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LINNAEUS AND CHINESE PLANTS: A TEST OF THE LINGUISTIC IMPERIALISM THESIS

by

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It has been alleged that Carolus Linnaeus practised Eurocentrism, sexism and racism in naming plant genera after famous botanists, and excluding 'barbarous names'. He has therefore been said to practise 'linguistic imperialism'. This paper examines whether Linnaeus applied 'linguistic imperialism' to the naming of Chinese plants. On the basis of examples such as *Thea* (=*Camellia*), *Urena*, *Basella*, *Annona*, *Sapindus* (=*Koelreuteria*), and *Panax*, I conclude that Linnaeus used generic names of diverse origins. However, he misidentified Chinese plants' habitats, and acted on these misapprehensions.

Keywords: Linnaeus; Osbeck; Joseph Needham; ginseng; tea; *Hortus Malabaricus*

INTRODUCTION

In 1752 Pehr Osbeck (1723–1805) presented Carolus Linnaeus (1707–78) with several Chinese plant specimens.[1] Linnaeus, who was completing his landmark work, *Species Plantarum* (1753), expressed delight:

> A thousand thanks for the consignment, which was second to none. . . . Such a great collection of plants has never come from *East India*, except for that of Hermann who lived there [present-day Sri Lanka] for nine years. I cannot understand, Sir, how you were able to gather so much during such a short stay and under such awkward conditions. . . . Now I can compete with any other botanist as to the *number* of herbs.[2]

Linnaeus seems to have been as pleased by the quantity of plants he received, and the power in botanical circles that this number conferred, as by their distant origin, which he summarized as 'East India'.

Was Linnaeus's seeming indifference towards the provenance of Chinese plants due to the 'supercilious Europocentrism' of which he was accused by Joseph Needham?

> It has to be admitted that Linnaeus was the evil genius of this Europocentrism. In +1737 he laid down that he would admit no generic name unless it came from Greek or Latin, or

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> looked as if it did, or commemorated a king or someone who had advanced the study of botany. He was only prepared to accept 'barbarous' words as adjectival nouns forming a specific name.[3]

A similar charge against Linnaean names goes under the rubric of 'linguistic imperialism', which asserts that Linnaeus erased not only indigenous names but also indigenous *knowledge* about plants' uses and habitat, thereby promoting European white male hegemony.[4]

These assertions rely heavily on an early work, *Critica Botanica* (1737), while making scant use of later Linnaean works that provide a wealth of synonymies and pharmacological information referring to indigenous plant names and uses. I argue that the linguistic imperialism thesis therefore fails to offer an accurate way to understand Linnaeus's naming of Chinese flora; although it is true that he globally imposed Latin generic names, Linnaeus was neither a Sinophobe nor an imperialist. I show that in naming Chinese plants, Linnaeus (i) applied his rules less restrictively than is generally thought, (ii) assigned only a small percentage of patronymic names, and (iii) offered a road map to many indigenous usages and names in his synonymies and *materia medica*.

This essay considers the 160 plants described by Linnaeus father and son, of which 100 appear in *Species Plantarum* (1753); 60 others appear in other works. A complete survey of the 319 Chinese plants known to Linnaeus lies beyond the scope of this essay.[5]

Encountering Chinese flora

From the earliest western contact with China, Europeans sought information about Chinese medicinal and other plants; Jesuits such as Michal Boym (1612–59), Dominique Parenin (1665–1741) and Pierre d'Incarville (1706–57) collected plant specimens and seeds, particularly *materia medica*. Many plants and seeds were sent to Europe to be cultivated and acclimatized in major botanical gardens such as the Jardin du roi in Paris.[6] Of the 365 plants in the Chinese pharmacopoeia, only a handful were known to Europeans;[7] of these, ginseng (*Panax ginseng* C. Meyer; 人參) was thought to possess remarkable healing powers and was extolled by a long line of botanical explorers;[8] another sought-after medicinal plant was the Chinese rhubarb (*Rheum palmatum* L.; 掌葉大黃), also known as the 'true' rhubarb.[9] Other famed drugs included cassia (*Cinnamomum aromaticm* Nees; 肉桂), camphor (*Cinnamomum camphora* (L.) J. Presl; 樟樹), cambogia (*Garcinia cambogia* Desr.; 藤黃果), ginger (*Zingiber officinale* Roscoe; 薑) and china root (*Smilax china* L.; 菝葜), an ingredient in the famed eighteenth-century 'Lisbon' diet drink and used by the Chinese in many medicines.[10] Boym's *Flora Sinensis* (1659) and *Receptarum Sinensium Liber* [Book of Chinese Prescriptions][11] described and depicted many Chinese medicinal plants for the first time.[12] By the late seventeenth century various French works, including a translation of Boym's *Flora Sinensis*, discussed Chinese pharmacopoeia in detail.[13]

However, in reporting on Chinese medicine,

> [w]estern observers routinely misunderstood the practices they witnessed, even when reporting them with considerable accuracy. Their translations introduced distortions and false equations. They selectively appropriated pieces of Chinese practice, and then rewrote them. It is useful to ask: Why these particular misunderstandings?[14]

This question is equally useful to our inquiry. Before passing judgement on Linnaeus's naming practices, we need to consider what materials Linnaeus studied, what he knew about China, and how well-informed were his informants.

In the 'Dedication' of *Species Plantarum* Linnaeus emphasizes that he has *seen* a specimen of each plant catalogued in the work: 'I have omitted here the PLANTS NOT SEEN . . . if indeed on occasion I have been unable sufficiently to examine a plant or have obtained an imperfect specimen, I have marked this with a sign . . . that others may examine the same more accurately'.[15] In his autobiography he claims: 'Linnaeus never speaks about anything unless he had had it before his eyes and examined it.'[16]

Linnaeus knew some Chinese plants, such as ginseng (*Panax*, discussed below), from George Clifford's garden at Hartekamp, documented in *Hortus Cliffortianus* (1738);[17] he obtained specimens of Chinese plants from Osbeck, from correspondents in Russia and from ships' captains. He also made observations of Chinese plants based on *images* of herbarium specimens, especially those in the herbarium of Sir Hans Sloane (1660–1753). Linnaeus did not make a direct study of Sloane's herbarium; rather, 'he based many species on published figures and descriptions of plants preserved in it.'[18]

This was observation at several removes from the plant in its native habitat, and it seems that Linnaeus was not even clear about China's location; he used 'India' or the 'Indies' to refer to India and to the East or West Indies:

> Linnaeus the father is generally very careless in his statements regarding the native countries of exotic plants. He seems to have had a very confused idea with respect to the geographical position of China, for he identifies it not unfrequently with India. . . . Many of Osbeck's Chinese plants appear in the *Species Plantarum* as plants collected by Osbeck in India. But . . . Osbeck never visited India. Linnaeus even does not distinguish between India *orientalis* and India *occidentalis*. Linnaeus, in describing new plants he had received from foreign countries deems it generally superfluous to notice the names of the collectors.[19]

Stearn concurs:

> Linnaeus seems to have confused China and India or regarded them as forming one region; he gave the epithet *indica* to Chinese species of *Daphne* and *Rosa* . . . and the epithet *chinensis* to Chinese species of *Poa*, *Osbeckia*, *Dolichos* etc. while recording them from India, as Bretschneider (1898) pointed out.[20]

