

"From having no Herbarium". Local knowledge vs. metropolitan expertise: Joseph Hooker's Australasian correspondence with William Colenso and Ronald Gunn

Article (Unspecified)

Endersby, Jim (2001) "From having no Herbarium". Local knowledge vs. metropolitan expertise: Joseph Hooker's Australasian correspondence with William Colenso and Ronald Gunn. *Pacific Science*, 55 (4). pp. 343-358. ISSN 0030-8870

This version is available from Sussex Research Online: <http://sro.sussex.ac.uk/1599/>

This document is made available in accordance with publisher policies and may differ from the published version or from the version of record. If you wish to cite this item you are advised to consult the publisher's version. Please see the URL above for details on accessing the published version.

Copyright and reuse:

Sussex Research Online is a digital repository of the research output of the University.

Copyright and all moral rights to the version of the paper presented here belong to the individual author(s) and/or other copyright owners. To the extent reasonable and practicable, the material made available in SRO has been checked for eligibility before being made available.

Copies of full text items generally can be reproduced, displayed or performed and given to third parties in any format or medium for personal research or study, educational, or not-for-profit purposes without prior permission or charge, provided that the authors, title and full bibliographic details are credited, a hyperlink and/or URL is given for the original metadata page and the content is not changed in any way.

“From having no Herbarium.” Local Knowledge versus Metropolitan Expertise: Joseph Hooker’s Australasian Correspondence with William Colenso and Ronald Gunn¹

*Jim Endersby*²

Abstract: Between 1844 and 1860, Joseph Dalton Hooker published a series of major floras of the southern oceans, including the first floras of Tasmania and New Zealand. These books were essential to establishing his scientific reputation. However, despite having visited the countries he described, Hooker relied on a large network of unpaid, colonial collectors to supply him with specimens. A study of his relationship with two of these collectors—Ronald Campbell Gunn and William Colenso—reveals warm friendships but also complex negotiations over individual authority, plant naming, and the status of local knowledge. The herbarium played a crucial role in mediating these negotiations. Although Bruno Latour’s theory of cycles of accumulation proved useful for analyzing the herbarium’s role, in this article some ways in which his ideas might be refined and modified are suggested.

IN 1854, THE BRITISH botanist Joseph Dalton Hooker (Figure 1) criticized William Colenso (Figure 2), his chief correspondent in New Zealand, for having attempted to name some supposedly new species of ferns: “From having no Herbarium,” wrote Hooker, “you have described as new, some of the best known Ferns in the world” (quoted by Colenso to J. D. Hooker, 24 August 1854: KDC 174). Hooker evidently thought that his herbarium gave him the prerogative to name plants that his colonial correspondent lacked. Colenso disagreed, arguing that “I am well aware that I know very little indeed (save from books) of the Botany of any Country except N.Z., still, I fancy, I know the specific differences of many N.Z. plants” (Colenso to J. D. Hooker, 24 August 1854: CP4). For the colonial naturalist, firsthand knowledge of his locality’s living plants gave him unique insights. However, Hooker ignored this local

knowledge and Colenso’s names never appeared in Hooker’s *Flora Novae-Zelandiae* (1855).

At first glance, this incident encapsulates an essential aspect of the colonial scientific relationship: the metropolitan expert using his position—both physical and social—to overrule the distant colonial (Brockway 1979, MacLeod 1987, MacLeod and Rehbock 1988, Miller 1996, McCracken 1997). Although Hooker was dependent upon people like Colenso for the specimens he needed to compile the books that made his name and reputation, he was not interested in their ideas. At the heart of his ability to keep Colenso in a subordinate role was the herbarium; I want to discuss the herbarium’s importance using Bruno Latour’s concept that exchanges such as those between Hooker and Colenso can best be understood by looking at the “cycle of accumulation” within which they participated (Latour 1987:219–220). Hooker made his herbarium into what Latour called a “center of calculation”—a place that brought him specimens, publications, and ultimately the directorship of the Royal Botanic Gardens, Kew.

In this article I shall look at the cycle of accumulation from the perspective of the periphery—by comparing and contrasting Colenso’s motivations with those of Ronald Campbell

¹ Manuscript accepted 1 February 2001.

² Department of the History and Philosophy of Science, University of Cambridge, Free School Lane, Cambridge, CB2 3RH, Britain (E-mail: jje21@cam.ac.uk).



