethren in Portugal⁴².

In Lisbon, two of the city's most important pharmacies operated under Jesuit control. These were attached to the *Casa Professa de São Roque* and the *Colégio de Santo Antão*. Together, these two pharmacies functioned as the hub of a network of Jesuit *boticas* that extended throughout the Portuguese seaborne empire. Without exaggeration, the Jesuits and, to a lesser extent, the Dominicans, helped to drive, direct and sustain the global market in many of the exotic medicinal plants or animal-based *drogas* arriving in Europe from Asia, Africa, and South America, partly because of their purchasing might in this profitable trade, but more importantly because of their influence and pharmacological expertise at those points in the empire where these substances could be procured⁴³.

This arrangement existed deep into the reign of Dom José (1750-1777). After the suppression of the Jesuit order under prime minister Pombal in 1759, the goods of the Jesuit colleges and their pharmacies situated across Portugal and the colonies became confiscate, spoils of crown policy. On the continent, the University of Coimbra absorbed much of the Jesuit's holdings into the Faculty of Medicine. Most of the substantial nation-wide stock of Jesuit medicines was sold at public auction⁴⁴.

Another Lisbon monastic pharmacy of great importance and repute was located in the courtyard of the monastery of the Augustinian Order of *Santa Cruz de Coimbra*, better known to *Lisboetas* as the venerable *Mosteiro de São Vicente de Fora*. The monks of this order naturally were involved in the pharmacist's trade as producers and vendors of medicines: one of their preparations was a mercury-based «panacea» in pill form, which the monks produced on the premises and shipped in great quantities along with a printed sheet of dosage instructions to destinations all over Portugal and the colonies – its particular use was to combat syphilis⁴⁵. They were best

⁴¹ *Representação da corporação dos boticários de Lisboa pedindo o encerramento das boticas dos conventos* (ANTT, Ministério do Reino, Maço 469, no date [mid-eighteenth century]). In DIAS, José Pedro Sousa – *Inovação técnica e sociedade na farmácia da Lisboa setecentista*. Lisboa: [s.n.], 1991. Tese de doutoramento, apresentada à Faculdade de Farmácia da Universidade de Lisboa. vol. II, p. 638-639. See also DIAS, Pedro Sousa; PITA, Rui – *A botica de S. Vicente...* p. 20.

⁴² DIAS, Pedro Sousa; PITA, Rui – *A botica de S. Vicente...* p. 19-20.

⁴³ *Ibidem*, p. 18 and 21.

⁴⁴ *Ibidem*, p. 18.

⁴⁵ COELHO, Manoel Rodrigues – *Farmacopeia tubalense chimico-galenica*. Lisboa: Officina de Antonio de Sousa Sylva, 1735. p. 845-846.

known, however, for their production of professional texts on matters of pharmacology and chemistry, which the monks wrote and published on an in-house press. During the first decade of the eighteenth century, one of their number, Dom Caetano de Santo António, produced what would quickly become the most widely known, influential and authoritative Portuguese «pharmacopoeia» – a manual of remedies and medicines for physicians, surgeons and barbers⁴⁶.

In 1704, Dom Caetano de Santo António, an Augustinian monk and druggist originally of the Monastery of Santa Cruz in Coimbra, published the first *farmacopeia*, or pharmaceutical guide, written wholly in the Portuguese language. At that time he still lived in Coimbra, and his initial book, *Pharmacopea Lusitana*, shows the influence of his working in this highly insulated community⁴⁷. In 1709, however, Santo António transferred his activities to Lisbon when he was nominated *boticário* of the famous pharmacy at the Monastery of São Vicente da Fora. In this more cosmopolitan environment, Santo António was exposed to innovative medicines and techniques from outside Portugal. He increasingly became aware of – and was perhaps less restricted in writing about – progressive medical science conducted in the north of Europe. This new consciousness led him to thoroughly revise and reissue his pharmacopoeia, which he published in 1711 under the title *Pharmacopea Lusitana Reformada*⁴⁸.

Dom Caetano de Santo António's new guide enjoyed immediate success; it was in great demand as a teaching text for pharmacology in Portugal, where it achieved a wide distribution. Subsequent editions, entitled *Pharmacopea Lusitana Aumentada* (1725⁴⁹ and 1754⁵⁰), further refined and disseminated a growing knowledge of the art and science of pharmacology. More importantly for purposes of understanding the cosmopolitan nature of medicine as practiced in contemporary Lisbon's hospitals, editions of Dom Caetano's book published after 1711 were increasingly informed and influenced by the accumulated knowledge of medicinal plants derived from contact with India, China, Africa, and Brazil⁵¹.