Although the *Species* was intended for 'the sake of students . . . reducing all to one system',[21] its geographical basis was sometimes shaky. Linnaeus designated several Chinese plants as '*Habitat in* India': *Hibiscus mutabilis* L. (木芙蓉),[22] *Chrysanthemum indicum* L. (野菊),[23] *Dolichos sinensis* L. (豇豆)[24] and *Rubus parvifolius* L. (茅莓)[25] (the last two were collected by Osbeck).[26] Linnaeus identifies *Bidens pilosa* var. chinensis L. (鬼針草) as '*Habitat in* India *orientali*'.[27] Linnaeus did correctly identify some plants, for example *Thea sinensis* L. (*Camellia sinensis* (L.) Kuntze; 山茶), as native to China.[28] Linnaeus probably added Osbeck's finds to the *Species* in 1752 at the last minute, after the penultimate draft had been prepared; some were added in the appendix to volume 2.[29]

Stearn notes that whereas 'Linnaeus . . . made little distinction between the West Indies and the East Indies and between India and China[,] that was reasonable on the basis of

the evidence available.'[30] For Linnaeus, 'habitat' referred to geographical location rather than ecological conditions.[31] Yet Linnaeus displayed a strong sense of ecology:

> The native place lays the entire foundation for the cultivation of the plant. For if we have a considered record of the climate in each region according to the longitude and latitude of the place, if we have a record of the soil from the mineral kingdom . . . we know more data about cultivation that are true, unambiguous and reliable.[32]

Linnaeus showed great attention to environment on his Swedish journeys, describing the 'native locations of plants' in relation to '*region*, *climate*, *soil*, and *ground*'.[33]

Designations of the 'Indies' in contemporary works varied: for example, the abbé Raynal referred to the 'two Indies [deux Indes]', whereas Jean-Jacques Rousseau referred to the West Indies as 'the Indies [les Indes]'.[34] Eighteenth-century Europeans often failed to distinguish China from India, including China within 'India' or 'India orientalis'.[35] Yet the *Encyclopédie* of Diderot and d'Alembert, volume 3 (published in October 1753, the same year as *Species Plantarum*), provided good geographical information on China:

> CHINA, *Geog*. Great empire of Asia, bordered in the north by Tartary, from which she is separated by a wall of four hundred leagues; in the east by the sea; in the west by high mountains & deserts; & in the south by the Ocean, the kingdoms of Tonkin, of Laos, & Cochin China.
>
> *China* is about seven hundred fifty leagues in length, and five hundred [leagues] wide. It is the most populous & the best cultivated country in the world; it is watered by several great rivers, & cut by an infinity of canals that have been made to facilitate commerce.[36]

The confusion about the nomenclature of the 'Indies' caused the encyclopedist Jaucourt to complain in 1768 that 'more inexcusably than the ancients the moderns name as the Indies countries so different in their position & extent on our globe, that in order avoid ambiguity, they have divided the Indies into oriental & occidental'. This distinction helped little, because 'East Indies' referred to a diversity of nations and regions, including modern-day India, Sri Lanka, Indonesia, the Philippines and the Marianas. This term could include, in a non-commercial context, China, Japan and Vietnam. 'Indies' referred to all of the Americas.[37] Jaucourt's critique notwithstanding, geographical ambiguities persisted in Linnaeus's works; Linnaeus probably never consulted the *Encyclopédie*, because he did not read French. Yet many eighteenth-century Swedes were aware of China through trade and the influence of physiocratic ideas (discussed in the next section).

Linnaeus laboured under other biogeographical misapprehensions about Chinese flora; a well-known case was his obsession with naturalizing tea in Sweden. He clung to the conviction that tea grows as far north as Beijing,[38] and believed he could cultivate it in Sweden; he had some brief success with a plant brought from China in 1763 by the Swedish East India Company captain Carl Gustaf Ekeberg (1716–84). Linnaeus announced this horticultural victory in the dissertations *Potus Theae* (1765) and *Usus Historiæ Naturalis* (1769); in the latter he wrote:

> It has been an object of wonder that the tea plant has not been introduced into Europe . . . and we must look for the cause of our want of success in the plant itself. This has been overcome by the most consummate Botanist of his age, and we may now promise ourselves, that the Tea plant will be in a little time as common in Europe as the Syringa, and native of the same country [China].[39]

Linnaeus's optimism was unfounded; despite his efforts and those of his student, Anders Sparrman, tea was never naturalized in Sweden; nor did introductions elsewhere in Europe starting in the 1680s succeed. By 1765 the one remaining tea plant was nearly dead.[40] Linnaeus's climatological assumptions were simply incorrect: 'tea is not grown at Peking. The extreme line of its cultivation does not go farther north than the 31° degree of lat[itude]', for example Shanghai.[41]

Linnaeus's poorly informed views on Chinese geography are not surprising, given that as a young man he left his native country for one sojourn in Holland and short visits to England and France. In his inaugural lecture as a professor at Uppsala in 1741 he spoke on the need to travel in one's own country. Yet this armchair naturalist dispatched his 'apostles' worldwide as ship's surgeons or clergymen on risky collecting expeditions from which many of them never returned; Linnaeus's desire to encompass the world's flora in his herbaria and *Species plantarum* was legendary.

Linnaeus's apostles, Pehr Osbeck and Olof Torén (1718–53), who visited Canton in 1751, were not able to dispel Linnaeus's biogeographical misapprehensions, because they were not sufficiently equipped, linguistically or logistically, to undertake extensive collecting in China; Osbeck's circumstances as a foreign collector in China were clearly less advantageous than those of Jesuit fathers such as Boym, Parenin, Jartoux and d'Incarville, who spent long periods in China, mastered the language and had privileged access to the best information sources before China closed itself off from foreigners in the mid eighteenth century. For example, Pierre Jartoux (1669–1720), who described ginseng in 1711, was mapping China for the emperor.[42]

As a ship's chaplain, Osbeck was tied to his vessel and limited in his financial resources. Furthermore, unlike the Jesuit fathers, the Linnaean apostles such as Osbeck had little or no knowledge of Chinese; sometimes Osbeck 'was forced to take the interpreter, or *comprador* ... who greatly circumscribed my pleasure by being in such haste to return.'[43] Osbeck's capacity to obtain well-qualified local assistance was likewise limited; he 'applied to those who were able to instruct me in this branch of knowledge [Chinese herbal medicine]; and offered moderate rewards: but it was absolutely impossible'.[44] Osbeck tried in vain to interview local people about their diseases, and what plants supplied the drugs they used; he felt that some Chinese plant names he was given were incorrect because they seemed too general.[45]

Osbeck's botanizing was precarious: on more than one occasion he was attacked or harassed while collecting plants, usually while in the company of other foreigners.[46] 'Often I was in danger of losing my clothes, my money, and even my life.'[47] In the account of his voyage, published in Swedish in 1757, he details his encounters with the Chinese:

> I was greatly desirous of getting some knowledge of the *Chinese* officinal herbs, and the diseases against which they are made use of ... but it was absolutely impossible; for first I could form no idea of their inward diseases, as the people themselves are not able to give a clear description of them; and the mere names of diseases are as incomprehensible to us, as ours to them. ... Secondly, their officinal plants themselves were unknown; and that the more, as none of them are to be met with in the apothecaries shops with the parts of fructification: and I could not, even for money, get one to shew me the place where they grew. It is probable they get them at a considerable distance; since, notwithstanding my walks about the town, I never found a single one in the places I was allowed to go to, such as gardens, environs of villages, hills, ditches, and rice

> fields. Thirdly, As soon as a *Chinese* observes you want to be acquainted with these particulars, he is either silent, or gives you a false account; as I have often observed from the different relations of several persons; which at last made me very loth to make any more enquiries.[48]

This is not to diminish Osbeck's work; he collected and described 244 plants, 11 of these for the first time.[49] For his services to botany Linnaeus honoured him with the genus *Osbeckia*.

