Reputation in a box. Objects, communication and trust in late eighteenth-century botanical networks[1]

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Some time in 1782 or 1783, Philippe-Victoire Lévêque de Vilmorin (1715-1804), a French nurseryman and botanist, sent a box of kitchen-garden seeds to America. The tinplate box, with a tightly fitting lid to keep out the noxious sea air as well as insects, heat, and water, was despatched to one of Vilmorin's correspondents, a Philadelphian plant hunter called William Young (or Yong) (1742-1785).[2] This parcel of seeds is

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[2] For more on Philippe-Victoire Lévêque de Vilmorin, see: Augustin-François de Silvestre, "Notice Bibliographique sur P.-V.-L. de Vilmorin," *Séance publique de la Société d'Agriculture* (Paris: Société d'Agriculture, 26 Brumaire an XIV [17 November 1805]); Gustav Heuzé, *Les Vilmorin (1746-1899)* (Paris: Libraire Agricole de la Maison Rustique, 1899). On William Young, see: John W. Harshberger, "William Young, Jr., of Philadelphia, Queen's Botanist," *Torreya. A Monthly Journal of Botanical Notes and News*, 1917, 17(6): 91-99; Samuel N. Rhoads, *Botanica*

unusual in the history of eighteenth-century plant transfers: it was not solicited by Young, who had shown no interest in collecting kitchen-garden plants, and it was not primarily intended as a gift. The vegetable seeds themselves were, in fact, not really the point at all. Vilmorin wanted Young to consider the composition and design of the box as a whole, for this, he said, 'will explain to M. Young better than all the [written] instructions, the care with which one sends the most delicate seeds.'[3]

Vilmorin sent his humble tinplate box as an educational device to teach his correspondent how to pack and send precious American seeds to France. He had showered scorn on the parcels that Young had already sent, because '[t]he greatest part of seeds which arrive here from North America never shoot', and because he despaired of otherwise ensuring the healthy survival of the fragile cargoes.[4] But the Frenchman's criticism must have been somewhat surprising to William Young, who was in fact well practiced at sending plants across the Atlantic. By the time that Vilmorin established a correspondence with Young and sent him the box, the Philadelphian had accrued nearly twenty years' experience of working as a plant hunter for British collectors and botanists.

Neglecta. William Young Jr. (of Philadelphia), "Botaniste de Pennsylvanie" and his Long-Forgotten Book. Being a Facsimile Reprint of his "Catalogue d'Arbres, Arbustes et Plantes Herbacées d'Amerique". Pref. and notes by S.N. Rhoads (Privately Printed: Pennsylvania, 1916).

[3] Archives Nationales de France [Hereafter "AN"], 399 AP 101, Draft letter from Malesherbes to Barbé-Marbois [no date; 1782 or 1783].

[4] AN, 399 AP 101, Philippe-Victoire Lévêque de Vilmorin, "Remarks upon the Exportation of Seeds and Plants from North America to France" [no date; 1782 or 1783].

Vilmorin and Young never met. The letters and boxes that they exchanged between 1782 and 1785 expose a much broader set of issues relating to the way that long-distance knowledge networks were structured and how relationships were maintained within them in the late eighteenth century. We might well conclude that William Young's problems with his French correspondents were due to conflicting national sentiments: between the 1760s and 1780s, the period discussed in this paper, practitioners' strengthening national loyalties unsettled the cosmopolitanism that had previously characterised scholarly exchanges, and in both France and Britain nascent nationalism disrupted the existing bases for exchange within knowledge networks.[5] Historians of science have, consequently, paid much attention to understanding how

[5] Classic works on the development of French and British national identities, and nationalisms, in the eighteenth century include David A. Bell, *The Cult of the Nation in France. Inventing Nationalism, 1680-1800* (Cambridge, Mass.: Harvard University Press, 2001), Linda Colley, *Britons. Forging the Nation 1707-1837* (2nd edn, New Haven and London, 2005) and Edmond Dziembowski, *Un nouveau patriotisme français, 1750-1770: la France face à la puissance anglais à l'epoque de la guerre de Sept Ans*, Studies on Voltaire and the Eighteenth Century 365 (Oxford: Voltaire Foundation, 1998). For historiography on the relationship between national loyalty and scholarly exchange, see footnote 6 and also: Lorraine Daston, 'Nationalism and Scientific Neutrality under Napoleon', in Tore Frängsmyr (ed.), *Solomon's House Revisited. The Organization and Institutionalization of Science* (Canton, MA: Science History Publications and The Nobel Foundation, 1990); Ludmilla Jordanova, 'Science and Nationhood. Cultures of Imagined Communities', in Geoffrey Cubitt (ed.), *Imagining Nations* (Manchester and New York: Manchester University Press, 1998), pp. 192-211.

eighteenth-century scholars negotiated the conflicting demands of cosmopolitanism and early nationalism; this historiographical focus developed particularly in response to Gavin de Beer's contention that 'the sciences were never at war'.[6] But as I will show, the macro-narrative, on which debates about the cosmopolitan nature of eighteenth-century science have largely been based, obscures as much as it reveals.

This paper will use William Young's relationship with his British and French counterparts as an example through which we can better understand the complexities of eighteenth-century scientific networking in action. Knowledge networks, as we will see, were grounded on interpersonal relationships; to fully understand how they operated, we need to focus in on the way in which negotiations were conducted between the members of a network. Individual judgements about skill, expertise and trustworthiness were crucial to ensuring the efficient circulation of objects and people. Practitioners intuitively used material objects such as Vilmorin's box to transmit social as well as scholarly information, particularly when they were acting at a distance from each other. Drawing outwards from this example, I will demonstrate how in Young's case, as in the others discussed in this article, questions of national sentiment or cosmopolitan outlook were only some of a much greater range of considerations that determined the shape and scale of eighteenth-century scholarly networks. The relationships between participants were primarily determined by

[6] Gavin de Beer, *The Sciences Were Never At War* (London and New York: Nelson, 1960); Maurice Crosland, 'Anglo-Continental Scientific Relations, c. 1780 – c. 1820, with Special Reference to the Correspondence of Sir Joseph Banks', in R.E.R. Banks, B. Elliott, J.G. Hawkes, D. King-Hele and G.L. Lucas (eds), *Sir Joseph Banks: A Global Perspective* (Richmond: Royal Botanic Gardens, Kew, 1994), pp. 13-22.

questions about consumption, communication, confidence and risk, concerns that made botanical networks analogous to mercantile ones.

By examining the extent to which eighteenth-century botanical networks mirrored mercantile ones in their form and function, this paper argues that the links between scholarly and commercial networks can lead us to a better understanding of the character and content of the information that circulated during this period. Understanding this association is important because it explains how and why Enlightenment scholars constructed and maintained their associations with each other, and how and why these changed over the 1770s and 1780s, as geopolitical rivalries hardened and increasingly extended into civil society. Finally, as the concluding part of my paper will show, the equivalences between scientific and commercial networks faltered not over national rivalries *per se*, but due to the problem of scale. Knowledge networks, unlike mercantile ones, were ultimately not able to expand beyond small-scale, reputation-based exchanges between acquaintances.

The business of botany

Botany was 'big science' in early modern Europe. The collection and classification of the world's natural resources conferred vital support to a range of imperial, commercial and scholarly agendas.[7] Since at least medieval times, travellers had scoured the boundaries of the known world in search of spices, medicines and other

[7] Harold J. Cook, "Physicians and Natural History", in Nicholas Jardine, James Secord and Emma Spary (eds), *Cultures of Natural History* (Cambridge: Cambridge University Press, 1996): 91-105, on p. 91.

valuable plants.[8] The drive to discover, identify, transplant and acclimatize lucrative vegetable commodities intensified between the sixteenth and eighteenth centuries, as trading companies and scholarly societies invested more money and manpower in overseas exploration and travel. By 1760 the search for plants was becoming ever more prominent in government agendas: botany was now something to be exploited explicitly in the service of empire.[9]

Many historical studies of early modern botanical exchanges have concentrated on the major expeditions sponsored by governments or by private trading companies such as the English, Dutch and French East India Companies, or the Spanish Casa de la Contratación. Scholarly attention has focussed in particular on three influential individuals: Carl von Linnaeus, the comte de Buffon, and Joseph Banks. 'Sitting like anointed monarchs at the centres of vast botanical empires',

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[8] Londa Schiebinger, *Plants and Empire. Colonial Bioprospecting in the Atlantic World* (Cambridge, Mass. and London: Harvard University Press, 2004), p. 4.

[9] Alice Stroup, *A Company of Scientists. Botany, Patronage, and Community at the Seventeenth-Century Parisian Royal Academy of Scientists* (Berkeley, Los Angeles and Oxford: University of California Press, 1990), Harold J. Cook, *Matters of Exchange. Commerce, Medicine, and Science in the Dutch Golden Age* (New Haven and London: Yale University Press, 2007); John Gascoigne, *Science in the Service of Empire: Joseph Banks, the British State and the Uses of Science in the Age of Revolution* (Cambridge: Cambridge University Press, 1998); Richard Drayton, *Nature's Government: Science, Imperial Britain and the 'Improvement' of the World* (New Haven and London: Yale University Press, 2000), Chapter 2; James E. McClellan III, *Colonialism and Science. Saint Domingue in the Old Regime* (Baltimore and London: Johns Hopkins University Press, 1992), Chapters 6 and 7.

Linnaeus, Buffon and Banks, we have been told, asserted their sovereignty over the European drive to collect and classify plants.[10] Yet the primacy that historians have accorded to these powerful people and places has more recently become subject to reassessment. Kapil Raj, Londa Schiebinger, Sujit Sivasundaram, and Susan Scott Parrish, amongst others, have interrogated the extent to which the individuals who worked for these botanical potentates also had agency. They have examined how knowledge was (or was not) transferred between Europeans and the indigenous peoples whom they encountered on their travels, and they have assessed the processes of exchange and erasure that took place when Europeans gathered specimens.[11] Through the critical study of a wider range of agents, this scholarship has

[10] Schiebinger, *Plants and Empire*, pp. 11-12; C.f. D.P. Miller, "Joseph Banks, Empire, and 'Centers of Calculation in Late Hanoverian London," in D.P. Miller and Peter Hans Reill (eds), *Visions of Empire. Voyages, Botany and Representations of Nature* (Cambridge and New York: Cambridge University Press, 1996): 21-37.