FIGURE 1. Joseph Dalton Hooker. Copyright Alexander Turnbull Library, Wellington, New Zealand.



FIGURE 3. Ronald Campbell Gunn. Copyright Royal Botanic Gardens, Kew.



FIGURE 2. The Reverend William Colenso. Copyright Royal Botanic Gardens, Kew.

Gunn (Figure 3), another of Hooker's Australasian correspondents. Although this approach illustrates the usefulness of Latour's model, it also highlights ways in which it might be modified.

HOW TO BECOME "SUCH A PERSON
AS MR. DARWIN"

Hooker corresponded with Gunn for 20 years, from 1840 to about 1860, and with Colenso from 1841 until Colenso's death in 1899. Hooker met both men during his voyage to Antarctica as assistant surgeon aboard HMS *Erebus* (1839–1843), commanded by James Clark Ross, which, with its sister ship, the *Terror*, was mapping terrestrial magnetism (Cawood 1979). However, the ships could not withstand the Antarctic winters, so took shelter in various places, including New Zealand and Van Diemen's Land (Tasmania), and also visited the numerous tiny islands around Antarctica. These sojourns were Hooker's chance to collect

plants in relatively unexplored regions; as he wrote to his father, “No future Botanist will probably ever visit the countries whither I am going, and that is a great attraction” (J. D. Hooker to W. J. Hooker, 3 February 1840: Huxley 1918:163).

Unexplored lands and unknown plants would, Hooker hoped, make his name. Before setting sail, Ross told Hooker that he wanted “such a person as Mr. Darwin” as the expedition’s naturalist, but because Hooker had not yet proved himself of Darwin’s caliber, Ross appointed him to the inferior position of botanist. On receiving this unwelcome news, Hooker wrote a disgruntled letter to his father, William Hooker, complaining “what was Mr. D. before he went out? he, I daresay, knew his subject better than I now do, but did the world know him? the voyage with Fitz-Roy was the making of him (as I hoped this exped. would me)” (J. D. Hooker to W. J. Hooker, 27 April 1839: Huxley 1918:41). Hooker knew that Darwin had been unknown when the *Beagle* set sail under Captain FitzRoy and hoped his own career might follow the same pattern—that he, too, could establish a scientific reputation by collecting during the voyage and publishing descriptions of his collections after he returned.

In a period with few established scientific career paths, traveling was an important way for someone like Hooker to become a man of science. He had to invent a career for himself, and long, uncomfortable years on board ship were the first step in this process. Although Hooker’s father had excellent contacts in the natural history world, he did not (unlike Darwin’s father) have a fortune to bequeath his son, so when Joseph Hooker returned to England, he needed a way to earn a living while pursuing his passion for botany. As he noted in a letter to his father, “I am not independent, and must not be too proud; if I cannot be a naturalist with a fortune, I must not be too vain to take honourable compensation for my trouble” (J. D. Hooker to W. J. Hooker, 18 May 1843: Huxley 1918:166).

For Hooker, publishing the *Botany of the Antarctic Voyage* was a way of earning “honourable compensation” for his efforts (Hooker 1847, 1855, 1859). However, he

complained to Gunn that the publication itself earned nothing. Indeed, the lavish illustrated volumes cost Hooker money: “the fact is I have to purchase all the coloring of the work: & have to give colored copies to the *nobs* who do not care a straw for me or my book—Reeves [his publisher] gives me nothing on the work, nor soon will” (J. D. Hooker to Gunn, October 1844: GC8). Despite having a subsidy from the Admiralty, it was clear to Hooker that it was only by building his reputation—his “symbolic capital”—that the book might pay off (Bourdieu 1977, 1984, Moore 1997).

By the time he returned to England, Hooker was contemplating writing floras not merely of the Antarctic, but also of much of the southern oceans, a project that would allow him to tackle the problem of plant distribution that fascinated him and many of his contemporaries (Browne 1983, Rehbock 1983). As Hooker traveled and collected, he noted that lands close to each other did not always have similar plants: the gum trees (*Eucalyptus*) and wattles (*Acacia*) that dominated the Australian landscape were never found in New Zealand; and the plants of the Kerguelen’s Land were clearly related to those of distant Tierra del Fuego, not to those of Lord Auckland’s islands—despite their being much closer (Hooker 1847:209–210, Hooker 1859:lxxxix). Like some of his contemporaries, Hooker believed that each species had been created—by some unknown means—in one place only, and that plants had migrated from their point of origin to the various places they currently occupied. However, this theory was hard to reconcile with members of the same group being found thousands of miles apart—such as on isolated islands—with no obvious, natural means by which they could have been transported. Hooker hoped that close study of the southern island floras might shed light on these puzzles and perhaps on the mechanism by which new species were created.