Cameralism meets botany

Linnaeus lived in a sinophile era. In 1731 the Swedish East India Company was established, beginning direct contact between Sweden and China; Swedes joined other Europeans in acquiring *chinoiserie*, Chinese garden styles and porcelain. Queen Lovisa Ulrika received a Chinese pavilion at Drottningholm Palace for her birthday in 1752; Swedes ordered Chinese porcelain on a mass scale, and Linnaeus obtained a tea set from China (via Pehr Osbeck) bearing the image of *Linnaea borealis* L.[50]

Linnaeus considered China '[a] positive model of a unified economic order, where all hands are kept busy for the common weal'.[51] There was much about China that Linnaeus could admire, and he was not alone; by the mid eighteenth century the Swedish elite knew of the French physiocrats' admiration for China's industrious people, large population and ample food supply, which were, they believed, indications of the wisdom of Chinese mores and governance. According to the *Encyclopédie*,

> [t]his nation is governed by an emperor, who is at the same time the head of the religion, & who has under his control the mandarins who are the great lords of the country: they have the freedom to make his faults known to him. The government is very gentle.[52]

Hence, the European notion of Asian inferiority was a late development: 'One thing seems certain . . . the gap between the Occident and the other continents widened *belatedly*'.[53]

The physiocrats' vision of China as an economic and political model was disseminated in Sweden by Carl Fredrik Scheffer (1715–86), mentor to King Gustav III, Government Councillor, director of the Swedish East India Company, and correspondent of the French physiocrat the Marquis de Mirabeau (1715–89). Scheffer defended the 1772 *coup d'état* by King Gustav III as a way for Sweden to imitate China as a well-governed, prosperous and happy state.

Linnaeus shared the contemporary view of China as a model for Europe: 'As Linnaeus saw it, Europe should cut its links to Asia by modelling itself on Asia.'[54] He therefore advocated Swedish autarky, rather than imperialism: 'Linnaeus, like his contemporaries, regarded non-European powers . . . as matching Europe's military skills and productive powers.'[55] Thus, if Linnaeus was imprecise in designating geographical origins of Chinese plants, his negligence did not arise from a sinophobic or imperialistic disposition.

Linnaeus the cameralist believed that naturalizing tea would reduce expensive imports paid for in specie. Osbeck echoed this view:

> I finally considered, that the Chinese officinal plants would not thrive in our climate; [and] that if any were of use in some diseases, we should be forced to get them from China, and so increase the revenues of its inhabitants unnecessarily, when we are already provided

> with a sufficient number of medicines. We have many plants in our country, which have not yet been tried in medicine.[56]

Linguistic imperialism? Some test cases

Linnaeus formulated his binomial nomenclature in Latin, a nearly dead language that the Chinese had never spoken; he named some of his 1313 genera after Europeans who had only tentative links, if any, with these genera. These statements would seem to make the case for Linnaeus as linguistic imperialist, but his practice was in fact more complex than this summary suggests.

Linnaeus's nomenclatural reform addressed important problems in European botany: multiple names for the same thing, and cumbersome, long names. Linnaeus eliminated many redundant names and shortened the definitive name to the binomial name, consisting of the genus and the trivial name; however, 'Linnaeus did not invent binomial nomenclature: he did not abandon polynomial nomenclature, i.e. the use of several word names . . . for diagnostic purposes; he introduced a dual system of nomenclature which led to the replacement of diagnostic polynomials by merely designatory binomials.'[57] Linnaeus specified his rules for generic plant names in his *Critica Botanica* of 1737 (distributed in 1738), and summarized them in his *Philosophia Botanica* of 1751.[58] According to the linguistic imperialism thesis, these rules promoted a sexist, Eurocentric ideology that consolidated Western hegemony; Latin generic names are said to have excluded indigenous knowledge of plant uses and deprived indigenous peoples, especially women, of credit for their discoveries.[59] Does the evidence show that Linnaeus pursued this agenda with respect to Chinese flora?

Patronymics East and West

Linnaeus has been criticized for stipulating that generic names could memorialize great botanists:[60] 'Generic names that have been formed to perpetuate the memory of a botanist who has done excellent service should be religiously preserved'.[61] Because most of these botanists were European, white and male, this rule seems to support the linguistic imperialism thesis. Yet Linnaeus's critics fail to note that he did not intend this to be the principal way of naming genera, but rather a last resort 'when no distinguishing character readily suggests itself, and there is no suitable alternative.'[62] Bretschneider's list of Chinese genera known to Linnaeus and his son, Carolus 'filius', confirms this: of the 131 genera listed, only 13 (i.e. 10%) bear the names of botanists.[63] Hence, even if this were 'a naming system abstract in relation to the properties of plants, but concrete in relation to the history of botany in Europe',[64] it is a minority practice in Linnaeus's assignment of generic names to Chinese plants.

Furthermore, patronymic generic names occur in Chinese plant nomenclature as well; Needham notes that while 'surprising[,] . . . Chinese names were also derived from the names of people in a way analogous to that which gave us *Fuchsia* or *Sigesbeckia*.'[65] In his *materia medica*, *Bencao gangmu* (本草綱目) (1596), Li Shizhen (1518–93) bestowed patronymic names. For example, golden rod (*Solidago Virga-aurea* Auct.; 劉寄奴草), rubber tree (*Eucommia ulmoides* Oliv.; 杜仲), greenbrier (*Smilax glabra* Roxb.; 土茯苓; also known as 草禹餘糧) and tree-peony (*Paeonia moutan* Sims; 姚黃) are named for an emperor, a 'semi-legendary Taoist', a 'legendary culture-hero' and a

'family of gardeners', respectively.[66] Without offering statistics, Needham asserts that patronymics 'are indeed much more common in Latin binomials than they are in the Chinese nomenclature.'[67] If Latin patronymics conceal local knowledge, Chinese patronymics must do likewise.

Did Linnaeus banish 'barbarous names'?