[11] Kapil Raj, *Relocating Modern Science. Circulation and the Construction of Knowledge in South Asia and Europe, 1650-1900* (Basingstoke: Palgrave MacMillan, 2007), Chapter 1; Schiebinger, *Plants and Empire*; Sujit Sivasundaram, "Trading Knowledge: The East India Company's Elephants in India and Britain," *The Historical Journal*, 2005, 48(1): 27-63; Susan Scott Parrish, *American Curiosity: Cultures of Natural history in the Colonial British Atlantic World* (Chapel Hill: University of North Carolina Press, 2006); Simon Schaffer, Lissa Roberts, Kapil Raj and James Delbourgo (eds), *The Brokered World: Go-Betweens and Global Intelligence, 1770-1820* (Sagamore Beach, Mass.: Science History Publications, 2009); David Arnold, *The Tropics and the Travelling Gaze. India, Landscape, and Science 1800-1856* (Permanent Black: Delhi, 2005), Chapter 5.

demonstrated the significance of the transnational settings within which early modern science was carried out, and the extent to which cross-cultural encounters determined and defined the shape of early modern enquiry.[12] This attention to the interstitial has shifted our focus in important ways, yet the question of how these cross-cultural interactions were related to wider social, political and economic forces that cut across but also defined national boundaries, remains unresolved.[13]

It is this question that frames this article. Late eighteenth-century plant exchanges were situated within a transnational milieu that was both scholarly and commercial. Historians' models of imperial networks, and the models of transnational connections discussed above, have missed examining the extent to which civil society also defined botanical exchanges. Botany in the late eighteenth century was not only the 'big science' of imperial expansion. It was also a 'big business' within expanding domestic markets. Enlightenment Europe saw the acceleration of new consumer cultures that featured a rise in expenditure on homes and gardens, and growing participation in educational leisure activities among the middling and upper ranks.[14]

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[12] Neil Safier, *Measuring the New World. Enlightenment Science and South America* (Chicago and London: University of Chicago Press, 2008), p. 14.

[13] See in particular the essays in the Focus section on "Global Histories of Science", edited by Sujit Sivasundaram, *Isis*, 2010, 101(1).

[14] The literature on the development of a consumer society in eighteenth-century Europe is vast, but see in particular: Maxine Berg, *Luxury and Pleasure in Eighteenth-Century Britain* (Oxford: Oxford University Press, 2005); Daniel Roche, *Histoire des choses banales: Naissance de la consummation dans les sociétés traditionnelles (XVIIe-XIXe siècle)* (Paris: Fayard, 1997).

Natural history was particularly popular.[15] The wider dispersal of wealth, and the expanding 'business' of Enlightenment, was reflected visually in changing garden styles: in both Britain and France, tastes shifted from formal 'French' and 'Italian' gardens to the 'natural' 'English' garden (*jardin anglais*).[16] Novel garden designs created new spaces in which exotic plants, brought back from distant colonies and trading posts, could be displayed prominently.[17]

The taste for gardening was linked conceptually to that for learning to identify and classify plants scientifically, and by the 1780s both Britain and France were said to be in the grip of a national 'mania' for botany.[18] Private collectors and plant traders commissioned plant hunters and other travellers to bring back rare specimens for the

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[15] Ann B. Shteir, *Cultivating Women, Cultivating Science: Flora's Daughters and Botany in England, 1760-1860* (Baltimore: Johns Hopkins University Press, 1996), p. 19; Daniel Roche, "Natural History in the Academies," in Jardine *et al.* (eds), *Cultures*, pp. 127-144.

[16] Horace Walpole, *Essai sur l'art des jardins modernes*, French translation: Duc de Nivernois (Twickenham, 1785), pp. 20ff.

[17] Walpole, *Essai*, pp. 27-28; Mark Laird, *The Flowering of the Landscape Garden. English Pleasure-Grounds, 1720-1800* (Philadelphia: University of Pennsylvania Press, 1999), pp. 12-16.

[18] Roger L. Williams, *Botanophilia in Eighteenth-Century France: the Spirit of the Enlightenment* (Dordrecht and Boston: Kluwer Academic Publishers, 2001); Londa Schiebinger, "The Private Life of Plants: Sexual Politics in Carl Linnaeus and Erasmus Darwin," in Marina Benjamin (ed.), *Science and Sensibility. Gender and Scientific Enquiry 1780-1945* (Oxford and Cambridge, MA: Basil Blackwell, 1991), p. 129.

delectation and edification of the European consumer.[19] The nurserymen Philippe-Victoire Lévêque de Vilmorin and William Young were members of an expanding international network that was composed of a few professional botanists and many more botanically trained gardeners, nurserymen and plant hunters. A large number of self-styled 'amateurs' of botany provided additional legwork in searching for new specimens from the natural world.[20]

Within Europe, the increased availability of new and exciting flora meant that the commercial trade in plants expanded exponentially. Plants and seeds had been sold on a small scale for centuries, but the eighteenth century saw a steep rise in the number of commercial nurseries established in Western Europe. The escalating nursery trade was distinct from the seed trade: while the latter was primarily concerned with selling agricultural seeds in bulk, commercial nursery gardeners sold live plants as well as seeds, primarily for decorative use in gardens or parks. We lack precise national statistics for the number of nurseries in existence, but the general picture for Britain (provided by the incidence of publication of nursery catalogues) shows a rapid increase over the course of the century, and especially between 1740 and 1770.[21] London dominated this network in the southern part of Britain, and the traders there enjoyed both a flourishing trade and patronage from an important network of scholars and wealthy collectors.

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[19] AN, 399 AP 99, L'Héritier de Brutelle (Paris) to Malesherbes, 7 October 1783.

[20] Sarah Easterby-Smith, "Cultivating Commerce: Connoisseurship, Botany and the Plant Trade in London and Paris, c.1760-c.1815" (Unpublished PhD Thesis, University of Warwick, 2010).

[21] John H. Harvey, *Early Nurserymen. With Reprints of Documents and Lists* (London and Chichester: Phillimore & co., 1974), Chapter V and Epilogue.

The existing evidence suggests that France saw a more gradual development of a national plant trade compared to Britain, and that networks of nurseries remained localised to the end of the eighteenth century. Dense networks existed, for example, in the Languedoc and around port cities, where the exotic flora that arrived from distant lands stimulated an active regional plant trade.[22] But it was Paris that laid claim to the highest botanical and horticultural prowess. Paris, and the surrounding Île de France area, enjoyed an active commercial nursery network thanks to the concentration of wealthy aristocratic consumers with grand gardens to maintain, both within and outwith the boundaries of the city.[23] Books published on horticulture and botany explicitly focused on the capital city and its surroundings, and the city also enjoyed the botanical and horticultural patronage of its Jardin du Roi and the scholars associated with this. As a 1785 horticultural handbook explained, 'Paris is the place where there is without any comparison, the most people in a position, thanks to their great aptitude, [and] thanks to the frequent opportunities that are provided them by amateurs, to see and to cultivate all varieties or species of plants, both from this

[22] James Livesey, 'Botany and Provincial Enlightenment in Montpellier: Antoine Banal père et fils, 1750-1800', *History of Science* 43 (2005): 57-76; Daniel Roche, 'Natural History in the Academies', in Nicholas Jardine, James Secord and Emma Spary (eds), *Cultures of Natural History* (Cambridge: Cambridge University Press, 1996), pp. 127-144.

[23] Traversat, Michel, 'Les pépinières: étude sur les jardins français et sur les jardiniers et les pépiniéristes' (Unpublished PhD Thesis, EHESS, Paris, 2001).

country and from foreign countries'.[24] It is unsurprising, therefore, that William Young chose to communicate directly with traders and botanists located in the capital cities of London and Paris; two cities that had become beacons for botany and horticulture by the latter half of the eighteenth century.

Thanks in part to its close alliance with horticulture, and also to the relatively low educational requirements for entry, botany was one of the earliest sciences to draw in a wide range of participants from across the social hierarchy, and to include women as well as men. Historians of science have noted how the escalation in the number of individuals involved in botanical collecting disrupted the existing social bases of knowledge networks, and destabilised the established methods of judging scholarly quality: participants received varying degrees of training and possessed diverse levels of competency.[25] But the presence of plant traders and amateur collectors draws our attention to another aspect of eighteenth-century botany that has received little critical attention to date from historians of science. The expansion of botanical networks introduced the problem of dealing with agents who were not only potentially unqualified, but who were also unknown. Rather than only making

[24] Anon. [Duchesne], *Traité de la manière de semer toutes sortes de graines et plantes potagères, avec le jardinier perpetuel* (Paris: Fournier, 1785), 'Avis sur le catalogue', p. 17.

[25] Anne Secord, 'Corresponding Interests: Artisans and Gentlemen in Nineteenth-Century Natural History', *British Journal for the History of Science* 27 (1994): 383-408; Anne Secord, 'Science in the Pub: Artisan Botanists in Early Nineteenth-Century Lancashire', *History of Science* 32 (1994): 269-315; Susannah C. Gibson, 'The Pursuit of Nature: Defining Natural Histories in Eighteenth-Century Britain', (Unpublished DPhil Thesis, University of Cambridge, 2011).

connections with acquaintances, individuals now potentially formed impersonal relationships with agents acting at a distance from them. Botanists, who were concerned to receive accurate information, and plant traders, whose livelihoods depended on receiving healthy and profitable specimens, both urgently needed to find new ways of judging the trustworthiness of, and of asserting control and coordination over, contacts dispersed within a widening world. The problem of establishing the foundations of trust is at the heart of many of the difficulties discussed in this paper.

Most historical research into trust divides between that conducted within history of science – most notably by Stephen Shapin – and that undertaken by economic historians. In the case of the eighteenth-century botanical trade networks, the two were deeply interrelated. Shapin's *Social History of Truth* has exposed the social nature of knowledge, and particularly the centrality of trust to the construction of truth. Trust, Shapin explains, is a relational concept; it is established between individuals, within communities.[26] Drawing from a philosophical tradition that stretches back to the Enlightenment, Shapin demonstrates that trust – particularly in the truthfulness of others – is central to social order and (importantly for our argument here), that the criteria by which trustworthiness is measured are embedded within communities themselves.[27] The consequences of this for our understanding of science are important: social relations, based on trust, are thus essential to all practical actions and cultural moves in science. This also underscores the collective nature of scientific knowledge, even though 'science' is (paradoxically) presented as individual.[28]

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[26] Stephen Shapin, *A Social History of Truth. Civility and Science in Seventeenth-Century England* (Chicago and London: University of Chicago Press, 1994).