Besides needing prestigious, reputation-building publications, Hooker had another motive for investigating plant distribution—to make botany into a more “philosophical” study (Rehbock 1983). In the early decades of

the nineteenth century, British botany was largely taxonomic and although the question of precisely which studies qualified as true sciences was still hotly debated, one widespread view was that the true sciences were concerned with mathematics, experimentation, accuracy, precision, and—most of all—with discovering causal laws. This was the view of most leading British men of science, who regarded Newtonian mechanics as the pinnacle of scientific achievement. But botany lacked anything that looked like Newton's laws, and Hooker (like several of his contemporaries) hoped plant distribution studies might offer a chance to discover such laws. The southern floras, especially those of islands, seemed particularly good ones to examine, judging by the achievements of the British botanist Robert Brown, who had published the first work on Australian plants in 1814. It was apparent to Brown, as to other European travelers, that the Tropics were rich in species and that as one sailed away from them, plants became scarcer until one reached either the Arctic or Antarctic, where there were no green plants at all. That much was obvious, but Brown had noticed something more interesting: as he traveled, the mathematical ratios between specific groups of plants seemed to change in a predictable way—the Tropics were not merely rich in species, but were characterized by large genera, those containing many species, but toward the poles, small genera predominated (Brown 1814:5–6, Browne 1983:62).

To give precision to his observations, Brown calculated the ratios between taxonomic groups, a technique that became known as botanical arithmetic. Brown's work was enthusiastically taken up by the German scientific explorer Alexander von Humboldt, who observed that Brown's ratios applied not only to changes in latitude, but also to changes in altitude: as he ascended South America's mountains, the lush vegetation of the Tropics gave way to a sparse, alpine flora that looked just like the plants of the icy southern tip of the continent (Browne 1983: 60–61, Pratt 1992, Dettelbach 1996).

However, although Humboldt's ideas became central to plant distribution studies, it

was Brown who stimulated Joseph Hooker's interest in the topic. Brown was a friend of Joseph's father and an inspiration to Joseph, whose letters home made his influence clear. Thus he wrote to his father while on the *Erebus*: "If ever on my return I am enabled to follow up botany ashore, I shall live the life of a hermit as far as society is concerned; like Brown perhaps, without his genius" (J. D. Hooker to W. J. Hooker, 3 February 1840: Huxley 1918:162). Later he wrote: "several of the tabular results I have drawn out show a delightful accordance, nor do I know of any result of this Expedition which gave me such pleasure as to find how beautifully the grasses rose in the scale of importance, beating even Brown's published ideas" (J. D. Hooker to W. J. Hooker, 25 November 1842: Huxley 1918:79–80). Botanical arithmetic was an essential tool with which Hooker hoped to interpret the southern floras and discover the long-looked-for laws of plant distribution (Browne 1979, 1980).

However, Hooker's ambitions outstripped the collections he made on his voyage. He needed more plants. But gathering them proved nearly impossible. Live plants were increasingly being shipped in Wardian cases, miniature greenhouses that improved the plants' chance of completing their long sea voyages in a healthy state. Nevertheless, unless someone traveled with the plants and looked after them, they often died. In 1869, Hooker told another New Zealand correspondent, James Hector, that "we have hitherto been most unfortunate & I now call Wards cases 'Wards coffins!'" (J. D. Hooker to Hector, 8 November 1869: Yaldwyn and Hobbs 1998:126). And, even if they had been transportable, many Australasian plants would not have grown at Kew except in greenhouses. Hooker compared over 8000 species in writing his *Flora Tasmaniae*; had they all been living plants, they would have overwhelmed even Kew's enormous grounds (Hooker 1859:ii–iii). So, rather than collect the actual plants, Hooker needed dried specimens as a substitute for them; they had, in Latour's terms, to be made *stable* (by drying them) in order to become *mobile* so that, once they had reached Kew, they were *com-*

binable—into Hooker’s imperial taxonomic scheme (Latour 1987:219–220, 222–225).