Linnaeus's rule excluding 'barbarous names' is likewise supposed to impose Eurocentrism:

> No sane person introduces primitive generic names.
>
> All barbarous names are regarded by us as primitive, since they are from languages not understood by the learned.
>
> [So are] doubtful appellations of plants, when it is hard to decide what language they are derived from.[68]

and

> Generic names that do not have a root derived from Greek or Latin are to be rejected.[69]

These rules do not preclude the use of vernacular names: 'Let each nation use its own language, only let Botanists come to an agreement among themselves';[70] 'I do not object to any nation retaining its own vernacular names for plants; what I do earnestly desire is that all learned Botanists should agree over the Latin names; since they have not done so, I foresee barbarism knocking at our gates.'[71] Thus, Linnaeus did not forbid vernacular plant names, nor was he singling out Chinese nomenclature for special treatment; yet Needham writes that the exclusion of Chinese plant names 'must have sprung partly from the *idée fixe* that vernacular Chinese was not the language of a learned people'.[72]

For Linnaeus, using Latin to name plants on a global scale was indispensable. He was competent only in Latin and Swedish and he took '[c]lassicism or pseudo-classicism' for granted 'as far as generic names were concerned'.[73] Although this preference for Latin and Greek was rooted in Linnaeus's provincial Swedish background, he was also defending Latin as a universal language uniting the scientific community against linguistic fragmentation, as exemplified by botanical works in the vernacular.[74]

Linnaeus retains 'barbarous names' 'when [he] can obtain a root suggesting a possible derivation from Latin or Greek, in which case such names have . . . the value of new coinages'.[75] In *Philosophia Botanica* he elaborates on this rule: 'We adopt barbarous names *if they were new-born*, provided that we remake the words that have to be excluded, forming them from Greek or Latin.'[76] Such 'new coinages' have an important role in Linnaean nomenclature. An analysis of the Linnaean names of 286 economically important genera reveals that 11% have a root that is neither Latin nor Greek. Examples include *Asparagus* and *Spinacia* (Persian), *Coffea*, *Pistacia*, *Ribes* and *Santalum* (Arabic), *Carissa* and *Saccharum* (Sanskrit), and *Thea* (Chinese). Linnaean names derived from native-American languages are particularly significant in the light of the linguistic imperialism thesis. These include *Ananas*, *Annona*, *Copaifera*, *Guaiacum*, *Mammea*, *Sassafras* and *Yucca*.[77]

This analysis accounts for only a fraction (21%) of all 1313 Linnaean generic names. The linguistic imperialism thesis assumes that indigenous names record uses, but this is not necessarily true. For example, the indigenous people of present-day Delaware regarded medicinal uses of plants as esoteric knowledge for initiates of the medicine lodge, so their names usually describe other plant features.[78] Such practices among the Iroquois

were likewise noted by the Jesuit missionary Joseph-François Lafitau (1681–1746): 'Besides the general remedies[,] each had his particular ones of which he was very jealous'.[79] Consistent with their medicine comprising esoteric knowledge was the name that the Iroquois called ginseng: 'garent oguen', meaning 'human thighs', referring to the plant's appearance. The Chinese name, *ren shen*, or man-root, does likewise.

Chinese plant names refer not only to uses but also to shape and form, size, colour, aroma, taste, special characteristics, habitat, geographical origin, climatic property and sex, as well as to famous people;[80] 'there was an exact parallelism between East and West in the choice and construction of plant names . . . every one of the categories into which the Chinese phytonyms were divided has its counterpart among the Western ones.'[81] Such naming practices undermine the claim by Linnaeus's critics that indigenous names proposed by Michel Adanson offered a more inclusive, use-based alternative to those of Linnaeaus.[82]

Linnaeus's rules allowed 'new coinages' such as *Thea*, which he relates to $\theta\epsilon\alpha$, the Greek word for goddess, nicely summarizing how the Chinese regard tea.[83] Linnaeus cites Engelbert Kaempfer (1651–1716), who called it *Thee*, and Caspar Bauhin (1560–1624), who used the Chinese name, 'chaa' or 'cha';[84] *Thea* comes from the Chinese, 'cha', via the Malay variant, 'teh'. Linnaeus notes the medicinal use of tea for 'calculus', or stones.[85]

Cross-cultural nomenclature

Linnaeus applied generic names to Chinese plants that reflected cross-cultural borrowing by other European botanists. For example, Linnaeus cited 258 Malayalam names in *Species Plantarum*, as well as 95 others in subsequent works.[86] He initially took many of these from the *Hortus Elthamensis* (London, 1732) of Johann Jakob Dillenius (1687–1747), perhaps because he did not have access to the authoritative 12-volume *Hortus Malabaricus* (Amsterdam, 1678–1703) of Hendrik Adriaan van Rheede tot Drakenstein (1636–91) during preparation of the first edition of *Species Plantarum*.[87] However, Linnaeus had confirmed his reliance on van Rheede and Dillenius in 'Ratio operis', the preface to *Genera Plantarum*.[88] Linnaeus gave Malayalam generic names, *Urena* and *Basella*, to two Chinese plants. *Urena procumbens* L. (procumbent Indian mallow; 梵天花) (figure 1) collected by Osbeck, was assigned to a genus whose name comes (via Dillenius) from 'Ooren', meaning 'that which loosens'; in India the root is used to make oil.[89] Linnaeus gave *U. procumbens* a full description in *Species Plantarum*, as he was reporting it for the first time.[90] In *Species Plantarum*, second edition (1762–63), Linnaeus gave 'China' as a habitat of *Basella alba* L. (Malabar, Ceylon, Indian or Chinese spinach, Malabar-Nightshade; 落葵), correcting an earlier attribution to 'Syria' in the first edition; he cited *Hortus Malabaricus* in the synonymy for *Basella rubra* L. (=*Basella alba* L), noting that *Hortus Cliffortianus* designated the genus *Cuscuta*.[91] The synonymies for *Basella* and *Urena* include Linnaeus's *Flora Zeylanica*, showing their connection with south Asia.[92]

Continuing his father's work, Linnaeus filius placed a Chinese plant in the genus *Annona*, dubbing it *A. hexapetala* L.f. (climbing ylang ylang vine; 鷹爪花, 鷹爪蘭) (see electronic supplementary material, appendix 1).[93] The genus *Annona*, comprising mainly American species such as *A. squamosa* L., sugar or custard apple, derives its name from Taíno, the pre-Columbian language of present-day Cuba, Haiti, the Dominican Republic and Puerto Rico.

Figure 1. *Urena procumbens* L., collected at Guangzhou (Canton), China, by Pehr Osbeck. LINN 873.4, Linnaean herbarium. (Courtesy of the Linnean Society, London.) (Online version in colour.)

Linnaeus sometimes used a Latin or Greek term to convey an indigenous use, even though recording use in the generic name contradicted his rules: '[t]he use of a plant supplies the botanist with a worthless distinguishing character.'[94] This objection draws on his knowledge of pharmacology: 'one and the same plant may often supply the user uses

differing according to the various desires of those that make use of them', whereas 'one and the same drug often has effects varying with the disease, the patient, and the time.' Effects on different species likewise vary: for example, bitter almond is fatal to dogs, horses, and parrots, yet not to man. Further, plant use differs by region:

> a number of plants are officinal in one region, but not in another. It is not fitting that the Botanist should visit the Pharmacists in order to learn about plants from them, but rather is it necessary that the Pharmacist should be instructed by the Botanist.[95]

Thus, even though Linnaeus stipulated that generic names should avoid reference to use, he did not follow this rule rigidly. For example, 23 of the 286 Linnaean generic names reviewed by Marafioti relate directly to use—medicinal, nutritional or industrial. Two generic Latin names that Linnaeus gave to Chinese plants refer to non-Western uses. One of these is *Sapindus* (see electronic supplementary material, appendix 2), a genus containing trees whose nuts produce saponins, used for soap by natives of southern Florida and the Caribbean.[96] The Chinese and Indians likewise traditionally used plants of the family Sapindaceae for soaps and treatment of skin diseases. In 1774 Linnaeus and his collaborator Johann Andreas Murray (1740–91) named a Chinese member of this family *S. chinensis* Murr. (=*Koelreuteria paniculata* Laxm.; panicled golden-rain tree; 欒華); the Chinese used it for dyeing.[97]