[27] Shapin, *Social History of Truth*, pp. 11-16, 34-36.

[28] Shapin, *Social History of Truth*, p. 27.

Shapin's ultimate conclusion, that knowledge-making is centred on a moral economy, not on solitary knowers, may now seem a common-place to historians of science. But it is important to stress this point, for the botanists discussed here were operating at a time when that moral economy was in flux. As Shapin himself points out, 'the manner in which trust is reposed is said to distinguish modern from premodern order.'[29] Modern societies, we learn, are characterised by higher degrees of complexity of social information, a reduction of familiarity with other people, and an obligation to trust in impersonal systems (rather than constructing individual judgements of others).[30] Late eighteenth-century botanical networks, as described above, teetered at the edge of a transition from interpersonal relationships to impersonal structures.

Economic studies of the commercial transitions that took place during the late eighteenth century have focused specifically on the move to modernity, particularly through examining how impersonal markets developed. Economic historians have traced how agents established exchange agreements that, as trading networks expanded, became increasingly characterised by anonymity. In particular, evidence of cross-cultural trade has been used, as Francesca Trivellato explains, 'as an abstract litmus test of modernity'. In a 'modern', 'anonymous', marketplace, trust is assured purely through 'contracts and enforcing institutions', and knowledge about the 'linguistic, religious, and ethnic identities of others' counts for very little.[31] The

[29] Shapin, *Social History of Truth*, p. 15.

[30] Shapin, *Social History of Truth*, pp. 12-16.

[31] Francesca Trivellato, *The Familiarity of Strangers. The Sephardic Diaspora, Livorno, and Cross-Cultural Trade in the Early Modern Period* (New Haven and London: Yale University Press, 2009), p. 1.

example provided by William Young demonstrates how agents participating in the cross-cultural trade of scientific specimens formed relationships with each other, and highlights the instabilities and contingencies upon which such relationships were formed. Young and his counterparts occupied an uncertain position within international scholarly circles: as experts located in the field, they were indispensable to the collection and circulation of botanical artefacts, but their personal involvement in making a profit from science potentially placed their trustworthiness in jeopardy. Was it possible for a network composed of both scholars and traders to expand to include anonymous connections?

Specific combinations of material, social and commercial factors defined the shape and potential for change in long-distance knowledge networks such as that of William Young. Plants and other specimens were significant because they were the substances upon which the people working within these networks constructed their personal reputations, and the media through which they communicated their relationships with each other. But these natural specimens were also precious objects that could deteriorate or even die during the journey. Arranging their transportation and care took up a significant amount of scholars' and traders' time and attention, and was central to ensuring the perpetuation of the entire network.

Botany on the high seas

Sending plants and seeds across the ocean was one of the greatest challenges faced by eighteenth-century botany. Parcels of seeds and dried specimens, and boxes of live plants, were at risk from a range of sea-borne hazards. Ships' cats might scratch at and destroy wooden cases, the contents could be consumed by rats and other vermin,

and sailors themselves had been known to drink the rum in which specimens of succulent plants had been bottled.[32] Seeds could sprout too early and then rot, especially if they were accidentally splashed by rain or seawater; alternatively excesses of cold or heat might destroy their 'vital properties', causing them to fail to germinate on arrival at their destination.[33] Live specimens were even more exacting. Their bulky cases jostled for space in some of the more sheltered spots aboard ship and the plants, which often required large quantities of fresh water, demanded daily care from whoever was in charge of their transport. The Atlantic voyage from America to Europe took around two months, but delays were common even once the ship had reached land. Parcels might be lost temporarily among the jumble of other packages stored aboard ship or held up at the Customs House, and the arduous overland journey might finish off the already weakened specimens.[34] It was important, therefore, that the ship carrying the tender parcels was destined for a port that was as close as possible to the final destination. In 1779 the Abbé Nolin, director of the royal nurseries in Paris, wrote in desperation to Benjamin Franklin (who, alongside his many scholarly interests, also made significant contributions to American horticulture) because a 'M. Gérard' of Philadelphia had forgotten to mention the names of two ships aboard which he had sent plants. Nolin hoped that

[32] Grieve, *Transatlantic Gardening Friendship*, pp. 8, 12.

[33] AN, 399 AP 101, Vilmorin, "Remarks".

[34] Peter Collinson to John Bartram, 26 and 27 March 1766, in Bartram and Marshall, *Memorials*, pp. 276-277; John Fothergill (London) to Humphrey Marshall, 11th, 2nd mo. 1771 [11 February 1771], in Bartram and Marshall, *Memorials*, p. 503.

Franklin might be able to help, explaining that 'There is everything to Fear that the anticipated Plants will be lost if we delay in claiming them'.[35]

Even when ships and final destinations had been carefully arranged, the odds on the survival of all but the hardiest seeds and plants were very low. These losses potentially carried a hefty economic price tag, as well as a botanical one: 'I have already paid 2168 *l.t.* [*livres tournois*] for the Parcels that have been sent to me from America', Nolin grumbled in the same letter, 'and I have received nothing but two very mediocre [parcels?] that have been obtained for me by chance.'[36]

Despite these difficulties, William Young was, by all accounts, an expert in sending live specimens to his British customers. John Fothergill (1712-1780), the British doctor and patron of botany, praised Young in 1771, explaining that he

> sends his plants over very safely, by wrapping them up in moss, and packing them pretty closely in a box. They come thus very safe, and we lose very few of them. He ties the moss in a ball about the roots, with a piece of packthread or matting, or hemp strings, and puts them

[35] Abbé Nolin (Versailles) to Benjamin Franklin, 2 September 1779, in the Digital Edition of *The Papers of Benjamin Franklin* http://franklinpapers.org/franklin/framedVolumes.jsp?vol=40&page=054 [Accessed 7 December 2011].

[36] Abbé Nolin (Versailles) to Benjamin Franklin, 2 September 1779, in the Digital Edition of *The Papers of Benjamin Franklin* http://franklinpapers.org/franklin/framedVolumes.jsp?vol=40&page=054 [Accessed 7 December 2011].

> so close as to prevent them shaking about in the box. It is surprising how well they keep in this manner.[37]

William Young's parcels were in fact so successful that within eighteen months Fothergill wrote again to complain that Young had 'glutted the market' with plants which, though once rare, had now become common in British gardens.[38]

William Young was not solely responsible for swamping the market with Yankee plants, and it is here that his example connects to wider transitions that were taking place within transatlantic botanical networks. Young was in fact one of several North American plant hunters and nurserymen who earned money by sending seeds and plants to European customers. He now cuts an obscure figure in the historiography on transatlantic plant exchanges, especially when compared to plant traders such as his neighbours (and rivals) John Bartram (1699-1777) and Humphrey Marshall (1722-1801). In part, Bartram and Marshall have attracted much more historical attention simply because more of their letters and publications have survived.[39] By contrast, little archival evidence written by Young himself appears to

[37] John Fothergill (London) to Humphrey Marshall, 11th, 2nd mo. 1771 [11 February 1771], in Bartram and Marshall, *Memorials*, p. 504. C.f. Peter Collinson to John Bartram, 28 December 1765, in Bartram and Marshall, *Memorials*, p. 274.

[38] John Fothergill (London) to Humphrey Marshall, 9th mo. 1772 [September 1772], in Bartram and Marshall, *Memorials*, p. 508.

[39] For a selection of recent work on the Bartram family and other Pennsylvania nurserymen, see: Amy R. W. Meyers (ed., with the assistance of Lisa L. Ford), *Knowing Nature. Art and Science in Philadelphia, 1740-1840* (New Haven: Yale University Press, 2012); Andrea Wulf, *The Brother Gardeners. Botany, Empire and*

remain except for a catalogue of the plants he sold which was printed in French in 1783.[40] Yet Young was well known to botanists and plant collectors in Britain, America and France. His character and activities were discussed first in letters exchanged among Bartram, Marshall and their British correspondents, and then among several French scholars of botany. These included the royal minister and amateur of botany, Chrétien-Guillaume de Lamoignon de Malesherbes (1721-1794); François Barbé-Marbois (1745-1837), who was the French Consul Général in Philadelphia from 1779 to 1785; and the royal nursery director, the abbé Nolin.

The British botanists' positive estimation of William Young was confirmed by his early history, as he had been trained by some of the leading Philadelphian and British nurserymen and botanists. Young had emigrated from Germany to America as a toddler, and he and his family eventually settled on a farm in Kingsessing,

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the Birth of an Obsession (London: William Heinemann, 2008); Judith Magee, *The Art and Science of William Bartram* (University Park, PA: Penn State Press, 2007). See also: Rose Marie Cutting, *John and William Bartram, William Byrd II and St. John de Crèvecoeur: A Reference Guide* (Boston: G.K. Hall & Co., 1976).

[40] AN, 399 AP 97, William Young, *Catalogue d'arbres, arbustes et plantes herbacées d'amérique* (1783). Young's *Catalogue* seems to have had a very limited circulation, possibly only among a select group of plant collectors in France and Britain. A copy of the catalogue is in the Malesherbes papers in the Archives Nationales de France, and another is at the Bibliothèque Centrale of the Muséum National d'Histoire Naturelle (catalogued under the name 'Yong'). A further copy, which once belonged to the English Quaker businessman John Barclay, was purchased and printed in facsimile by Samuel N. Rhoads in 1913 [See note 2].

Philadelphia, when he was thirteen.[41] There, the Youngs were neighbours to the Quaker farmer and plant hunter John Bartram. Bartram had been sending American plants to wealthy collectors in England since the early 1730s, in return for annual subscriptions of 5 guineas per box.[42] This perhaps inspired the teenage William Young to establish his own nursery. Around 1760, he made contact with the Charleston doctor, botanist and plant collector Alexander Garden (1730-1791) probably via an introduction from John Bartram, who in turn introduced Young to his British correspondents. Garden wrote excitedly to the cloth-merchant-turned-botanist and gardener John Ellis (c.1710-1776) announcing that 'I have at last met with a man who is to commence nurseryman and gardener, and to collect seeds, plants &c., for the London market.' Garden judged the nineteen year old to be 'a sensible, careful man', who 'has a turn for that business. He shall receive all the advice and assistance that I can give him.'[43] John Bartram also praised his neighbour, writing in 1764 that he 'will make a botanist, as he is very industrious and hath a good share of ingenuity.'[44]

William Young sealed his success during his first trip to England, undertaken between 1764 and 1766. He travelled there at the request of Queen Charlotte, to

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[41] Harshberger, "William Young, Jr.," pp. 93-94.