To create the global floras and distribution studies he required, Hooker needed many more dried specimens, and he turned to his father’s networks of correspondents to supply them. Joseph Hooker was, in the words of his first biographer, “born to the purple, for in the realm of botany his father, Sir William Hooker, was one of the chief princes” (Huxley 1918:3). While Joseph was growing up, William was professor of botany at Glasgow University and he later became director of Kew. However, although a prince in some regards, William Hooker was a pauper in others, for the new job reduced his income; Joseph told Gunn, “I am now working in Co[mpany] with my father, keeping a sort of common purse which I grieve to say is very different from what it was in Glasgow, when the Professorship provided him twice the emolument of this” (J. D. Hooker to Gunn, 13 May 1844: GC8). Nevertheless, William Hooker’s correspondence networks girdled the earth and Gunn and Colenso were among his most regular and reliable correspondents in the Antipodes. Their importance to Joseph’s work can be gauged from the thanks he offered them in his books and by the fact that his floras were dedicated to his colonial collectors. Yet neither man was employed to collect for Kew, and neither sought a paid career within botany or the other sciences; it is obvious why Joseph Hooker needed their specimens, but to appreciate how he obtained them, we need to understand what motivated Gunn and Colenso to collect.

GUNN AND HOOKER: “TO RECOMMEND MY
HUMBLE SERVICES”

Ronald Campbell Gunn (1808–1881) was the son of a soldier; he decided not to follow his father’s career and instead emigrated to Tasmania in 1830, where he soon obtained a minor government post as superintendent of convicts (Baulch 1961:xiii–xiv). Two years later, he joined William Hooker’s collecting network, with the encouragement of his friend Robert William Lawrence, already a Hooker correspondent. Gunn sent Hooker a

package of dried plants: “with a view that should you *not* desire a second correspondent in this Colony, to recommend my humble services to some Botanist Friend who will in return forward me a few good works to advance me in the Science, (of which I am as yet totally ignorant,) and also—seeds of any Plants, useful, remarkable, ornamental or which have not yet been introduced into this Colony” (emphasis in original) (Gunn to W. J. Hooker, 18 August 1832: Burns and Skemp 1961:22).

Gunn wanted to exchange common Tasmanian plants for European plants and books to educate himself in botany. In 1833, after beginning his correspondence with William Hooker, he asked specifically for seeds for his newly created garden “so that I may acquire a knowledge of the different Genera by sight, as also of the various natural orders” (Gunn to W. J. Hooker, 15 November 1833: Burns and Skemp 1961:32). Just as the garden was intended mainly to develop his knowledge of botany, so were the books. Gunn acknowledged that he was “ignorant of Botany,” because he had “*no Books on the subject*—and none can be obtained here” (emphasis in original) (Gunn to W. J. Hooker, 18 August 1832: Burns and Skemp 1961:22).

Why was a knowledge of botany so important to Gunn? One might assume that he wanted to sell his collections to supplement his modest income, but in fact he refused all payment for his efforts. When he sent plants to John Lindley, professor of botany at University College London, and got no response, Gunn complained to Hooker that he had a “slight feeling of annoyance,” especially “when I compare your Conduct to his.” Gunn explained that his motive for collecting “was purely taste, and a mind bent upon some pursuit, and not necessity or for a livelihood & I was afraid Mr. Lindley whom I only knew from his public name, might forget those points.” Gunn did not want to be regarded as a commercial collector: “If my collections are worth the freight & a few seeds in return, it was all I looked for” (Gunn to W. J. Hooker, 14 September 1834: Burns and Skemp 1961: 39–40).

The significance Gunn attached to being

an unpaid collector is apparent from his grumbles about John Edward Gray, keeper of zoology at the British Museum, who had not reciprocated his gifts of specimens: "I do not desire to profit by Natural History, but I cannot afford to follow it extensively at my own sole expense merely 'for the glory of the thing'—without even books to guide me in my researches—and which a public institution like the British Museum could surely afford to give. Your Father has as completely *overpaid* me as the others have underpaid. I wish I was independent—I would then work away *con amore*" (emphasis in original) (Gunn to J. D. Hooker, 13 March 1844: KDC 218).