Another important example of this practice is *Panax*, which contains various species of ginseng.[98] *Panax*, a Greek name meaning panacea or cure-all, refers to its medicinal use, denoting how both Chinese and Westerners regarded it. Charles II of England and Louis XIV of France were keen to be treated with this alleged cure-all, tonic and predecessor to Viagra; the Royal Society and its correspondents were long interested in this plant, as were many botanical explorers.[99]

Linnaeus's student, Pehr Kalm, described how the Chinese viewed ginseng: 'The Chinese value the root so highly that it is worth its weight in silver. They believe it to be a panacea against all sickness.'[100] Osbeck indicated the Chinese and American provenances and names for ginseng:

> YAN-SAM, or *Yan-som*, is the *Chinese* name of a root, which is to be got in our apothecaries shops by the name of *Ninsi* (*Panax quinque folia*, Linn.) . . . it often divides into two stalks, in which the *Chinese* find the resemblance of a man, for which reason they have given it the aforementioned name.
>
> YAN-SAM, or, as we commonly say, *Ginseng*, is not allowed to be imported into *China*, because it grows wild in that country. . . . When Father *Jartona* undertook to make a map of *Tartary*, he described this plant; which is likewise, though seldom, found in *Setchuen*. In *America* it is called *Garentouges*, or human thighs.[101]

Linnaeus and his contemporaries knew ginseng to be native to both Asia and North America[102] from explorers such as the physician Michel Sarrazin (1659–1735), and the Jesuits Jartoux and Lafitau (mentioned above); Jartoux suggested a possible Canadian habitat for ginseng.[103] After reading Jartoux's work, Lafitau found a species of ginseng in Canada in 1715; the resemblance between ginseng's Chinese and Iroquois names led him to speculate on a prehistoric land bridge between Asia and North America.[104] He named his discovery *Aureliana Canadensis sinensibus Gin seng Iroquaeis Garent oguen*, thereby preserving the plant's Chinese and Iroquois names. Unlike Sarrazin, who unknowingly

PENTAGYNIA.

ARALIA. g. pl. 251.

1. ARALIA caule aculeato.
Aralia arboreſcens ſpinoſa. *Vaill. ſex.* 43.
Angelica arboreſcens ſpinoſa; ſeu Arbor indica fraxini folio, cortice ſpinoſo. *Raj. hiſt.* 1798.
Angelica arboreſcens ſpinoſa ſeu Arbor indica fraxini folio, cortice ſpinoſo. *Comm. hort.* 1. *p.* 89. *t.* 47.
Chriſtophoriana arbor aculeata virginienſis. *Pluk. alm.* 98. *t.* 20. *Boerh. lugdb.* 2. *p.* 62.
Creſcit in Virginia.

2. ARALIA caule nudo:
Aralia caule aphyllo, radice repente. *Vaill. ſex.* 43.
Aralia canadenſis, aphyllo caule. *Boerh. lugdb.* 2. *p.* 63.
Zarzaparilla virginienſis noſtratibus dicta, lobatis umbelliferæ foliis, americana. *Pluk. alm.* 396.
Chriſtophoriana virginiana, zarzæ radicibus ſurculoſis & fungoſis, Sarſaparilla noſtratibus dicta. *Pluk. alm.* 98. *t.* 238. *f.* 5.
Creſcit in Canada & Virginia.

3. ARALIA ex alis florifera.
Aralia canadenſis. *Tournef. inſt.* 300. *Boerh. lugdb.* 2. *p.* 63.
Aralia caule folioſo lævi. *Vaill. ſex.* 43.
Panaces carpimon ſive racemoſa canadenſis. *Corn. canad.* 74. *t.* 75.
Panax carpimos racemoſa canadenſis. *Barr. rar. t.* 705.
Chriſtophoriana canadenſis racemoſa & ramoſa. *Moriſ. hiſt.* 1. *p.* 9. *ſ.* 1. *t.* 2. *f.* 9.
Angelica baccifera. *Raj. hiſt.* 661.
Creſcit in Canada.

Ff Li.

Figure 2. 'Aralia' in Linnaeus, *Hortus Cliffortianus* (1737), p. 113.

sent Canadian ginseng in 1700 to the Jardin du roi in Paris, Lafitau recognized the Canadian plant then called '*Aralia*' as ginseng.[105] Sébastien Vaillant of the Jardin du roi rejected Lafitau's name, but Jan Fredrik Gronovius (1686–1762) cited it in his *Flora Virginica* (1743), calling the genus *Panax*.[106] In *Hortus Cliffortianus* (1737), Linnaeus followed Vaillant, calling this genus *Aralia*[107] (figure 2), but his *Materia medica* (1749) cites Lafitau, the Chinese name, 'Sinensibus Ginseng', and the generic name *Panax*, [108] giving its habitats as Tartary[109] and Canada (figure 3). By adopting the name *Panax*, Linnaeus may have followed his friend Grovonius, whom he cites together with Lafitau in the synonymy for *Panax quinquefolium* in *Species Plantarum* (see electronic supplementary material, appendix 3).[110] Another source for this name may have been the American botanist John Mitchell (1711–68), who called it 'Panacea'.[111]

Because Linnaeus referred explicitly to *'Lafit. gins.'* in *Species Plantarum*, he did not suppress ginseng's provenance and its indigenous names; even though he did not use the Iroquois name, the reference to Lafitau leads the reader to it (figure 4). The detailed synonymies in *Species Plantarum* therefore constitute a rich, but neglected, source of information about generic names and non-European pharmacological plant uses.

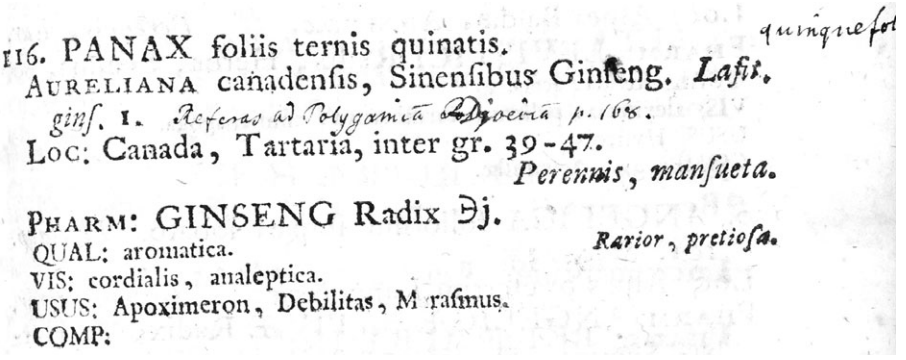
116. PANAX foliis ternis quinatis. quinquefol
AURELIANA canadenſis, Sinenſibus Ginſeng. *Lafit.*
ginſ. 1. *Referas ad Polygamia Dioecia p. 168.*
LOC: Canada, Tartaria, inter gr. 39-47.
Perennis, manſueta.
PHARM: GINSENG Radix ℈j.
QUAL: aromatica. *Rarior, pretioſa.*
VIS: cordialis, analeptica.
USUS: Apoximeron, Debilitas, Marasmus.
COMP:

Figure 3. '*Panax*' in Linnaeus, *Materia medica liber I. de plantis* (1749), p. 39, showing his first use of this generic name. (Courtesy of the US National Library of Medicine.)