[42] Hilda Grieve, *A Transatlantic Gardening Friendship, 1694-1777*, Kenneth Newton Memorial Lecture, 1980 (Historical Association, Essex Branch, 1981), pp. 13, 23.

[43] Alexander Garden (Charleston, South Carolina) to John Ellis (London), 25 July 1761, in Rhoads, *Botanica Neglecta*, p. v.

[44] John Bartram to Peter Collinson, 15 October 1764, in John Bartram and Humphrey Marshall, *Memorials of John Bartram and Humphrey Marshall*, ed. William Darlington ([1849] New York and London: Hafner, 1967), p. 266.

whom he had apparently already sent an unsolicited box of specimens, and who, 'supposing this to be an extraordinarily hopeful lad, had the youthful Young brought to London.'[45] Supported by warm letters of recommendation from Alexander Garden, Young was introduced to key British botanists and obtained training in some of the best botanical gardens and nurseries around London.[46] He was taken to Court, and in 1765 was engaged as the 'Queen's Botanist' and awarded an annual stipend of £300 sterling, an astounding sum by eighteenth-century standards.[47] This was much to the envy of John Bartram, who in the same year won the title 'King's Botanist' from George III and the much smaller amount of £50 per annum. While Bartram was initially forced to divide his time between botany and other occupations in order to support himself and his expanding family, Young's stipend permitted him to concentrate fully on collecting plants in America and sending them to Britain.[48] The entrepreneurial young man returned to America in 1766, lavishly decked in gold lace

[45] Johann David Schoepf, *Travels in the Confederation, 1783-84* [Ger. edition: Erlangen, 1788] English translation: Alfred J. Morrison (New York: Burt Franklin, 1968), vol. 1, p. 93.

[46] Alexander Garden (Charleston, South Carolina) to John Ellis (London), 25 July 1761, in Harshberger, "William Young, Jr.," p. 94.

[47] John Bartram to Peter Collinson, 5 December 1764, in Bartram and Marshall, *Memorials*, p. 285; Harshberger, "William Young, Jr.," p. 96. To give a sense of the value of Young's stipend, his family had previously purchased 50 acres of woodland for their farm for £250. Harshberger, "William Young, Jr.", pp. 93-94.

[48] Wulf, *Brother Gardeners*, p. 76.

and with a sword swinging by his side, far outshining the drab appearance of his humble Quaker neighbours.[49]

The composition and geographical orientation of the transatlantic network in which Young and the other American nurserymen participated were largely shaped by political events. In 1775 the American Revolutionary Wars pitted Britain against America and France. Young's stipend from the Queen ceased and his connections with his other British correspondents contracted notably. His family lost land and several members were taken prisoner during the conflict.[50] War did not terminate the American plant trade with Europe, but it did reorient it geographically: within a few years of the outbreak of hostilities, botanists and plant collectors in continental Europe were writing to their contacts in America in hopes of obtaining new specimens. Connections were often initiated through diplomatic lines, via chains of intermediaries. In 1777 Benjamin Franklin forwarded to Bartram a list of specimens sought by French botanists, and in 1780 nurseryman Humphrey Marshall received a letter explaining that the Consul Général Barbé-Marbois had written 'in [sic] behalf of the Marshall Noailles, and the Royal Garden at Paris'.[51] Barbé-Marbois explained that

[49] Harshberger, "William Young, Jr.", p. 95.

[50] Harshberger, "William Young, Jr.," p. 97.

[51] Thomas Bond to Humphrey Marshall, 26 October 1780, in Bartram and Marshall, *Memorials*, p. 538. The duc de Noailles possessed a significant collection of rare plants at his Hôtel on the rue Saint-Honoré in Paris. For descriptions, see Pons-Augustin Alletz and Jacques-René Hébert, *Almanach parisien, en faveur des étrangers et des personnes curieuses*, ed. Daniel Roche ([1776] Saint-Étienne: Université de Saint-Étienne, 2001), pp. 69-70 and *Journal de Paris*, no. 257, 14 September 1785.

the Parisian scholars wished 'to enter into a commerce of exchange of such trees, plants &c., as would be a mutual advantage and improvement, in the natural productions of Europe and America.'[52]

In 1782 and 1783 Barbé-Marbois negotiated another 'commerce of exchange', this time between William Young and the Parisian botanists. He sent a warm letter of recommendation to Paris, and proposed that Young should visit France.[53] Yet although French botanists were keen to obtain plants and other natural productions from America, they were deeply suspicious of Young's capabilities as a plant hunter and reliable correspondent. The abbé Nolin wrote to Malesherbes in July of that year expressing his concern that Barbé-Marbois had a 'blind confidence' in the Philadelphian, who appeared to Nolin to be 'poorly instructed, and very dishonest [*malhonnête*].'[54]

The French reaction to Young was exactly the opposite to that of the British. Although they ultimately consented to establish 'a commerce' with Young, his French correspondents treated him as if he had no previous knowledge or experience at all. Vilmorin sent instructions to Young that carefully explained to him – in English – how to package seeds and plants. He chastised Young for his existing methods of packing, noting that:

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[52] Thomas Bond to Humphrey Marshall, 26 October 1780, in Bartram and Marshall, *Memorials*, p. 538. See also: Thomas Bond to Humphrey Marshall, 7 August 1779, 26 October 1780, 20 November 1780, 2 December 1780 and 16 March 1781, in Bartram and Marshall, *Memorials*, pp. 536-539.

[53] AN, 399 AP 99, Barbé-Marbois (Philadelphia) to unknown addressee (probably the Abbé Nolin), 1 March 1783.

[54] AN, 399 AP 99, Abbé Nolin to Malesherbes [no date but probably 3 July 1783].

> [i]t has been remarkd [sic] that the greatest number of the cases which have been sent are ill covered, the upper boards have chinks which let in air &c. insects heat &c. even sea water very often. The Parcels of seeds are pack'd too loosely in the Cases and are not covered with any thing fit to preserve them from the dangers of the sea.[55]

Furthermore, Vilmorin informed Young that he had been sending parcels at the wrong time of year. Most of the seeds they had received 'never shoot because they are over heated in the voyage and by that means their virtue is quite destroyed'. To prevent this he asked Young not to send 'cases of seeds or plants … after the month of april [sic], because all those which arrive during the summer season have been entirely spoiled; the seeds were destroyed by thousand [sic] of insects'. Finally, he emphasised that Young needed to pay more careful attention to the welfare of the plants themselves at the time of packing: 'you must not send large trees 6 feet high as you have done hitherto, & which you was [sic] forced to bend double'.[56] Young's apparent inability to send seeds and plants safely to France seems surprising considering his excellent and sustained reputation in Britain: According to his British recipients, Young's plants had been expertly packaged and usually arrived in a healthy state. The material challenges of sending specimens across the oceans were paralleled by the problems Young faced in maintaining good social relations with his European correspondents.

[55] AN, 399 AP 101, Vilmorin, "Remarks", ff. 1r-1v.

[56] AN, 399 AP 101, Vilmorin, "Remarks", ff. 1r-1v, 2v.

William Young had moved from an established position in the Anglo-American collecting network into a Franco-American botanical network that was in rapid expansion. The French disregard of his expertise and their mistrust of his reliability as a supplier was indicative of his failure to develop a good relationship with them. But this presents us with a puzzle: Why, despite being so successful in Britain, did Young struggle to transfer his good reputation to France?

Although there are very few sources regarding Young, the next section will use comparative evidence to explain what happened, and to place the example within the wider contexts of economic and social transition discussed earlier. Young's earlier success at sending specimens to Britain suggests that, contrary to the French botanists' assumptions, the problems he experienced with them were neither due to botanical incommensurability, nor to a deficiency in horticultural skill. The level of William Young's botanical knowledge may well have been superior to that of his more celebrated neighbour John Bartram: According to Alexander Garden, John Bartram was 'a worthy man; but … can scarcely spell, much less make out the characters of any one genus of plants'.[57] William Young, by contrast, had been trained in some of the best gardens in London and then returned to America. William Young's difficulties with the French were connected to the problems he faced in reconstructing his reputation as a trustworthy supplier within a new social context.

The ways in which objects, people, and information circulated were defined by social, material and commercial forces, many of which were beyond the control of the individuals working in centres such as Kew Gardens or Paris's Jardin du Roi.

[57] Alexander Garden to John Ellis, 15 July 1765, quoted in Edmund Berkeley and Dorothy Smith Berkeley, *The Life and Travels of John Bartram: From Lake Ontario to the River St. John* (Tallahassee: University Presses of Florida, 1982), p. 228.

These factors exerted a strong influence on how the correspondents within these networks established criteria of trust, and therefore defined the character of the relationships that individuals formed with each other. This in turn impacted on the trajectories that specimens took within knowledge networks.

War, national loyalties, and botanical exchange

In what ways did national loyalties affect the relationships that actors in cross-cultural networks formed with each other? The 1760s and 1770s were a particularly stormy period within the Atlantic world, for Britain and France were at war with each other for more than half of these years. Within this tense political climate the cosmopolitan ideal promoted by the scholarly community was placed under strain by the development of nationalist sentiments.

The French botanists' misgivings about William Young could have been linked to the fact that he had formerly been the servant of one of their most longstanding national enemies. Living in Pennsylvania, William Young and his kin were directly caught up in the conflict over America's independence. His father, brother-in-law and nephew were taken prisoner by the British in 1778.[58] We do not know which side Young took during the wars, but circumstantial evidence suggests that he flouted the rebel cause and supported his British patrons – he was the Queen's botanist, after all. Young was also cut out of his father's will, which hints of a family feud perhaps caused by the political dispute.[59]

[58] Harshberger, "William Young Jr.," p. 98.

[59] Harshberger, "William Young Jr.," p. 98.