Gunn saw himself as a disinterested enthusiast, an "amateur" in the sense of one who pursues a subject for love ("*con amore*"). His participation in exchanges was soured when men of the stature of Gray or Lindley refused to reciprocate; Gunn observed that "My only desire to obtain returns for my numerous Collections is to enable me in fact to Collect *with more effect* by getting Books to let me know what I am about" (emphasis in original) (Gunn to J. D. Hooker, 28 May 1845: KDC 218). His sense of himself as, in some respects, the equal of his correspondents is apparent from a later comment that Hooker's "account of the Rewards bestowed upon Science & learning in England is not encouraging," but that "it hardly required your letters to satisfy me that Natural History must be followed for its own sake alone by enthusiasts like ourselves" (Gunn to J. D. Hooker, 26 September 1844: KDC 218).

GUNN AND LAWRENCE: "THE BLANK HIS
DEATH HAS MADE"

Gunn represented knowledge of botany as an end in itself; however, his motivations were more complex. As noted, he joined the Kew network through Lawrence who had, as Gunn told William Hooker, "exited [*sic*] in me a taste for Botany and Collecting" (Gunn to W. J. Hooker, 18 August 1832: Burns and Skemp 1961:21–23). Gunn met Lawrence in the early 1830s and they soon became friends.

He was distraught when Lawrence died in October 1833, just 26 years old. His wife had died just weeks before him—less than a year after they had married and soon after giving birth to their daughter. According to Gunn, Lawrence was so distressed by the loss of his wife that he "was carried off in a fit of apoplexy" soon afterward—husband and wife were buried within a fortnight of each other. This tragedy affected Gunn deeply. He told William Hooker that he had been to Lawrence practically: "his only friend on earth, and we were almost brothers to each other,—Our pursuits and feelings alike, and it will be long ere I shall be able to fill the blank his death has made. I owe much to his memory as he led me to commence the study of Botany, in which I have spent many happy hours, and yet look forward to years of pleasure in the same pursuit. His loss to you will also be most severe, as he was years ahead of me in experience . . . of Botany . . . I can only however promise to do *all I can*, and trust time will improve me" (emphasis in original) (Gunn to W. J. Hooker, 15 November 1833: Burns and Skemp 1961:31–33).

Lawrence's death moved Gunn to continue his work and he seems to have thought of his botanical collections as, in part, a memorial to his comrade. He was also lonely without his friend, telling Hooker that Lawrence's death "has thrown me back more than I could have conceived as I have now no one with whom to talk over Botanical matters or to excite me to exertion." Two years later, Gunn was still lamenting his lack of "some botanically inclined person to exchange thoughts with" (Gunn to W. J. Hooker, 14 September 1834, 30 March 1835: Burns and Skemp 1961:41–43).

Loneliness was another powerful motivation for seeking a correspondent with common interests, but Lawrence's example also suggests a reason for the *way* Gunn chose to collect: Lawrence had been the son of a wealthy landowner, but Gunn held a poorly paid government post as superintendent of convicts, so perhaps Gunn's professed desire to follow botany "*con amore*," as a "pursuit," and not out of "necessity or for a livelihood"

was motivated by a desire to emulate his late friend and act the gentleman. Similar attitudes are apparent in William Archer's correspondence with Joseph Hooker. Archer, another of Gunn's friends, was also a landowner who pursued botany in a disinterested, gentlemanly way. He wrote to Hooker that "there is a source of happiness, inherent in the pursuit of botanical science, of which external circumstances cannot rob us altogether" and described botany as his "darling pursuit" (Archer to J. D. Hooker, 26 July 1854: KDC 218).

Anne Secord commented on the importance of gift exchanges in overcoming the social distance between correspondents of different social classes in British natural history. Artisans could join scientific correspondence networks by adhering to gentlemanly standards of conduct, such as giving gifts and declining payment. She showed that gifts were reciprocated in kind, with cash payments often being refused by artisans who knew that money played no part in exchanges between gentlemen. She quoted the zoologist Edward Turner Bennett as saying that "a man of character is respectable whatever may be his rank in life, and one who collects with a view to Science and not to Profit I should esteem as an Entomologist" (Secord 1994: 384, 393).

Although Gunn's social status was rather different from that of Secord's artisans (who were generally *not* trying to change their social status), her argument supports the idea that Gunn's collecting was, in part, an effort to imitate the gentlemanly behavior of his friends Lawrence and Archer, perhaps in the hope of eventually emulating their social status. Whether or not he had planned to do so, Gunn joined the landowning class: by the 1850s, he had acquired a substantial estate near Launceston, in northern Tasmania (Baulch 1961:xv). His growing prosperity seems to have coincided with a gradual loss of interest in botany. Perhaps managing his estates became too time-consuming. But perhaps he felt that, because he had finally become a gentleman, he no longer needed to engage in aspirational, gentlemanly pursuits.