So, through works like this and a few others, such as the highly derivative *Pharmacopea Tubalense* (1735 and 1760), specific information about *drogas* and remedies from the imperial enclaves first became broadly and systematically known within Portugal, gradually entering mainstream medical practice. While knowledge of such drugs may have come to some Portuguese physicians earlier through works published outside Portugal in other languages – Spanish, French and Latin-language publications from the sixteenth and seventeenth centuries circulated in Portugal prior to the publication of *Pharmacopea Lusitana Reformada* in 1711 – this information was not so widely known and imperfectly understood beyond the cosmopolitan centers because it was not written in Portuguese⁵².

⁴⁶ BASSO, Paula; NETO, João – *O Real Mosteiro de S. Vicente de Fora*. In *A botica de São Vicente de Fora*. Lisboa: Associação Nacional das Farmácias, 1994. p. 14. NETO, João – *A botica do Real Mosteiro de S. Vicente de Fora. Medicamento, história e sociedade*. Ano 3 N^o 4 (Setembro 1994), p. 10-11.

⁴⁷ DIAS, José Pedro Sousa; PITA, Rui – *A botica de S. Vicente...* p. 23; NETO, João – *A botica do Real Mosteiro...* p. 10-11.

⁴⁸ SANTO ANTÓNIO, Dom Caetano de – *Pharmacopea lusitana: método prático de preparar, e compor os medicamentos na forma galenica com todas as receitas mais usuais*. Coimbra: Imprensa de João Antunes, 1704; and SANTO ANTÓNIO, Dom Caetano de – *Pharmacopea lusitana reformada: método prático de preparar os medicamentos na forma galenica e chimica*. Lisboa: Imprensa no Real Mosteyro de São Vicente de Fóra, 1711; NETO, João – *A botica do Real Mosteiro...* p. 10-11.

⁴⁹ SANTO ANTÓNIO, Dom Caetano de – *Pharmacopea lusitana aumentada*. Lisboa: Na Officina de Francisco Xavier de Andrade, 1725.

⁵⁰ SANTO ANTÓNIO, Dom Caetano de – *Pharmacopea lusitana aumentada*. 4th ed. Lisboa: Imprensa no Real Mosteiro de São Vicente de Fóra, 1754. p. 1-61; 144-189; 190-238; 352-377.

⁵¹ DIAS, Pedro Sousa; PITA, Rui – *A botica de S. Vicente ...* p. 23.

⁵² DIAS, José Pedro Sousa – *Inovação técnica...*, vol. II, p. 609-621. Dias lists the personal medical libraries of five Lisbon *boticários*, which were included in the inventories of their respective estates.

Thus, knowledge about colonial curatives was not widespread at the popular or professional level in Portugal until after 1711, and such knowledge spread only gradually thereafter. By far, most Portuguese curative preparations, both in popular healing lore and in academic pharmacological publications and practice, came from sources which were locally available. While this is to be expected, of course, the striking corollary is that, even with the potential availability and relative cheapness of medicinal plants from Asia, they were nevertheless rarely employed in recipes for medicines in continental Portugal. Folk healers and licensed physicians alike preferred to use locally-grown plants or medicines from the European medical tradition almost exclusively, the effects with which they were most familiar. Despite the exotic allure of tropical colonial drugs and their rumored efficacy, Portuguese physicians resorted to them only rarely, while popular *curandeiros* (folk healers) used them practically not at all⁵³.

There were, of course, exceptions: Rhubarb, benzoin, *pedras cordiais* from Macau, and the like enjoyed a certain popularity. Saleable as these substances were, they constituted only a minor piece of the total pharmaceutical market's volume. Comparing prices, colonial drugs from Asia or South America available in the imperial capital were in general only marginally more dear than medicinal substances procured from more convenient locations closer to Lisbon; and Asian drugs were actually cheaper on average than medicinal *drogas* originating in the Americas. Prices were determined not so much by distance travelled as by availability, demand, or difficulty of manufacture. While the average price for vegetable drugs coming from Asia or African was slightly higher than for plant medicines originating in Europe or the Mediterranean, every region provided expensive substances, the prices for which reflected that drug's rarity. Prices often exceeded those of *drogas* arriving from Asia by a wide margin⁵⁴. Based on their relatively comparable prices, most medicinal plants coming from Asia do not seem to have been difficult to procure in sufficient quantities to easily meet the demands of the Lisbon market⁵⁵.

