

## Colonial Botany: Science, Commerce, and Politics in the Early Modern World

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The editors of this very useful collection of essays boldly state that it is their thesis that 'early modern botany both facilitated and profited from colonisation and long distance trade and that the development of botany and Europe's commercial and territorial expansion are closely associated developments' (p. 3). They are to be congratulated on striving to bring the science of botany from its perceived isolation as the history of taxonomy into its widest context of the culture, politics and economics of the early modern world. Inherent in the search for colonies was the need to manage the diseases of the area, to create an economic base and to assert political domination. This often meant beating others at the same game, and even the most altruistic botanists required patronage or political support underpinned by economic profit.

Among the strengths of the volume is the interdisciplinary spread of contributors, which brings a broad range of approaches and interpretations and unfamiliar knowledge to those in other disciplines, as well as a range of academic writing styles which are lessons in themselves. Historians of science, scientists, political historians and historians of art all approach the central theme of the volume from their own perspectives and within their own methodologies.

The volume is organised thematically, which is sensible, but within each section there is a rough chronological structure. One of the satisfying elements of the work is the thorough editing which ensures appropriate cross-referencing so that several themes can be picked up throughout. At the same time, each contribution can usefully stand alone. There is a variety of international contributions exploring the colonial activities of inter alia the Spanish, Dutch, French, Swedes, Poles and Danes, but, remarkably, of the English only in passing references. This is somewhat surprising since the volume has its greatest concentration in the eighteenth century when the English were consolidating their place in world trade and expanding their colonies in America and the East. The work of Hans Sloane is largely overlooked, except by Schiebinger in chapter 7, 'Prospecting for drugs: European naturalists in the West Indies', and an illustration of a drawer from one of his cabinets as an exemplar of organisation of specimens (pp. 250–1), while Michael Bravo comments on Joseph Banks's 'near omniscient role in matters relating to the conjunction of British botany and Empire' (p. 51). This omission may merely be a reflection of the current interests of the contributors, or it may have been deliberate editorial policy to highlight the activities of those whose exploits normally receive less attention from English speaking historians; and if the latter is true, some clarification would have been helpful.

There are several subsidiary themes running through the essays, some of which are less well articulated than others. The major theme complementing the defined thesis is the debt owed to local knowledge and the way it was acquired, understood, interpreted and recorded by the Europeans. Fairly explicitly the editors have encouraged an approach to the colonial activities of the early modern Europeans which dwells on their arrogance and the exploitation of the indigenous, slave and Euro-Creole populations. This leads to the only real weakness of the volume: the apparent inability of several of the contributors to recognise the culture of the world in which the early modern European botanists, traders and travellers were working. Applying modern morality to the past may be a justified historical practice, but it should not be used to distort the interpretation of the past. For example, Julie Berger Hochstrasser notes: 'Ironically, then, with regard to the prevailing moralising interpretation of still lifes of the laid table, there was a great deal these painters *could* have moralized about that they did *not*.' (p. 182) This begs the question why, in the context of their patronage and propagandist responsibilities, *should* they have done so? Less obviously, individual authors, often by default, draw attention to the internationalism of the development of botany as a science. These approaches will be referred to in the more specific critiques below.

The book is divided into four sections. The first section, 'Colonial governance and botanical practices', approaches the main thesis most closely from the perspective of the European state, but also brings into play several of the subsidiary themes. The first two chapters, Chandra Mukerji, 'Dominion, demonstration and domination: religious doctrine, territorial politics, and French plant collection' and Staffan Müller-Wille, 'Walnuts in Hudson Bay, coral reefs in Gotland: the colonialism of Linnaean botany', both discuss the home-based botanical work of two countries in the late seventeenth and early eighteenth centuries. The colonial ambitions of Louis XIV's France, combined with the centralism of its regime, led to the creation of botanical gardens in France developing from the early seventeenth-century successes of Montpellier and centred around the new Jardin de Roi in Paris. The need for local remedies being developed in the colonies as, for example, the Dutch were doing in the Cape Colony, was ignored by the French, who used their botanical gardens to reflect and demonstrate the political power of the crown. Sweden, on the other hand, had few, if any, colonial ambitions by the turn of the eighteenth century and developed its home-based botanical study within 'cameralist' or 'import substitution' policies. Müller-Wille questions how Linnaeus became associated with European colonialism while operating within this system.