The conflicts had a direct impact upon all forms of transatlantic trade. Political instability meant trade restrictions, piracy and privateering: borders were closed, hostile powers imposed embargoes on each others' commodities, and the quantities of 'prize goods' seized by rival powers increased dramatically. The reduction in mercantile shipping imposed severe limitations on the international movement of plants because there were fewer vessels available to transport specimens.[60] The sailors and travellers who braved the oceans in this period found that not only their livelihoods, but even their own lives, were at risk: Thomas Blaikie, a Scottish plant hunter and gardener, was shocked to find himself imprisoned on the Channel Islands in 1777 because the local population thought he was an American spy, not a botanist.[61] Francis Masson (1741-1805), a Scottish collector working for Joseph Banks, anxiously requested in 1778 that he might travel to Morocco rather than to the Caribbean, because 'hostilities are commenced between G. Britain and France, which will render any voyage to the W. Indies a little disagreeable.'[62]

International conflict during the 1760s and 1770s complicated the practicalities of plant transfers, but its impact on altering the attitudes of the practitioners involved in global plant exchanges was more marginal. In spite of the

[60] PSJB, 5.13.09, Francis Masson (Puerto de la Orotava, Tenerife) to Joseph Banks, 20 February 1778; 5.13.11, Francis Masson (Tenerife) to Joseph Banks, 4 May 1778; 5.13.17, Francis Masson (St Christopher) to Joseph Banks, 15 January 1780.

[61] Thomas Blaikie, *Diary of a Scotch gardener at the French court at the end of the eighteenth century*, ed. with intro. Francis Birrell (London, 1931), pp. 119-122.

[62] State Library of New South Wales, The Papers of Sir Joseph Banks Online http://www2.sl.nsw.gov.au/banks/ [Hereafter "PSJB"], 5.13.11, Francis Masson (Tenerife) to Joseph Banks, 4 May 1778. Masson's request was refused.

dangers to which plant hunters were exposed, most British and French scholarly travellers claimed to act according to a 'cosmopolitan' philosophy by which they upheld the idea that information and objects should be exchanged without regard to the contemporary political state of affairs.[63] The cosmopolitan ideal, now characterised by historians as the 'leitmotif of Enlightenment science', was strongly promoted by patrons of science such as Joseph Banks.[64] 'I cannot conceive', Banks later declared, in 1793, 'that any one would consider as a political necessity to debar me from the acquaintance of a Learned [sic] man because he is of a nation with which we are at war'.[65] This, and his other pronouncements promoting cosmopolitan behaviour, is seen to characterise the spirit of scholarly exchange in the eighteenth century.

Plant traders were also keen to conform to the cosmopolitan ideal that their botanical brethren upheld so strongly. This was often used as a marketing strategy through which the traders downplayed the commercial nature of their activities in an attempt to present themselves in public as scholars. They shared specimens with other botanists, participating in the same gifting cycles as their scholarly counterparts, and making similar claims to cosmopolitanism.[66] Declarations such as that made by Young's British counterpart, the nurseryman James Lee, that 'Tho I live by Plants I

[63] Gascoigne, *Science*, pp. 147-165; Maurice Crosland, *Scientific Institutions and Practice in France and Britain, c. 1700 – c. 1870* (Aldershot: Ashgate, 2007), pp. 25-34.

[64] Lorraine Daston, "Objectivity and the Escape from Perspective," *Social Studies of Science*, 1992, 22: 597-618, on p. 608.

[65] Quoted in Gascoigne, *Science*, p. 155.

[66] Easterby-Smith, "Cultivating Commerce", pp. 86-107.

love to Communicate, for the good of Science', typified the traders' eagerness to associate their activities with scholarly, rather than mercantile, communities.[67] Such assertions paid off because they increased traders' access to specimens. When French plant collector André Michaux (1746-1802) sent seeds to British correspondents such as Joseph Banks, he explicitly requested that Banks also gave specimens to James Lee. In a letter accompanying a parcel sent in 1784, Michaux proposed to Banks that, 'if you share seeds amongst Cultivators, I recommend to you Mr Lee of Hammersmith … he has communicated several Plants to me and I wish to show my gratitude to him.'[68] Traders and botanists mutually benefited from maintaining social associations with each other, because their connections facilitated the flow of new and 'curious' plants in both directions.[69]

The traders who successfully cultivated a scholarly image benefited further from the cultural association between them and the botanists who were members of learned institutions such as the Royal Society or Académie des Sciences. Consumers also seemed to find the image of a scholarly nurseryman attractive: purchasing plants from a knowledgeable 'scholar-trader' was not only an assurance of the quality and

[67] British Library [hereafter "BL"], Add. Ms. 18565, 'Kaye Notebooks', Vol. XVI, f. 83r. James Lee's comment was recorded among notes made about Kew Gardens by the amateur botanist Sir Richard Kaye. The notes are undated but probably from around 1790.

[68] BL, Add. Ms. 8096, f. 137, André Michaux (Shiraz) to Joseph Banks, 15 March 1784.

[69] See: AN, 399/AP/98, Malesherbes, Memo re: trading with John Bartram Junior and Philippe-Victoire Lévêque de Vilmorin [1780?]; Loddiges, *Botanical Cabinet*, vol. 1, Description of Plate 19 "Pancratium rotatum".

rarity of the specimens; it was also a means of literally buying into the Enlightenment.[70]

The plant traders' assertions of scholarliness and of cosmopolitanism did not remove commercial competition or international rivalries. Indeed, the traders did not always live up to such a high-minded ideal. But regardless of the degree of genuine cosmopolitan behaviour, the ideal nevertheless exerted a prevailing cultural influence over both commercial and scholarly networks. Traders, like scholars, would mostly downplay national difference in the interest of ensuring that specimens, information, people, and money continued to circulate. Cosmopolitanism informed the language used by both scholars and traders and they used it to mediate their interactions and negotiate their exchanges with each other, across social and political boundaries.[71]

The political events of the 1770s and 1780s altered the geographical orientation of Atlantic networks because trade embargoes and piracy meant that the

[70] Sarah Easterby-Smith, 'Selling Beautiful Knowledge: Amateurship, Botany and the Marketplace in Late Eighteenth-Century France', *Journal for Eighteenth Century Studies* 36(4): 531-543. For a parallel example from a different commercial context, see: Colin Jones, "The Great Chain of Buying: Medical Advertisement, the Bourgeois Public Sphere, and the Origins of the French Revolution," *American Historical Review*, 1996, 101(1): 13-40.

[71] Easterby-Smith, "Cultivating Commerce," pp. 192-199. Note that, despite Banks's influence, the extent to which individual scholars in either period *actually* conformed to this ideal in fact varied widely according to personality and to the specific nature of the hostilities in question. Regardless of the degree of genuine cosmopolitan behaviour, the ideal nevertheless exerted a prevailing cultural influence within scholarly networks.

supply lines between Europe and America were greatly restricted. But the persistence of the cosmopolitan ideal as a framing motif for international exchange meant that scholars and traders from different nations did not usually renounce their connections with each other. In keeping with the precedent set by scholars, we find examples of fluidity and adaptation in traders' behaviour rather than strong divisions formed along national lines.[72] Personal loyalties trumped national identity as the defining feature of the relationships formed within knowledge networks. The disparity in the British and French reactions to Young was unusual for botano-mercantile networks of the 1770s and 1780s.

The Social Lives of Specimens

Personal relationships, grounded on a cosmopolitan sensibility, usually trumped national loyalties within natural history networks during the period of the American Revolution. It is improbable, then, that political enmities or antipathy to dealing with a trader were at the heart of the troubled relationship between William Young and the French botanists. Young's perplexing failure to inspire trust in his correspondents invites us to interrogate more closely the nature of the social relationships that were formed within collecting networks and, more particularly, the ways in which material objects functioned to define these relationships. The personal connections that botanists, traders and amateur collectors formed with each other were integral to defining the success or failure of exchanges. The quality and constitution of each of these connections determined the extent to which members of long-distance networks

[72] Easterby-Smith, "Cultivating Commerce," pp. 213-235.

were willing to trust and invest confidence in their counterparts.[73] But material objects, which were subject to a range of human and environmental hazards beyond the control of individual correspondents, also exerted a significant influence on the way that such connections were perceived.

Both Patrick Joyce and Bruno Latour have offered influential descriptions of the social world as being formed through networks of 'actors'.[74] Both scholars emphasise that people's interactions with material objects are significant to the construction of 'the social', and that objects should therefore be understood as agents. As Joyce explains, this conceptualisation 'moves away from notions of a coherent social totality, towards the erasure of familiar conceptual distinctions between the natural and the social, the human and the non-human, and the material and the cultural'.[75] Crucially, social networks are understood as being composed of, and performed by, 'material things just as much as by humans'.[76] While I would not go as far as attributing autonomous agency to the objects discussed here, the contention that social relationships between people are constructed as much through their interactions

[73] David S. Lux and Harold J. Cook, "Closed circles or open networks? Communicating at a distance during the scientific revolution," *History of Science*, 1998, 36: 179-211, pp. 179-182.

[74] Patrick Joyce, "What is the Social in Social History?" *Past and Present*, 2010, 206: 213-248; Bruno Latour, "The Powers of Association," in John Law (ed.), *Power, Action and Belief. A New Sociology of Knowledge?* (London: Routledge and Keegan Paul, 1986): 264-280; Bruno Latour, *Reassembling the Social. An Introducton to Actor-Network-Theory* (Oxford: Oxford University Press, 2005).

[75] Joyce, "What is the Social," pp. 226-227.

[76] Joyce, 'What is the Social," p. 227.

with material objects as through interpersonal encounters is very instructive.[77] For late eighteenth-century botanical networks, the ways in which relationships might be constructed or maintained through objects was particularly important, because so many agents were acting at a distance from each other.

Environmental historians have emphasised in addition how ecological factors have also defined social life, and this was manifestly the case with regards to transatlantic knowledge networks.[78] The geography of transnational encounters was determined more than anything by oceanic currents, trade winds, and the locations of natural resources. These defined the routes that people took in their explorations of the world, and the intensity of their contact with particular local populations.[79] On a smaller scale, the botanists' struggles to control the levels of heat, light and water that plants were exposed to onboard ship show that these environmental conditions were the hardest of all for humans to manipulate successfully. The interactions between people, objects and the environment functioned as a means of assuring – or undermining – the smooth running of scholarly networks.

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[77] Arjun Appadurai, "Introduction: Commodities and the Politics of Value," in Arjun Appadurai (ed.), *The Social Life of Things. Commodities in Cultural Perspective* (Cambridge: Cambridge University Press, 1986): 3-63; Leora Auslander, "Beyond Words," *Amer. Hist. Rev.*, 2005, 110(4): 1015-1045.