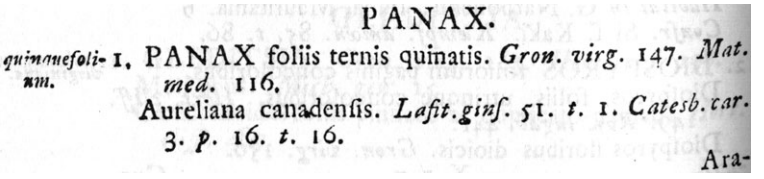
PANAX.
quinquefoli-um. 1. PANAX foliis ternis quinatis. *Gron. virg.* 147. *Mat. med.* 116.
Aureliana canadenſis. *Lafit. ginſ.* 51. *t.* 1. *Catesb. car.* 3. *p.* 16. *t.* 16.
Ara-

Figure 4. '*Panax*' in Linnaeus, *Species Plantarum* (1753), p. 1058, showing synonymies in Lafitau, Gronovius, and Linnaeus's *Materia medica*.

Conclusion

Contrary to the linguistic imperialism thesis, Linnaeus father and son derived several generic names for Chinese plants from non-European names and/or understandings of plants. Most strikingly, while *Panax* is not an indigenous *name* for ginseng, it nevertheless records the popular Asian, Iroquois *and* Western use of this plant; *Panax* also overcomes the synonymy problems posed by multiple names—Chinese, Iroquois and others. Needham's 草禹餘糧 (cao-yu-yu-liang), cited above, is a case in point; it is a regional or colloquial name that is synonymous with other names, one of which, 土茯苓 (tu-fu-ling), is considered official. Needham acknowledges this dilemma: 'It might have been difficult to decide, in the case of a plant growing in six different countries, which of the six different names should be adopted as official.'[112]

My findings suggest that Linnaeus father and son engaged in cross-cultural nomenclature, confirming the view that 'binomial nomenclature was thus designed to operate in, or rather, to mediate between different cultures rather than to serve the interests of a particular one.'[113] The rules for naming stated in *Critica Botanica* should therefore not be taken as a definitive guide to Linnaean naming practice, which bears further investigation.

Acknowledgements

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Notes

1 Linnaeus attributes 37 plants to Osbeck, although 18 other Chinese plants appear in *Species Plantarum*, and Osbeck was presumably their source. Osbeck described 155 other plants growing in and around Canton. E. Bretschneider, *History of European Botanical Discoveries in China* (reprint edition) (Zentral-Antiquariat der DDR, Leipzig, 1962 [1898]), p. 59.

2 Emphasis added; Linnaeus to Osbeck, 10 August and 7 September 1752, quoted in Carlo Hansen and Anne Fox Maule, 'Pehr Osbeck's collections and Linnaeus's *Species plantarum* (1753)', *Bot. J. Linn. Soc.* **67**, 189–212 (1973), at p. 203.

3 Joseph Needham, with Lu Gwei-Djen and Huang Hsin-Tsung, *Science and civilisation in China*, vol. 6 (*Biology and biological technology*), part I (*Botany*) (Cambridge University Press, 1986), p. 168.

4 *Ibid*., p. 169; Londa Schiebinger, *Plants and empire: colonial bioprospecting in the Atlantic world* (Harvard University Press, Cambridge, MA, 2004), pp. 194–225.

5 Bretschneider, *op. cit*. (note 1), pp. 64–106. Linnaeus knew 319 plant species from the region. E. D. Merrill, 'Osbeck's Dagbok Ofwer en Ostindsk Resa', *Am. J. Bot*. **3**, 571–588 (1916), at p. 573.

6 J. Roi, 'Les missionaires de Chine et la botanique', *Collect. Commiss. Synod. Sinis* **11**, 695–706 (1938), at p. 699.

7 Emil Bretschneider, 'Botanicon Sinicum: notes on Chinese botany from native and western sources', *J. North-China Branch R. Asiat. Soc.* **16**, 18–223 (1881), at p. 30.

8 *Ibid*., pp. 104ff.; John H. Appleby, 'Ginseng and the Royal Society', *Notes Rec. R. Soc.* **37**, 121–145 (1983) (doi:10.1098/rsnr.1983.0007).

9 Clifford M. Foust, *Rhubarb: the wondrous drug* (Princeton University Press, 1992); Denis Leigh, 'Medicine, the city and China', *Med. Hist*. **18**, 51–67 (1974), at p. 55.

10 Leigh, *op. cit*. (note 9), pp. 55–57; Needham, *op. cit*. (note 3), p. 160.

11 Michal Piotr Boym, *Flora Sinensis* (M. Rictius, Vienna, 1656).

12 Edward Kajdański, '*Receptarum Sinensium Liber* of Michael Boym', *Janus* **73**, 105–124 (1990), at p. 109.

13 Eugene Flaumenhaft and Mrs Eguene Flaumenhaft, 'Medicinal plants in seventeenth-century French literature', *Econ. Bot*. **36**, 147–162 (1982).

14 Linda Barnes, *Needles, herbs, gods and ghosts: China, healing, and the West to 1848* (Harvard University Press, Cambridge, MA, 2005), p. 48.

15 Carolus Linnaeus, *Species Plantarum*, facsimile edition with an introduction by William T. Stearn (2 volumes) (The Ray Society, London, 1953), vol. I, p. 153.

16 Quoted in Arvid Hj. Uggla, 'The preparation of the *Species Plantarum*', *Taxon* **2** (3), 60–62 (1953), at p. 60.

17 Carolus Linnaeus, *Hortus Cliffortianus*, reprint edition (J. Cramer, Lehre, 1968), p. 113.

18 William T. Stearn, 'Linnaean Herbaria', in Linnaeus, *op. cit*. (note 15), vol. I, p. 120. On ginseng specimens in Sloane's herbarium, see Appleby, *op. cit*. (note 8), p. 126. Margery Rowell, 'Linnaeus and botanists in eighteenth-century Russia', *Taxon* **29** (1), 15–26 (1980), at p. 19. See also Mariette Mantelkow and Kenneth Nyberg, 'Linnaeus's apostles and the development of the *Species Plantarum*', *Symb. Bot. Upsal*. **33**, 73–80 (2005), at p. 74.

19 Emphasis added; Bretschneider, *op. cit*. (note 1), p. 64.

20 William T. Stearn, 'Geographical names in the *Species Plantarum'*, in Linnaeus, *op. cit*. (note 15), vol. I, p. 144.

21 *Ibid*., 'Dedication', vol. I, p. 154.