Mukerji's chapter covers many major themes of the volume in the context of Louis XIV's France. As this section does not have a sixteenth or early seventeenth century chapter, the gradual 'erosion' of the search for the new Eden, or earthly paradise (pp. 21–3), is introduced before it is discussed by Jorge Cañizares-Esguerra and Hochstrasser. Cañizares-Esguerra argues that the idea of finding or recreating Eden/Paradise persisted well into the eighteenth century. Unknown worlds were seen to be the obvious places to search and the exotic could more easily be equated with the mythological than the familiar. The debate on what the conditions for Paradise were inevitably led to a more scientific interpretation and the consideration of micro-climates contributing to the whole.

Müller-Wille's case study is based on Linnaeus's student Pehr Kalm's research trip to Hudson Bay in 1747. It confirms that the exchange of intellectual and scientific ideas and knowledge between scholars happened beyond the boundaries of political states, as a continuation of the Republic of Letters of the seventeenth century, itself one of the inheritors of the European Renaissance. Linnaeus played much the same kind of role as Galileo or Newton. The circumstances of his impact on colonial exploits may have been something new, but its international application should not be surprising, as Müller-Wille himself points out the contacts Linnaeus had amongst 'naturalists' on both sides of the Atlantic (p. 43).

Michael T. Bravo's 'Mission gardens: natural history and global expansion, 1720–1820', extends Swedish cameralism into Linnaean Lutheranism (p. 54), but the main thrust of the chapter is on the problems encountered by local settlements in their efforts to achieve self-sufficiency, which was impossible without the co-operation and knowledge of indigenous populations and continued European supplies. Using the example of the Moravian Scandinavian missions he explores the way these challenges were met through a

range of practical skills the settlers brought and the willingness to interpret the 'local flora and fauna' working with the indigenous populations. The links between a working mission and its primary aim of conversion are clear, but what also emerges is a pragmatic use of slavery, in complete contradiction to European Moravian practice. This ensured greater likelihood of survival under the patronage of plantation owners in the West Indies, but, in the end, profit was found to be the surest form of self-sufficiency. By extending the study to contrast the Moravian experiences in the West Indies and Greenland the essential need to interpret and adapt to local cultures becomes even clearer. Thus Bravo shows that whatever the original aim of the settlement, understanding local flora and fauna in its indigenous culture and the benefits to others of recording this experience is a common theme throughout seventeenth- and eighteenth-century botany.

Andrew J. Lewis, 'Gathering for the Republic', turns the story around and shows the newly independent United States as the collector and botanist, building up networks and, 'just as Benjamin Franklin (1706–90) modelled the American Philosophical Society in 1743 after London's Royal Society, so early republic naturalists modelled their epistemology on European precedent' (p. 67). While drawing attention to the individual political, economic and cultural motives of states, Lewis highlights the internationalism of learning. Nevertheless, the new nation was exploiting its own natural resources to further the development of its own economy and culture. Two of the main hindrances were 'folk knowledge' and the natural historians' struggle to develop a modern approach in the face of amateur interest in 'curiosities'. Lewis concludes that the economic factor, aligned with the acceptance of folk knowledge, undermined the progress of 'epistemological authority' (p. 79), and he therefore questions the value of over-reliance on local knowledge. Some of the later contributors to this volume take a more positive view of local 'folk' knowledge.

The second section of the book is titled 'Translating indigenous Creole, and European botanies: local knowledge(s), global sciences. In her article 'Books, bodies and fields: sixteenth-century transatlantic encounters with New World *Materia Medica*', Daniela Bleichmar brings this new natural world into the sphere of the principal political and economic motives for colonisation. To show how the early colonists appropriated the natural wealth of the Americas, she looks at Nicolas Monardes's (c.1508–88) *Historia medicinal de las cosas que se traen de nuestras Indias Occidentales que sirven en medicina* (1574) (p. 84) as one example of the Europeanisation of knowledge, which she asserts was largely acquired 'second-hand' or 'at home', rather than in the field – a natural enough experience for most knowledge in the early days of colonialism. By the end of the seventeenth century more texts were being produced by travellers, collectors and those in the service of the states or trading companies in situ.