[78] Christopher Smout, *Nature Contested. Environmental History in Scotland and Northern England since 1600* (Edinburgh: Edinburgh University Press, 2000), Introduction; Arnold, *Tropics*, Introduction.

[79] Richard Drayton, 'Maritime Networks and the Making of Knowledge', in David Cannadine (ed.), *Empire, the Sea and Global History. Britain's Maritime World, c. 1760-c.1840* (Basingstoke: Palgrave MacMillan, 2007): 72-82.

Botanical and horticultural knowledge, and the practices that were associated with these disciplines and which contributed to their definition as sciences, were not only transmitted in verbal form, but also through artefacts such as letters, drawings, and plants in boxes.[80] Materiality featured prominently in the relationships formed between all members of scholarly networks; the transfer of objects was, of course, the entire reason why all these traders and collectors were in communication with each other. Separated by thousands of miles of ocean, Vilmorin and Young used letters and objects to transmit information of a scientific nature. But these items also conveyed other forms of evidence. The objects that they exchanged were the substances upon which social relationships were founded, and the media through which these relationships were maintained.[81]

A botched shipment was treated very seriously because it signalled a failure on the part of the plant hunter. This was the case even though the sender could not control much of what happened to plants and seeds during transit.[82] Regardless of whether they were collecting specimens commercially or for private patrons, most

[80] See Miles Ogborn, "Writing Travels: Power, Knowledge and Ritual on the English East India Company's Early Voyages," *Transactions of the Institute of British Geographers*, 2002, 27: 155-171.

[81] Miles Ogborn, *Indian Ink. Script and Print in the Making of the English East India Company* (Chicago and London: University of Chicago Press, 2007), p. 11.

[82] Plant collectors often sent careful instructions to intermediaries explaining exactly how to treat the parcels during the journey. See for example Muséum National d'Histoire Naturelle [Hereafter "MNHN"], Ms 2445, Hoffmansegg (Brunswick) to Mess[rs] Pilaer & Van Winghen (Lisbonne), 27 Mai 1803; AN, AJ/15/511/412, "Envoi de M. Dombey 1786," Item no. 7.

plant hunters in the later eighteenth century did not usually accompany the boxes they sent to Europe themselves. They remained overseas, searching for more specimens. One of the unwritten challenges that plant hunters faced was to quickly develop local information networks at the ports in their host countries, because they needed to find travellers who would reliably care for the plants aboard ship and ensure that they were safely conveyed to their ultimate destination once they reached land. Francis Masson regularly used the social status of these intermediaries as an implicit marker of their potential reliability. The people he chose to care for plants and seeds aboard ship were always gentlemen or officers: the consignments he sent from the Cape of Good Hope, for example, were cared for by one 'Edward Maxwell Esqr', 'an old acquaintance[,] Mr Bisset' and a 'Capt[ain] Christmas'.[83] These intermediaries were *not* trained as botanists or gardeners, but their high social status served as a guarantor of their reliability, and thus their trustworthiness, as wardens of each tender parcel.[84]

[83] PSJB, 5.13.56, Francis Masson (Cape of Good Hope) to Joseph Banks, 25 February 1793; PSJB, 5.13.60, Francis Masson (Saldanha Bay) to Joseph Banks, 31 January 1794; PSJB, 5.13.63, Francis Masson (Cape of Good Hope) to Joseph Banks, 9 October 1794.

[84] 'Honour' was, of course, an essential characteristic of any diplomat or soldier – thus reaffirming for botanists the value of selecting a gentleman or officer to convey parcels. On the links between diplomats and botanists, see: E.C. Spary, *Utopia's Garden. French Natural History from Old Regime to Revolution* (Chicago and London: University of Chicago Press, 2000), pp. 67-68. On the development of a gentlemanly culture within eighteenth-century science more generally, see: Stephen Shapin, "'A Scholar and a Gentleman': The Problematic Identity of the Scientific

The only other way that a plant hunter could ensure the survival of consignments was through packing them carefully. That the method of packing was almost universally considered to reflect upon the *character* of the sender was made manifest in the correspondence between plant hunters and their patrons. For example, the French collector André Michaux wrote a heated response to a suggestion that the tree specimens in his boxes reached France in a weak state because they were poorly packaged. Michaux's letters to his Parisian patrons were usually one and a half to two sides quarto, which he acknowledged was relatively short for a botanical letter.[85] His letter about packing plants contrasted markedly to his usual format. Written on the folio paper that he normally reserved for lists of specimens, Michaux wrote volubly in defence of his methods for preparing parcels:

> The Abbé Nolin complains of the manner in which I carry out the packaging of trees, he reproaches me of having wrapped the tree roots with pine needles [*feuilles de pin*]. It would be crazy to work in such a way. I made use of these pine needles to fill the void between the branches and to prevent the fermentation that could result in the ships if one were to put so much fresh moss in the middle of the box and

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Practitioner in Early Modern England," *History of Science*, 1991, 29: 279-327; Gascoigne, *Joseph Banks and the English Enlightenment*: 58-60.

[85] Huntington Library Manuscripts [Hereafter "HM"], HM 71883, André Michaux (New York) to André Thouin (Paris), 12 May 1786. Michaux frequently concluded with somewhat hollow-sounding apologies for the brevity of his letters: 'J aurois bien dautres détails a vous donner mais le départ du navire est fixé a demain et me prive de m'entretenir avec vous'.

> among the branches as one must put around the roots[,] which are wrapped in it. In the hold of the ship where one generally places the boxes the fermentation and the heat often make buds develop and leaves grow on the trees.[86]

Michaux was anxious to show that the failure of the plants in that particular consignment was not due to any fault of his own. He hoped the Jardin botanists would see that he had packaged the trees intelligently and with care.

André Michaux's other letters make evident the conceptual link that existed between the consignments and the character of the plant hunter. He regularly referred to his 'honour' and 'character', as well as to that of his assistant, the French gardener Pierre-Paul Saunier. This was part of a rhetoric of patronage which, as Emma Spary has shown, was fundamental to the way that metropolitan botanists asserted control over collectors working at a distance.[87] Good conduct and deference were not only signalled verbally. Michaux explicitly acknowledged that the health of the plants they collected and cultivated reflected directly on both their reputations: 'I have every ground to hope that he [Saunier] will make very good parcels [*envoies*] this Autumn', he explained before he departed solo on a plant hunting trip, 'because I have often repeated to him that my absence [from their New York garden] is known [in France] and that the honour of having done well will be attributed to him.'[88] Plant hunters, nurserymen and botanists invested a great deal of significance in the physical state of

[86] HM 71889, André Michaux (Charleston) to André Thouin (Paris), 6 November 1787.

[87] Spary, *Utopia's Garden*, pp. 62-78.

[88] HM 71885, André Michaux (New York) to André Thouin (Paris), 19 August 1786.

the specimens they sent to each other, and this was not only linked to their botanical value. The specimens, and the boxes in which they were contained, were material manifestations of the plant hunter's character, expertise and skill. It was vital, therefore, that the metropolitan botanists approved of the methods used by collectors to package and transmit plants.

Communication through words and objects was not just about transmitting practical information or the latest botanical discovery. It was also about establishing and transmitting the reputation of the correspondent. The reputations of these individuals were constructed through personal encounters, through circulation of the written word, and through the exchange of objects. William Young never met the French botanists in person; his relationship with them was entirely constructed through intermediaries, which were variously human and material. His connection with the French was already uncertain because Malesherbes, Vilmorin and Nolin had little confidence in the opinion of Barbé-Marbois. The association was further undermined by the unfortunate failure of his consignments.

Confidence and coordination

Personal encounters and the successful arrival of parcels significantly influenced the construction of confidence within scholarly networks. When actors could not meet in person their relationships were defined above all else by the things they sent to each other – and judgements were directed at boxes and wrappings as well as the contents. The French botanists' reluctance to trust William Young speaks to wider shifts in the structure of botanical networks that took place during the same period. As we have seen, obtaining a reliable agent, and maintaining a good rapport with that agent,

became more difficult as the distances that separated correspondents increased and as the number of people participating in collecting networks grew. Formerly, botanical networks had been founded largely on interpersonal relationships where individual collectors travelled under commission from a specific patron or coalition of patrons.[89]

The entrepreneurial activities of traders such as the Americans William Young, John Bartram and Humphrey Marshall greatly increased the possibility that scholarly collectors would establish exchanges with people who were relatively unknown to them and to their associates. This was not, of course, a completely new phenomenon: European collectors had purchased specimens from traders located far away for centuries. However, anonymity became problematic in the eighteenth century because of the increasing public involvement in science. The corollaries of this will be explored further here, for as the scale of public participation in natural history, especially botany, increased, so did the potential for misunderstandings and confusion. The rise of a host of poorly educated amateurs prompted those in positions of authority to define the science and its epistemological – and social – boundaries. Training and disciplining the go-betweens, who linked up scholars located at a distance from each other, became crucial for establishing trust.[90]

Anonymity posed a problem because there was no means by which correspondents could judge the scholarly value of their interlocutor: was a contact a well educated amateur of science, or had they simply picked up a few notions about

[89] Spary, *Utopia's Garden*, p. 66.

[90] On go-betweens and knowledge communication see the chapters in Schaffer *et al.*, *Brokered World*, in particular Margaret Meredith, "Friendship and Knowledge: Correspondence and Communication in Northern Trans-Atlantic Natural History, 1780-1815".

the subject via one of the many books on natural history produced in the later eighteenth century? The Quaker plant hunters John Bartram and Humphrey Marshall overcame this difficulty by making initial connections with other Quakers. The strong moral and cultural code to which Quakers were known to adhere certainly facilitated the creation of trust between individuals who never met each other, even if scholarly credentials were lacking.[91] William Young – who was not a Quaker – had no obvious affinity with his British correspondents. However, he travelled to England, met, and was trained by, the botanists there. This provided the basis for a strong bond between him and them. He had no ties with the Parisian botanists, however. Young's doomed exchange agreement with the French was a symptom of a wider transition towards anonymity within botanical networks in the late eighteenth century, which destabilised the methods that botanists had formerly used to measure the trustworthiness of, and therefore the extent of their confidence in, a correspondent. This was a new challenge to botany, but was not at all unusual in other mercantile networks that had long been subject to similar pressures.