22 *Ibid*., vol. II, p. 694; Carolus Linnaeus, *Species Plantarum*, 2nd edn (Laurentius Salvius, Stockholm, 1762–63), vol. II, pp. 977–978.
23 Bretschneider, *op. cit*. (note 1), p. 85; Linnaeus, *op. cit*. (note 15), vol. II, p. 889.
24 Linnaeus, *op. cit*. (note 22), vol. II, p. 1018.
25 Linnaeus, *op. cit*. (note 15), vol. II, p. 1197.
26 Bretschneider, *op. cit*. (note 1), p. 77.
27 *Ibid*., p. 85; Carolus Linnaeus, *Mantissa plantarum Generum editionis VI. et specierum editionis II*, pp. 281, 463 (Laurentius Salvius, Stockholm, 1767).
28 Linnaeus, *op. cit*. (note 15), vol. I, p. 515; Linnaeus, *op. cit*. (note 22), vol. I, p. 735.
29 William T. Stearn, 'Sources of Epithets', in Linnaeus, *op. cit*. (note 15), vol. I, p. 72.
30 William T. Stearn, 'Carl Linnaeus's acquaintance with tropical plants', *Taxon* **37**, 776–781 (August 1988), at p. 781.
31 Charlie Jarvis, personal communication, 11 April 2009.
32 Quoted in William T. Stearn, 'Carl Linnaeus and the theory and practice of horticulture', *Taxon* **25**, 21–31 (1976), at pp. 25–26.
33 Carolus Linnaeus, *Philosophia botanica* (tr. S. Freer) (Oxford University Press, 2003), p. 284.
34 Guillaume-Thomas-François Raynal, *Histoire philosophique et politique des établissemens & du commerce des européens dans les deux Indes* (6 volumes) (Amsterdam, 1770); Rousseau to Malesherbes, 19 December 1771; Jean-Jacques Rousseau, *Correspondance complète de Jean-Jacques Rousseau* (ed. R. A. Leigh) (Voltaire Foundation, Oxford, 1981), vol. XXXVIII, p. 302.
35 Hansen and Maule, *op. cit*. (note 2), p. 204; Bretschneider, *op. cit*. (note 7), p. 81.
36 All translations mine unless otherwise indicated. Denis Diderot and Jean Le Rond d'Alembert (eds), 'Chine, (la) *Géog.*', in *Encyclopédie, ou dictionnaire raisonné des sciences, des arts, et des métiers, par une société de gens de lettres* (CD-ROM edition) (Redon, Paris, 2000), vol. 3, p. 339.
37 Louis de Jaucourt, 'Indes, (*Géog. mod.*)', *ibid*., vol. 8, p. 662.
38 Carolus Linnaeus, 'Potus Theae', defended 7 December 1765 by Petrus C. Tillaeus, *Amoenitates academicae* (Laurentius Salvius, Stockholm, 1769), vol. 7, p. 239.
39 Carolus Linnaeus, 'Usus Historiæ Naturalis', defended 17 May 1766 by Matthew Aphonin, *ibid.*, pp. 422–423, translated as 'On the use of natural history', in *Select dissertations from the Amoenitates Academicæ* (tr. F. J. Brand) (facsimile edition) (Arno, New York, 1977 [1781]), p. 31.
40 Letter of 24 September 1765 from Linnaeus to Claude Richard, in *Correspondance inédite de Linné avec Claude Richard et Antoine Richard* (tr. and ed. A. Landrin) (Imprimerie d'Auguste Montalant, Versailles, 1863), p. 19. Some tea plants were alive in England in the early 1770s. John Coakley Lettsom, *The natural history of the tea-tree: with observations on the medical qualities of tea, and effects of tea-drinking* (Edward and Charles Dilly, London, 1772), pp. vi–vii.
41 Bretschneider, *op. cit*. (note 1), p. 70.
42 Pierre Jartoux, 'Lettre', 12 April 1711, in *Lettres édifiantes et curieuses, écrites des missions étrangères* (J. Vernarel [etc.], Lyon, 1819), vol. 10, pp. 71–81.
43 Pehr Osbeck, *A Voyage to China and the East Indies* (2 volumes) (tr. John Reinhold Forster) (Benjamin White, London, 1771), vol. 1, p. 16.
44 *Ibid*., vol. 1, p. 224. Osbeck says little about his local informants, but he does say that some Chinese in Canton could speak Swedish: *ibid*., vol. 1, pp. 274–275.
45 *Ibid*., vol. 2, p. 10.
46 *Ibid*., vol. 1, p. 337.
47 Letter of Osbeck to Linnaeus, 14 October 1751, quoted in Hansen and Maule, *op. cit*. (note 2), p. 191.
48 Osbeck, *op. cit*. (note 43), vol. 1, pp. 224–225.
49 Bretschneider, *op. cit*. (note 1), p. 59.

50 Actually, there were two tea sets, because the first one was broken in transit. H. Walter Lack and Winfried Baer, 'Ein "botanisches" Porzellanservice aus Berlin für die Kaiserin Joséphine', *Willdenowia* 8, 235–259 (1978), at p. 237.
51 Lisbet Koerner, *Linnaeus: nature and nation* (Harvard University Press, Cambridge, MA, 1999), p. 100.
52 Denis Diderot and Jean Le Rond d'Alembert, eds., 'Chine, (la) *Géog.*', in Diderot and d'Alembert, *op. cit.* (note 36), p. 339.
53 Emphasis original; Fernand Braudel, *Civilisation matérielle, économie et capitalisme XV^e–XVIII^e siècle* (3 volumes), vol. 2 (*Les jeux de l'échange*) (Armand Colin, Paris, 1979), p. 142.
54 Koerner, *op. cit.* (note 51), p. 101.
55 *Ibid.*, p. 2.
56 Osbeck, *op. cit.* (note 43), vol. 1, pp. 225–226.
57 William T. Stearn, 'The Background of Linnaeus's contributions to the nomenclature and methods of systematic biology', *Syst. Zool.* **8**, 4–21 (1959), at p. 6. Linnaeus's innovation was the marriage of binomial names 'with some 10,000 descriptions and carefully drafted definitions': *ibid.*, p. 7.
58 Linnaeus, *op. cit.* (note 33), pp. 210–255.
59 Schiebinger, *op. cit.* (note 4), p. 198.
60 Needham, *op. cit.* (note 3), p. 167; Schiebinger, *op. cit.* (note 4), pp. 201–204 and 211.
61 Linnaeus, *op. cit.* (note 33), p. 185.
62 Carolus Linnaeus, *The 'Critica Botanica' of Linnaeus* (tr. A. F. Hort) (The Ray Society, London, 1938), p. 71.
63 Bretschneider, *op. cit.* (note 1), pp. 64–106.
64 Schiebinger, *op. cit.* (note 4), p. 201.
65 Needham, *op. cit.* (note 3), p. 159.
66 *Ibid.*, p. 153; Needham's 草禹餘糧 (cao-yu-yu-liang), meaning 'food left behind by Yü', is a synonym for the official name, 土茯苓 (tu-fu-ling; *S. glabra*), a well-known medicinal herb. Needham's identification of this plant as *H. japonica* seems to be incorrect. Concerning the confusion caused by synonymous Chinese plant names, see Bretschneider, *op. cit.* (note 1), p. 106.
67 *Ibid.*, p. 167.
68 Linnaeus, *op. cit.* (note 33), p. 172.
69 Linnaeus, *op. cit.* (note 62), p. 37.
70 *Ibid.*
71 *Ibid.*, p. 38.
72 Needham, *op. cit.* (note 3), pp. 19 and 144.
73 Blake, S. F., 'Byways of nomenclature', *Am. J. Bot.* **36**, 8–9 (1949), at p. 8. Linnaeus was not an Aristotelian essentialist, as A. J. Cain asserts; see Mary P. Winsor, 'Cain on Linnaeus: the scientist-historian as unanalysed entity', *Stud. Hist. Phil. Biol. Biomed. Sci.* **32**, 239–254 (2001), at pp. 245ff., and Winsor, 'The creation of the essentialism story: an exercise in metahistory', *Hist. Phil. Life Sci.* **38**, 163–166 (2006).
74 Koerner, *op. cit.* (note 51), p. 47. Botanical works in the vernacular included Sébastien Vaillant, *Sermo de structura florum/Discours sur la structure des fleurs* (Pierre Vander Aa, Leiden, 1718); Michel Adanson, *Familles des plantes* (2 volumes) (Vincent, Paris, 1763–64), and Jean Baptiste Fusée Aublet, *Histoire des plantes de la Guiane françoise* (4 volumes) (Didot jeune, Paris, 1775).
75 Linnaeus, *op. cit.* (note 62), p. 176.
76 *Ibid.*; emphasis original.
77 Richard Lynn Marafioti, 'The meaning of generic names of important economic plants', *Econ. Bot.* **24**, 189–207 (1970); the calculations are mine.
78 August C. Mahr, 'Analysis of eighteenth-century Delaware Indian names for medicinal plants', *Ethnohistory* **2**, 11–28 (1955), at pp. 11–12.