Like others, Monardes's work was an international resource being translated into Italian, French, English and German and most notably, a revised Latin translation by Clusius in 1605. Its claim to fame was based on the novel inclusion of the practical application of medicinal herbal preparations rather than mere descriptions. Monardes, although acquiring his primary resources second-hand, only published after quasi-scientific observation and experimentation. But he did also include anecdotal evidence, most importantly the full text of a letter from a Spanish soldier (Osma) describing attitudes of native Amerindians to sharing or withholding their knowledge, exemplifying the difference between experience and practice in the New World (Osma) and interpretations in the Old based on classical and contemporary practice and knowledge (Monardes). This is an important piece of the overall jigsaw, contemporary with botanical exploration in the Mediterranean.

Harold J. Cook's article 'Global economies and local knowledge in the East Indies: Jacobus Bontius learns the facts of nature' takes one of Bleichmar's themes forward to the 'so-called scientific revolution in Europe' (p. 100), using another single work as an exemplar of how the need for accurate accounts was being met by the mid seventeenth century. The Dutch East India Company (Verenigde Oostindische Compagnie, or VOC) was a major force in providing the means for such work and Jacobus Bontius was a servant of the VOC in Batavia and wrote his *Methodus medendi qua In Indiis Orientalibus oportet (On the Proper Treatment of Diseases in the East Indies, c.1629)* while in the colony. This chapter highlights the progress of natural history through international debate, with Bontius challenging earlier naturalists' studies, such as Garcia da

Orta's *Colóquios dos simples e drogas ... da India* (*Colloquies on the Simples and Drugs of India*, 1563), and building on Clusius's work. Much of Bontius's own original material was acquired later by the early eighteenth-century English botanist William Sherard, ensuring the progressive acquisition of knowledge. Bontius's observations in the colony enabled him to work with the whole spread of society both acquiring their knowledge and practising upon them. In particular Cook cites the local practices of women. He argues that there might have been a 'modicum of mutual respect' (p. 116), which was presumably a result of mutual need.

Schiebinger's 'Prospecting for drugs: European naturalists in the West Indies' takes the story a hundred years on, but the same theme of debt to the indigenous populations and the recording of careful enquiry remains. While acknowledging the driver of profit motives, the need to develop cures for the colonies is the context of this chapter. Schiebinger dwells mainly on the native populations and their contribution to European botany – the results of their exploitation by colonisers. She alleges that before the nineteenth century greater value was placed on indigenous knowledge but within a strictly understood 'anthropo- and Eurocentric chain of beings, from animals (with their instinctive cures), to indigenous peoples, to the Spanish, and according to the French mathematician Charles-Marie de la Condamine (1701–76), ultimately to the French' (p. 124). Once again the internationality of codifying is evident, but Schiebinger shows that by the eighteenth century, although much work was still shared by an international scholarship, the profit and status motive was beginning to lead to jealousies and secrecy.

Using the rather artificial and, as she admits, problematic, theory of bicontact-zones, she discusses the issues arising from communication between European and indigenous peoples, not only those of language, but cultural, political and economic ones. Incorporating the African slaves with the indigenous populations, she attempts to correct the errors of arrogance and assumptions of early modern colonisers. Although fascinating in its detail and well argued, this chapter is rather one-sided and Schiebinger does not give much credit to the European achievement. The development of European language was a pre-condition for its own culture which, however we may judge it in retrospect, was the dominant influence in the colonisation of the New World. It was the European networks which provided the resources for assimilating the knowledge, the intellectual arena for its interpretation and the motivation and means for its practical application, a point clarified by Antonio Lafuente and Nuria Valverde in 'Linnaean botany and Spanish imperial biopolitics', who explain how the profit motive of plants and their uses were successful because 'as an imperial undertaking [it] was linked to its ability to set up an international network of professorships, gardens, expeditions, and publishing companies able to produce a version of nature easily put into words, and deducible from very little data' (p. 142).