The underlying difficulty that botanists faced was of ensuring coordination between the various actors (human and material) who were involved in collecting, packing, and transferring plants. On an epistemological level, discipline and

[91] On the perceived trustworthiness of Quaker merchants, see: Margaret Ackrill and Leslie Hannah, *Barclays: the Business of Banking, 1690-1996* (Cambridge: Cambridge University Press, 2001), pp. 23-48; Helen Berry, "Polite Consumption: Shopping in Eighteenth-Century England," *Transactions of the Royal Historical Society*, 2002, 12: 375-394, on p. 391. On Quakers and botany, see: John Brooke and Geoffrey Cantor, *Reconstructing Nature: The Engagement of Science and Religion* (Edinburgh: T&T Clark, 1998), Chapter 9.

coordination were necessary because different visions of what scientific collecting *was* coexisted and potentially conflicted with each other in the eighteenth century.[92] As already stated, naturalists relied on two types of collector to accumulate and convey objects and observations to them: botanically trained plant hunters, who were sent with specific commissions, and 'amateur' voyagers, who travelled independently as 'gentlemen savants' and who possessed varying levels of skill and expertise. Botanists could discipline the practices used by the former by training them in botanical gardens and by insisting that they corresponded regularly and in an approved manner when they travelled. The official *brevets* (commissions) issued to French botanical collectors required that the collector would write regularly to his patron. André Michaux's *brevet* stated that he must 'embrace, moreover, all the researches which relate to botany, and to establish correspondence by means of which the director of buildings [the comte d'Angiviller] can continue the researches and the advantages which they should produce.'[93]

'Gentleman travellers', by contrast, usually received instruction in written form, in published books of instructions, and in questionnaires intended for these intrepid amateurs. The ultimate intention that underpinned both these was that the botanists could ensure that everyone shared the same priorities with regards to *what* to collect and observe.[94] The individuals working in locations such as Kew Gardens and

[92] Spary, *Utopia's Garden*, pp. 78-88.

[93] Quoted from the translation in Henry Savage and Elizabeth J. Savage, *André and François André Michaux* (Charlottesville: University Press of Virginia, 1986), p. 34.

[94] AN, O/1/2111, Abbé Nolin, "État des graines d'arbres, arbrisseau, plantes, oignons a fleurs, qu'il seroit nécessaire de faire venir du Levant, pour les Jardins Botaniques, et d'agrémens [sic], de sa Majesté" (Paris: Hérissant 1779); Lorelai Kury, "Les

the Jardin du Roi, described as 'centres of calculation' by the proponents of Actor-Network-Theory, sought to achieve coordination through the clear assertion of their authority and the explicit demarcation of their expectations.[95]

While useful to think with, Actor-Network-Theory's model of centres of calculation suppresses the high level of uncertainty that characterised exchange arrangements, especially those conducted across different cultures.[96] It is here that we return to question how nations affected transnational scholarly networks. I have argued that national contexts had a marginal impact on altering the *attitudes* of scholars and plant traders between the 1760s and 1780s, who, despite the outbreak of two wars, still tended towards cosmopolitanism. Nevertheless nations still could matter in mercantile contexts, not necessarily for sentimental reasons, but because they defined the legal frameworks through which agents' compliance could be guaranteed. As an agent for the British, William Young's obedience was initially secured via an economic and legal system that extended to the British colonies in America. He was bound by contract to collect for the Queen. Many French botanical collectors were secured similarly under royal contracts, of course.[97] In both cases, the legal contract assured coordination and obedience.

But in the other examples discussed here, the botanists did not appear to make much of these legal guarantees, which were in fact hardly mentioned in the

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instructions de voyage dans les expéditions scientifiques françaises (1750-1830)," *Revue d'histoire des sciences*, 1998, 51: 65-91.

[95] Kury, 'Instructions', pp. 65-70; Miller, "Joseph Banks," pp. 21-37.

[96] Trivellato, *Familiarity of Strangers*.

[97] Spary, *Utopia's Garden*; Lorelai Kury, *Histoire naturelle des voyages scientifiques (1780-1830)* (Paris: L'Harmattan, 2001).

correspondence. Perhaps surprisingly, the absence of a binding legal system did not mean a lack of coordination or certainty. As studies of other types of economic networks have shown, participants usually used a cultural 'focal point' mechanism to assure agents' cooperation in cases where legal and economic institutions played a minor role. According to Avner Greif, actors in early modern mercantile networks that lacked legal guarantees used their shared cultural tenets to define and uphold rules, procedures, routines and conventions. Agents demonstrated their mutual understanding – and therefore their trustworthiness – through their behaviour.[98] This was especially important in long-distance networks because an individual's personal reputation was the sole guarantee of reliability against the uncontrollable risks of natural hazards, warfare and slow communications.[99] This was also the case for botanists. In the examples discussed here, the references to Michaux's and Saunier's 'honour', cited above, were markers of patronage relations and signalled the *honnêtété* of each botanist. These assertions of social respectability were central to a rhetoric of creditworthiness that functioned, as John Smail put it, 'as an antidote to risk'.[100]

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[98] Avner Greif, "Contract Enforceability and Economic Institutions in Early Trade: The Maghrebi Traders' Coalition," *The American Economic Review*, 1993, 83(3): 525-548, p. 329.

[99] Peter Mathias, "Risk, Credit and Kinship in Early Modern Enterprise," in John J. McCusker and Kenneth Morgan (eds), *The Early Modern Atlantic Economy* (Cambridge: Cambridge University Press, 2000): 21-32.

[100] John Smail, "Credit, Risk, and Honor in Eighteenth-Century Commerce," *Journal of British Studies*, 2005, 44: 439-456, p. 439.

Eighteenth-century botanical networks cohered around a behavioural, rather than a legal, focal point. This further heightened the significance of maintaining and transmitting a positive reputation through objects and intermediaries. Participants relied on mutual monitoring and communication through correspondence as a way of guaranteeing the trustworthiness of their agents.[101] Botanical letters from the period are consequently characterised by the constant exchange of gossip between botanists, plant hunters and private collectors. Correspondents willingly shared information about each other because everyone stood to gain from the smooth functioning of the network.

William Young received more attention than many because his ostentatious personality jarred against his Quaker neighbours' sense of decency. As already noted, Young adopted the fashionable dress and comportment of the 'macaroni' (Figure 1) following his reception at court in 1765. His flamboyance was anathema to the contemporary Anglo-American botanical community, which was predominantly puritanical: Writing to Bartram, Peter Collinson declared that 'He [Young] is now so new modelled, and grown so fine and fashionable, with his hair curled and tied in a black bag, that my people, who have seen him often, did not know him.'[102] Young persisted with the same behaviour following his return to Philadelphia: in 1766 John Bartram described with disgust how Young 'struts along the streets, whistling, with his sword and gold lace, &c.'[103]

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[101] Greif, 'Contract Enforceability', p. 528.

[102] Peter Collinson to John Bartram, 28 May 1766, in Bartram and Marshall, *Memorials*, p. 279.

[103] John Bartram to Peter Collinson, 5 December 1766, in Bartram and Marshall, *Memorials*, p. 285.

Figure 1. Matthew and Mary Darly, 'My Lord Tip-Toe. Just arrived from Monkey Land' 1771. British Museum Ref. AN188376001. © Trustees of the British Museum. This caricature lampoons the contemporary fashion among young British gentlemen who dressed and behaved as Italianate or Frenchified 'macaronis' following their return from the Grand Tour.[104]

Young's bumptiousness was subject to moral censure and, on its own, Alexander Garden's personal recommendation of Young might not have been sufficient to ensure that the other British botanists would accept and trust him. But Garden could also monitor Young from America, thus implicitly guaranteeing the latter's compliance. In eighteenth-century botanical networks, behaviour and comportment were by far the most significant means by which agents could offer assurances of their trustworthiness, and through which their superiors could ensure coordination and control. Mutual monitoring played an important part in this.

[104] Amelia Rauser, "Hair, Authenticity, and the Self-Made Macaroni," *Eighteenth-Century Studies*, 2004, 38(1): 101-117.

The lack of personal contact between William Young and the French botanists was a major reason why they were so reluctant to trust him. Young's comportment and dress, if known to the French, did not elicit commentary. But the correspondence about him, and about other botanical collectors, confirms the significance of personal encounters. Barbé-Marbois explicitly requested that Young should be sent to France to meet the Parisian botanists. '[C]onversation with these men [i.e. plant hunters such as Young]' he stressed, 'will give amateurs of botany much more knowledge [*lumières*] than all the written clarification that I would be able to extract from him.'[105] Malesherbes and Nolin, however, received Barbé-Marbois's request very coldly. Writing privately to Nolin, Malesherbes declared that the 'proposition of bringing M. Young to France … has no common sense.'[106] Neither the French government, nor the private individuals who had offered a subscription to support the proposed exchange, wished to pay for Young to come to France.[107] Indeed, Malesherbes emphasised that it should rather be 'a question of sending a Frenchman to America'.[108] Although they differed over deciding who should be sent where, all correspondents recognised the significance of personal encounters. Botanising and talking together was a way for individuals to measure each other's abilities as scholars

[105] AN, 399 AP 99, Barbé-Marbois (Philadelphia) to unknown addressee (probably the Abbé Nolin), 1 March 1783.

[106] AN, 399 AP 99, Draft letter from Malesherbes to abbé Nolin, 18 June [1783].

[107] For the subscribers, see: AN, 399 AP 99, L'Héritier de Brutelle (Paris) to Malesherbes, 7 October 1783.

[108] AN, 399 AP 99, Draft letter from Malesherbes to abbé Nolin, 18 June [1783].

and to share their mutual passion for nature.[109] William Young was only able to convince his British correspondents of his capabilities as a botanist because he had met them, and because he had been trained by several of them. He was not able to do the same with the French.

Vilmorin's attempt to communicate with William Young through objects was thwarted, ultimately, by environmental rather than social factors: In 1785 Young dramatically slipped from a cliff on which he was botanising, and drowned in the creek below.[110] Ultimately, William Young achieved only an untimely curtailment, and he would probably have been entirely forgotten – were it not for the determinedly persistent appearance of his name in British and French botanical records of the 1780s. Young's example may tell us little about botany *per se*, but when allied with the other cases discussed here, the relationships formed between these travellers speak volumes about the shifting bases on which trust was established, underlining the continuing needs for travel and personal encounter, and for mutual monitoring as a means of maintaining confidence within a globalising network.