Among imperial medicinal items of animal origin, three stand out for their exotic provenance and assumed efficacy. Ambergris was the second most expensive item held in the *Colégio de Santo Antão's* stocks. A fatty substance found on beaches and floating in tropical waters, it is thought to originate in the intestines of Sperm whales. At 53,333 *reis* per pound, ambergris was valued for its musk smell; it was used as a fixative agent in perfumes and drugs, and was expected to add to the potency of medicinal compounds. Bezoar stones, too, had been sought for centuries for their supposed power as a universal remedy. A concentrated enzyme secretion found in the stomachs of goats in India and China, they were thought to staunch bleeding wounds and generally increase vitality. Reflecting both their great rarity and high demand, Asian bezoar stones sold for 12,800 *reis* apiece. The intriguing entry «elephant oil» at 960 *reis* per pound concludes the list, the intended application for which this historian was unable to discern. *Drogas* from Asia of animal or mineral origin, it must be noted, represented only a tiny fraction – just six or seven items – of the substances found on this pharmacy's complete list. Except for a few exotic animal substances, most medicinal drugs imported from Asia on the *Carreira da Índia* were plant derivatives⁵⁶.

⁵³ ARAÚJO, Maria Benedita – *O conhecimento empírico dos fármacos nos séculos XVII e XVIII*. Lisboa: Edições Cosmos, 1992. p. 20-21.

⁵⁴ DIAS, José Pedro Sousa – *Inovação técnica...*, vol. II, p. 697-699.

⁵⁵ *Ibidem*.

⁵⁶ RUSSELL-WOOD, A. J. R. – *A world on the move: the portuguese in Africa, Asia and America, 1415-1808*. Manchester: Carcanet Press, 1992. p. 126-127.

Regarding medicines imported to Lisbon from Brazil, by the mid-eighteenth century, a broad range of South American medical substances had entered common pharmaceutical usage in continental Portugal⁵⁷. Indigenous medicinal plants that Portuguese settlers adopted and exported from Brazil in significant quantities beginning in the sixteenth century included derivatives of *cacau* (medicinal chocolate and cocoa butter, the latter used to treat skin ailments); *ipecacuanha* (also called *cipó*), a reliable emetic and diaphoretic; cinchona bark (also called *quina* or *quineira*), arguably the most important remedy found in the New World, essential to treating malaria and other tropical fevers;⁵⁸ *jalapa*, an effective purgative; *copaíba*, to treat gonorrhoea; and *salsaparilha*, administered against syphilis and skin diseases⁵⁹. More than any others, these particular Brazilian remedies travelled within the Atlantic World medicinal economy, gaining widespread medical usage elsewhere in the Portuguese empire, and becoming both medically and commercially significant commodities.

CONCLUSION

Remedies from the Asian and South American colonies, then, were not in the same demand as medicinal products created with local, traditional ingredients. The supply of medical goods was not a problem; at issue, rather, was the willingness of traditional medical practitioners to use these goods in sufficient quantity to justify their increased importation. This did not occur. Medicines from the colonies remained in the realm of the exotic. Most healing in continental Portugal in the eighteenth century was done with traditional local medicines made from local plants. By far, the majority of medicinal substances in use at the Todos-os-Santos Hospital during the eighteenth century were derived from plants of European or Mediterranean origin, reflecting not simply the relative ease of supply for these products, but also the popular and professional demand for them⁶⁰. Moreover, the healing techniques employed came from a centuries-old European tradition which remained resistant to innovation from the imperial enclaves. Moreover, despite earlier discovery and reporting of medicinal plants by Portuguese explorers in the sixteenth century, knowledge of these plants did not become widespread until the eighteenth century, with the publication of technical pharmacist's guides written in Portuguese.



⁵⁷ DIAS, Pedro Sousa; PITA, Rui – A botica de S. Vicente... p. 12-20.

⁵⁸ JARCHO, Saul – *Quinine's predecessor: Francesco Torti and the early history of Cinchona*. Baltimore: Johns Hopkins University Press, 1993. p. 102-104; 297-298; and MAEHLE, Andreas-Holger – *Drugs on trial: experimental pharmacology and therapeutic innovation in the eighteenth century*. Amsterdam: Rodopi, 1999. p. 223-233.

⁵⁹ For detailed descriptions and documentation of the various uses of these medicinal plants, see WALKER, Timothy – The medicines trade in the portuguese atlantic world: dissemination of plant remedies and healing knowledge from Brazil, c. 1580-1830. *The Social History of Medicine*. 26:3 (2013), p. 428-431.

⁶⁰ *Lista da botica de São Roque* (Arquivo Histórico do Tribunal de Contas, *Junta da Inconfidência*, nr. 112, f. 58-73). In DIAS, José Pedro Sousa – *Inovação técnica...*, vol. II, p. 626-633.

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