In her conclusion, Schiebinger goes as far as she can to differentiate between the continuing influx of new colonials and those who, after two generations, became de fact indigenous (but ethnically separate) populations whose natural world was not European, even if their underpinning cultural influences still may have been. However, this is picked up immediately by Lafuente and Valverde whose theme is botany as experience and observation as well as description, with the authors distinguishing between Spanish 'imperial botanical policies' and 'creole political botany' (p. 135). On the whole this chapter is a more general overview than the previous case studies, but does have a tendency to fall into the trap of rhetoric based on twenty-first century ideologies with a strong modern conservationist argument on pages 141–44.

The chapter ends with a detailed case study of the Columbian Euro-Creole, Francisco José de Caldas (1768–1816) the 'discoverer of biogeography' (p. 144) and the importance of climate, environment and topography to the successful transplanting of specimens, which is picked up by Jorge Cañizares-Esguerra in the next chapter, 'How derivative was Humboldt?'. He argues that the influences in the colonies were as important as the European interpretations, through allusion to the different influences of the Europeans in the colonies by the eighteenth century and role of the indigenous populations. Cañizares-Esguerra extends the role of Caldas, who worked for Humboldt, with their mutual sharing of knowledge leading to the theories of bio-distribution and the use of cross-sectional mapping – moving a long way from the Linnaean assumptions about climate and conditions based on lines of latitude discussed by Müller-Wille (p. 40).

Cañizares-Esguerra argues that the Spanish used the 'new sciences' to help consolidate their presence in America after defeat in the Seven Years War (1756–63), through economic utilisation of the flora of the Andes, such as quinine. New Granada became the 'laboratory' for Caldas and Humboldt. This chapter argues that in accepting the failure of the Spanish Americas to become more than a resource for European economic and cultural exploitation, historians have lost sight of the importance of the contribution the Euro-Creole local knowledge made to the development of 'European' science.

In the third section of the book, 'Cash crops: making and remaking nature', Julie Berger Hochstrasser begins by transporting us back to the seventeenth-century Dutch adventure and the visual and written demonstration of Dutch colonial and trading supremacy. The Dutch Republic was a state which, more than most, portrayed far more overtly the indispensable link between its political strength and its economic success, epitomised by the VOC. Hochstrasser, following one of the major themes of the volume, does not fail to bring out the negatives of these enterprises: loss of life, colonial wars, and 'inhuman' exploitation of indigenous peoples. Rather naively she is disturbed that those engaged in publicising the new knowledge and opportunity did not mention the cost to those being exploited, although some more disinterested observers such as Lorenzo Reael did. Disarmingly, Hochstrasser concludes that the Dutch decline was their come-uppance for having lived beyond their means, but that late in the twentieth century they have redeemed themselves by taking a lead in pushing for an international commitment to sustainability.

In 'Of nutmegs and botanists', Emma Spary argues that 'the history of colonial botany be written as process, negotiation and exchange, rather than as event(s)' (p. 189). This is a sound and attractive approach which reflects the reality more accurately bringing the individual experience into the common discussion over time as knowledge is shared and gradually analysed and structured. Spary uses the example of the French botanist Pierre Poivre's efforts to introduce nutmeg to the French colonies. We are taken to the colonial conflicts of the East Indies, but also to the smaller world of individual rivalry between Poivre and his peer Aublet about whether Poivre's import was the 'true' nutmeg. Spary tells an engaging story to illustrate the complexity of the way scientific developments interacted with political motivations and ambitions, and the importance of political favour and patronage. The concluding paragraphs bring the reader back to the scale of the problems of authenticity of botanical species given the limitations of access and the dependence on the few extant descriptions, in the case of nutmeg, Rumphius's *Herbarium Amboinense* (1741).

Judith Carney's case study, 'Out of Africa: colonial rice history in the black Atlantic', confirms the 'process, negotiation and exchange' theory of Spary. It does not negate the European role as 'winner' determining the 'progress' of development, while acknowledging the debt to the indigenous people, the slaves and the Euro-Creoles. But this is also a further elaboration on the theme of shifting from Eurocentric interpretations by showing how African slave expertise in growing rice was used by the English and French planters in America. This is a convincing chapter on the evidence for an African origin of rice, and the skills and knowledge harnessed by the slave masters. But it was the structure of the slave trade which enabled sufficient quantities of rice seed corn to be transported to the colonies; the slave ships were provisioned with rice and the supporting early nineteenth-century illustrations show female slaves preparing rice on board ship (pp. 213–4).