The letters that French botanists exchanged with the plant hunter André Michaux, some of which I have already quoted, confirm these connections unquestionably. André Michaux recounted a conversation with Avistay de Chateaufort, the French Consul at Charleston, who had proposed that Michaux should create a garden there to house his Carolinian collections before they were sent to Europe. Michaux treated the idea with scepticism because he feared that there were no suitably qualified gardeners in America: 'I told him that the difficulty of finding

[109] There are numerous examples of this in the Swiss section of Blaikie, *Diary*, pp. 31-96.

[110] Harshberger, 'William Young, Jr.', p. 97.

someone to direct the establishment would hamper us from drawing all the advantages that we propose.'[111] His response underlines the extent to which the Parisian botanists preferred practitioners who had been trained in Europe. Michaux insisted that the only person he would trust with the job was 'le Jeune Archibal[d]', a Scottish gardener who had trained in London and immigrated to France in 1777.[112] Michaux's own assistant, the French gardener Saunier, was by no means perfect – Michaux described how he 'forgets even the most essential things' – but he was nevertheless 'infinitely better than anything that we might find here.'[113] The French were very reluctant to extend their confidence to anyone who had not been trained in Europe, and who they did not know.

Conclusion

The transatlantic botanical network was placed under pressure by the political and economic transitions that ripped through the Atlantic world in the later eighteenth century. The ways in which entrepreneurial individuals such as William Young participated in botanical networks were shaped by these external forces, which defined global connectedness more widely. Young's network shifted in geographical

[111] HM, 71885, André Michaux (New York) to André Thouin (Paris), 19 August 1786.

[112] Archibald MacMaster worked for the duc de Choiseul at Chanteloup from 1777-1785, and afterwards for M. d'Harvillier at Auteuil. For details about MacMaster, see: Blaikie, *Diary*, pp. 169, 198-199.

[113] HM, 71885, André Michaux (New York) to André Thouin (Paris), 19 August 1786.

focus because of the American Revolution. Crucially, the cosmopolitan ideal of scholarly exchange persisted throughout the period and the Revolution did not provoke divisive new loyalties among scholars and traders. However, trade embargoes and piracy meant that Young and his counterparts in America were physically cut off from their British clients, and therefore were forced to create alternative connections with other Europeans. As collecting networks grew more extensive and socially diverse, commerce became increasingly significant to scientific exchange.

The personal relationships forged within mercantile contexts significantly determined the nature of global scholarly connectedness.[114] While we are already aware that much eighteenth-century scientific enquiry was driven by imperial, religious and medical motives, this paper has demonstrated that scholarship also shared many tenets with eighteenth-century commerce, which expanded concurrently. Traders and scholars sought to use their connections with each other advantageously, to increase the quantity of specimens in circulation. The number of merchants working within scholarly networks consequently increased. This complicated the social structure upon which such exchanges were based, and threw into question the ways in which participants might ensure the trustworthiness and reliability of their agents.

If scholarly networks were to expand further they needed to emulate mercantile networks by developing ways of dealing with anonymity. Previously, scholars had mostly obtained specimens either through gift exchange or by sending

[114] Londa Schiebinger and Claudia Swan (eds), *Colonial Botany. Science, Commerce, and Politics in the Early Modern World* (Philadelphia: University of Pennsylvania Press, 2005), *passim*.

collectors out on individual commissions.[115] A collectors' honesty was assured because in most cases the promise of their payment was projected into the future. Consequently, collectors usually took careful precautions to guarantee the safe passage of the objects they obtained.[116] Economic historians would describe this as the first stage of development in a network, in which merchants travel with their goods and therefore are not able to utilize all possible markets.[117]

William Young launched his career as a plant hunter by creating individual relationships that were characteristic of this initial stage of network development. He won the confidence of his British correspondents through his visits to London in the mid-1760s. These visits engendered some disapproval due to his predilection for macaroni-like ostentation and affectations. But Young's personal encounters with his correspondents provided him with the opportunity to prove his skill and capacity as a botanist, which evidently overrode their other scruples about him.

Personal contact was central to the formation of relationships of trust, and scholars relied on using intermediaries to supervise the behaviour of their correspondents. Once William Young had established his standing in Britain as a reliable botanist and plant hunter, he was then able to progress to what might be

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[115] For examples of such arrangements, see: AN, O/1/2113A, Dossier 6 "Copie de l'acte par le quel le Botaniste s'engage à payer [Nicholas Fish]," 7 February 1786; MNHN, Ms 307, "Vegetaux envoyés au Sultan Tippo [sic] Zaib par le Jardin du Roi 1788," document E3, "Articles de la Convention General"; MNHN, Ms 1945, "Expédition d'Aristide Aubert Dupetit-Thouars pour la recherche de La Pérouse, 1792," document 9, Draft memorandum [written by Labillardrie?], c. 31 August 1791.

[116] Wulf, *Brother Gardeners*, p. 31.

[117] Greif, "Contract Enforceability," p. 526.

described as the 'second stage' of network development. Young acted as an overseas agent in America, receiving a stipend in return for fulfilling his duties as a plant collector. His behaviour was monitored by a coalition of reliable intermediaries, including Alexander Garden, John Bartram and Humphrey Marshall, whose Quaker faith was a further confirmation of their credibility.[118]

The situation in France was different because William Young and his French correspondents attempted to enter directly into a 'second stage' relationship, in which Young immediately took the position of an agent acting at a distance. However, the French lacked sufficient means of monitoring and regulating Young's behaviour, and therefore could not place their confidence in him as a supplier. Malesherbes, Nolin and the other French botanists did not trust Barbé-Marbois as an agent. Writing to Malesherbes in 1783, Nolin expressed his hope that Barbé-Marbois would be replaced by J. Hector St John de Crèvecœur, by whom 'we will be better and more usefully served'.[119] Crèvecœur (1735-1813), who was indeed appointed as Consul de France later that year, was an amateur of botany who had corresponded extensively with French and American scholars on matters of botany and agronomy. Nolin, therefore confident in Crèvecœur's scholarly capabilities, believed that he could judge reliably an agent's adeptness as a botanist and steadfastness as a supplier.[120]

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[118] Avner Greif, Paul Milgrom and Barry R. Weingast, "Coordination, Commitment, and Enforcement: The Case of the Merchant Guild," *Journal of Political Economy*, 1994, 102(4): 745-776, on pp. 746-748.

[119] AN, 399 AP 99, Abbé Nolin to Malesherbes, [no date but probably 3 July 1783].

[120] J. Hector St. John de Crèvecœur (1735-1813), a French immigrant to America, is now best known as the author of the *Letters from an American Farmer*, which were first published in English in 1782 and in French in 1784. See Albert E. Stone,

Geographical distance meant that face-to-face interactions were not possible, and correspondents consequently attempted to use letters and objects as intermediaries through which to maintain their reputations. Malesherbes and Nolin thought that their misgivings about Young were due to the problem of knowledge communication. They consequently attempted to transmit tacit knowledge, sending objects when words failed them. But there was a deeper problem embedded within this, which related to the need to ensure communication and information flows within an information network that was becoming depersonalised. Young's correspondents had not developed mechanisms for establishing trust without actually meeting a supplier or their agents in person. Objects could not substitute for a continuing need to monitor behaviour. This limited the potential for the knowledge network to expand further.

This article's analysis of transnational networks led to an interrogation of the links through which knowledge was communicated.[121] It has demonstrated that the efficient operation of knowledge networks was contingent upon the effective control of social and cultural factors (communication and comportment) and environmental factors (what happened during transit). Information certainly moved within and between different nations, but each new context required the careful negotiation of discreet social parameters which related more to personalities and less to questions of national rivalry. If misinterpreted, these social parameters could be highly constraining both for the reception of information and for the potential for future knowledge exchange. My findings call into question the way that global

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'Introduction' to Crèvecœur, *Letters from an American Farmer and Sketches of Eighteenth-Century America* (London: Penguin, 1986): 7-25.

[121] See also James Secord, 'Knowledge in Transit', *Isis*, 2004, 95(4): 654-672.

connectedness has been envisaged in the history of science. We need to conceptualise botanical networks more broadly, to include not just botanists working for major metropolitan institutions and powerful patrons, but also amateur collectors and plant traders. These individuals were active in constructing their own networks, which might be transnational in nature, and in which agents might act quasi-independently from the purportedly powerful centres of Enlightenment. Significantly, the participation of amateur collectors and plant traders in the collecting networks that were centred on European metropoles could alter the ways in which the networks themselves operated.[122]

Further, we cannot divorce the activities of botanists from the wider social, cultural and natural worlds in which they lived and which conditioned their behaviours. Thinking about the relationship between cultural proximity and geographical distance has underlined the challenges faced by knowledge transfer in the early modern period, when the criteria for trust were grounded so firmly in interpersonal contact. Understanding how the brokering of social relationships shaped the movement of information is key to solving the puzzling case of William Young and, on a wider level, to comprehending the relationship between European science and the global context in which it was located. While we might have assumed that competing national identities were at the heart of Young's difficulties with the French, the persistence of cosmopolitanism as the dominant ideal for Enlightenment scholarly exchange meant that national identity mattered far less at this point in history. Eighteenth-century botany was a highly sociable science, in which the

[122] See also Antonella Romano and Stéphane Van Damme, "Science and World Cities. Thinking Urban Knowledge and Science at Large (16th-18th century)," *Itinerario*, 2009, 33(1): 79-95, on p. 84.

relationships formed individually between participants were essential for scholarly credibility and confidence. The geographically dispersed nature of botanical collecting meant, however, that these relationships were physically stretched across seas, swamps, woods and mountains. Efficient communication over distance was essential. The objects and letters that circulated between correspondents gained amplified significance because they became the material representations of individuals who saw each other rarely, if at all.

William Young struggled to form a good relationship with the French because the existing modes of assessing reliability and trustworthiness were destabilised when he attempted to expand the basis of his network beyond interpersonal relationships. The objects he sent and received did not act efficiently as substitutes for personal encounters and as means of creating and communicating a positive reputation. Letters and material artefacts could convey misunderstandings that might even block the transferral of information. The question was thus not so much about botany in boxes, as Vilmorin thought, but more about the reputations and relationships formed between the people who packed, carried and opened them.