79 Joseph François Lafitau, *Mémoire presenté à son altesse royale Monseigneur le duc d'Orléans, Régent du Royaume de France: concernant la précieuse plante du Gin seng de Tartarie découverte en Canada par le P. Joseph François Lafitau, de la Compagnie de Jesus, Missionaire des Iroquois du Sault Saint Louis* (Joseph Mongé, Paris,1718), pp. 11–12.
80 Needham, *op. cit*. (note 3), p. 149.
81 *Ibid*., p. 165.
82 Adanson, *op. cit*. (note 74), vol. 1, pp. clxiii–iv; Schiebinger, *op. cit*. (note 4), pp. 196 and 220–222. However, despite his reputation for nomenclatural inclusiveness, Adanson was deeply implicated in the colonial project. See Jean-Paul Nicolas, 'Adanson et le mouvement colonial', in *Adanson: the bicentennial of Michel Adanson's Familles des plantes* (ed. G. H. M. Lawrence), pt 2, pp. 393–449 (Pittsburgh: The Hunt Botanical Library, 1964), at pp. 444 and 447.
83 Linnaeus, *op. cit*. (note 33), p. 176.
84 Linnaeus, *op. cit*. (note 15), vol. I, p. 515.
85 Carolus Linnaeus, *Materia medica*, *liber I. de plantis* (Laurentius Salvius, Stockholm, 1749), p. 93.
86 K. S. Manilal *et al.*, 'Carl Linnaeus and *Hortus Malabaricus*: a 250th anniversary tribute to *Species Plantarum*', *Rheedea* **13**, 3–18 (2003); H. Y. Mohan Ram, 'On the English edition of Van Rheede's *Hortus Malabaricus* by K. S. Manilal (2003)', *Curr. Sci.* **89**, 1672–1680 (2005), at p. 1677. On Linnaeus's purported 'targeting' of Malayalam names, compare Schiebinger, *op. cit*. (note 4), pp. 200 and 218.
87 Manilal, *op. cit.* (note 86), p. 6.
88 Carolus Linnaeus, *Genera Plantarum*, 2nd edn (C. Wishoff, Leiden, 1742), p. xiii, par. 24.
89 K. S. Manilal, *Van Rheede's Hortus Malabaricus (Malabar garden): with annotations and modern botanical nomenclature* (University of Kerala, Kerala, 2003), vol. 10, p. 7.
90 Linnaeus, *op. cit*. (note 15), vol. 2, p. 692.
91 Manilal, *op. cit*. (note 89), vol. 7, p. 45; Linnaeus, *op. cit*. (note 22), vol. I, p. 390.
92 Carolus Linnaeus, *Flora Zeylanica* (Laurentius Salvius, Stockholm, 1747), pp. 119 and 256.
93 Carolus Linnaeus, fil., *Supplementum plantarum systematis vegetabilium generum plantarum, et specierum plantarum* (Impensis Orphanotrophei, Braunschweig, 1781 [1782]), p. 270; Marafioti, *op. cit*. (note 77), p. 190.
94 Linnaeus, *op. cit*. (note 62), p. 146.
95 *Ibid*., p. 147.
96 Linnaeus, *op. cit*. (note 85), p. 187; Marafioti, *op. cit*. (note 77), p. 203.
97 Carolus Linnaeus, *Systema vegetabilium secondum classes, ordines genera, species cum characteribus et differentiis*, 13th edn (ed. Johann Andreas Murray) (Johann Christian Dietrich, Göttingen, 1774), p. 315.
98 Linnaeus, *op. cit*. (note 15), vol. II, pp. 1058–1059.
99 Barnes, *op. cit*. (note 14), p. 106; Appleby, *op. cit*. (note 8), pp. 121–133.
100 Pehr Kalm, 'Pehr Kalm's Short Account of the Natural Position, Use, and Care of Some Plants, of Which the Seeds Were Recently Brought Home from North America for the Service of Those Who Take Pleasure in Experimenting with the Cultivation of the Same in Our Climate' (tr. Esther Louise Larsen), *Agric. Hist*. **13**, 33–64 (1939), at p. 44.
101 Emphasis original; Osbeck, *op. cit*. (note 43), vol. 1, pp. 222–224.
102 *Species Plantarium* lists two American species, *P. quinquefolium* and *P. trifolium*. Charlie Jarvis, *Order out of chaos: Linnaean plant names and their types* (The Linnean Society in association with the Natural History Museum, London, 2007), p. 719. Although Linnaeus may not have seen any Asian species, *Panax* species are closely related as a result of the close floristic relationships between eastern Asia and eastern North America, a relationship noted by Jartoux in 1711, by Lafitau in 1718, and by the Linnaean dissertation defended by Jonas P. Halenius on 22 December 1750, 'Plantae camschatcenses rariores', in *Amoenitates*

Academicae, vol. 2, pp. 332–364 (Laurentius Salvius, Stockholm, 1752), at pp. 336–338. In 1843 C. A. Meyer distinguished the Asian *P. ginseng* from the American *P. quinquefolium* and *P. trifolium*.

103 Jartoux, *op. cit*. (note 42), pp. 74–75.

104 Lafitau, *op. cit*. (note 79), pp. 17–18.

105 *Ibid*., p. 87.

106 Jan Fredrik Gronovius, *Flora Virginica* (Cornelius Haak, Leiden, 1743), p. 147.

107 Linnaeus, *op. cit*. (note 17), p. 113; see also Appleby, *op. cit*. (note 8), p. 128.

108 Linnaeus, *op. cit*. (note 85), p. 39.

109 'Tartary' referred to northern China between the 39th and 47th degrees of latitude.

110 Linnaeus, *op. cit*. (note 15), vol. I, p. 1058; Linnaeus, *op. cit*. (note 22), vol. II, pp. 1512–1513.

111 Linnaeus, *op. cit*. (note 33), p. 163. Mitchell, a physician, moved to England in 1746, where he specialized in exotic botany.

112 Needham, *op. cit*. (note 3), p. 168, n. (d).

113 Staffan Müller-Wille, 'Walnuts in Hudson Bay, coral reefs in Gotland: the colonialism of Linnaean botany', in *Colonial botany: science, commerce and politics in the early modern world* (ed. Londa Schiebinger and Claudia Swan), pp. 34–48 (University of Pennsylvania Press, Philadelphia, PA, 2005), at p. 48.