In the fourth section, 'Technologies of accumulation', the volume concludes with some fascinating illustrations of the practicalities of the development of botany, preceded by a short chapter on the collection of *Naturalia* in the seventeenth century Dutch Republic, once again highlighting the indivisibility of political, cultural and economic motivations spurring on the development of colonial botany. The derivative nature of much early knowledge is cogently exemplified by the minor botanical references in Linschoten (1562–1611) mainly gleaned from da Orta (1500–69), which were enlarged upon by Linschoten's medical friend Paludanus. Paludanus nearly took the appointment eventually filled by Clusius at Leiden, and 'it is generally known tended a stupendous collection; as well as a garden' (p. 227). Swan rightly draws the connection between collection (and hence museums) and the need for medicinal cures and knowledge of a wider world. She highlights the problems as 'Botanical goods were imported: knowledge, by and large, was not' (p. 233). Thus we again have a reinforcement of the need for travel and exchange of ideas and knowledge 'in the field'.

Te Heeson, in 'Accounting for the natural world', blends the fiction of Robinson Crusoe with the exploits of the German scholar and physician Daniel Gottlieb Messerschmidt (1684–1735) to describe how both 'turned to the compilation of tables to order their thoughts and keep their spirits up' (p. 238); in effect, a written cabinet of curiosities: the predecessors of card indexes and database programs with which the academic researcher continues to struggle. The history of the correlation between financial accounting and scientific recording is explored in careful detail from Messerschmidt's tables to Sloane's cabinets.

In 'Surgeons, fakirs, merchants and craftspeople', Kapil Raj starts to bring together what some of the contributors seem bent on dividing, examining 'the relationship between the two spaces, between those "out there" and their sedentary colleagues who often played a crucial role in validating knowledge claims made in the field' (p. 252). His case study is the East and he sharpens our focus by reminding us that whereas the West was unknown to the early modern European, much of the East was familiar, through the conflicts with Islam, and with trade and supporting networks. By extension, of course, Europe was familiar to Asia, and we need to remember that the accumulated culture and knowledge of Europe and Asia did not necessarily bring the experience to understand the new worlds in the West. There may have been inequalities of power between the Europeans and indigenous Americans, but there was equality of ignorance of each other's cultures.

Raj has recently brought to light a manuscript at the Muséum National d'Histoire Naturelle in Paris to illustrate his theories about the relationship between European botany and Asia. The author, Nicolas L'Empereur, was representative of so many seventeenth-century collectors travelling at the instigation of a patron, in this case the French crown through the Compagnie des Indes, with an elementary medical background and a brief to understand, interpret and describe the potential new medicines. Like Jacobus Bontius, he used locals for collection and for experimentation. L'Empereur's story ended disappointingly as his work was never acknowledged, not even the receipt of it by Jussieu and he died poor and unrewarded in Bengal. Raj believes that the political motivation of Jussieu to exploit knowledge to outwit the Dutch by import substitution was in direct contrast to L'Empereur's own aim of understanding regional cures and to 'commodify them'.

The final chapter in this section by Marie-Noëlle Bourguet, 'Measurable difference, botany, climate and the gardener's thermometer in eighteenth-century France', shows how the eighteenth-century collectors applied a wide range of new technologies to the more successful transportation and transplantation of plants through a greater understanding of the geo-diversity or micro-climates, the development of effective thermometers, as well as the understanding of other geophysical and climatic conditions. This was still a young form of science in the mid eighteenth century, but was much more useful than the speculative experimentation of the seventeenth. Bourguet concludes that 'Precision and quantification were now necessary for scientific credibility' (p. 283), and consequently put ever greater demands on practitioners. These practitioners were also having to respond to the challenges posed by states in response to the changing international political situation, and she uses the example of post-revolutionary France and the attempts at import substitution by

acclimatisation of foreign species.

Thus the volume is taken full circle back to the politico-economic motives for colonisation and the development of botanical sciences in order to harness the resources to the full. The different interpretations of the balance between European acquisition of knowledge and the contribution of the indigenous, slave and Euro-Creole populations provide a challenge for further work.

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