COLENZO AND CUNNINGHAM:
"ANY LITTLE VEGETABLE NOVELTY"

Hooker's other major Australasian correspondent, the Reverend William Colenso (1811–1899) (a cousin of the controversial Bishop Colenso of Natal), had been apprenticed as a printer in England before being sent to New Zealand in 1834 by the Church Missionary Society to produce Maori translations of the gospels and similar works (Mackay 1990:87–89). Colenso's botanical motivations had some similarities to Gunn's; his interest in plants also had been aroused by a botanical friend, the Australian botanist Allan Cunningham, who visited New Zealand in 1838 (McMinn 1970:112). On his return to Sydney, Cunningham wrote to Colenso, answering his botanical questions, buying him collecting equipment or having it made to order, offering homely advice on diet and health, and sending him gifts (Cunningham to Colenso, 24 October 1838 and 4–11 December 1838: CP4). Cunningham identified the plants that Colenso had gathered in the months after they had met, noting one that "is perfectly new, and is a very remarkable species." Cunningham promised to cite Colenso as its discoverer when he returned to England and published his collections (Cunningham to Colenso, 9–17 January 1839: CP4).

Colenso was overwhelmed by his new friend's generosity: "really, I have no little weight of obligation on me now! How shall I make a shadow of return?" (Colenso to Cunningham, 1 March 1839: CP4). Cunningham replied: "If, as you enquire, you wish to know in what way you can make me (not a 'shadow') a solid substance of return for the little civility and attention, I may have shown you since we last saw each other at Paihia, I'll just tell you—by writing to me at your leisure as long as I am in this roasted colony; by sending me . . . any little vegetable novelty, and by bearing in mind this humble request of mine, viz. Not to lose sight of the vegetation of the Land you live in, and not to scatter to the winds, that little you gather'd regarding the peculiarities of those vegetables, when

I was with you. Let these investigations be your recreation after the more important miss[ionar]y. duties of the day are done. Thus in time, you will acquire a mass of most valuable information, in regard to the Botany of Islands, daily becoming more and more important in the Eyes of Europe, in this Age of Colonizn. and immigration" (Cunningham to Colenso, 11 April 1839: CP4). Cunningham's reference to the "Botany of Islands" probably referred to plant distribution studies, in which islands were particularly important; the phrase suggests an interest in botany's wider "philosophical" issues—he apparently hoped that information gathered by himself and Colenso would prove useful for the kinds of studies that Hooker would eventually write.

Cunningham urged Colenso that "what you do, do well, with all your heart. Cherish a feeling for investigations of these kinds that will urge you to go about them *con amore*" (Cunningham to Colenso, 11 April 1839: CP4). These words must surely have struck a chord with the evangelical missionary, not least because by the time Colenso's reply arrived in Sydney, Cunningham was dead (Colenso to Cunningham, 27 May 1839: CP4). A final letter from Colenso was "returned unopened"; in it he had thanked Cunningham once again for "your always-to-be-borne in mind friendly present of a Bot. Glass, doubly enhanced to me in value from having seen it around yr neck and used by You" and he had signed himself, "your most sincere well-wisher and disciple and friend, William Colenso" (Colenso to Cunningham, 12 July 1839: CP4).

Cunningham's "humble request" thus became his last testament to his "disciple." Just as Gunn was partly motivated by Lawrence and inspired by his death to carry on his work, so Colenso's passionate pursuit of botany—and in particular his pride in the plants of New Zealand—seems, in part at least, to have followed from his determination to carry out Cunningham's last wishes: to prove himself worthy of the botanical friend he had so unexpectedly lost. And, like Gunn, Colenso was afflicted by what was perhaps a peculiarly colonial loneliness, being isolated both from the centers of European science, and being

one of the few in the colony with an interest in botany. In his later years, he admitted to Joseph Hooker that "sometimes—now & then—I long for a visit from a friend, or to hear the sound of a human Voice speaking kind words" (Colenso to J. D. Hooker, 22 January 1883: HLR11).

COLENZO AND HOOKER:
"PECULIARLY LOCAL"

Yet, although Colenso had much in common with Gunn, he had different ambitions. As an ordained minister, he already had a vocation and seems to have had no desire for worldly status. Indeed, he was proud of the fact that, unlike some of his brothers in the Church, he had never enriched himself by acquiring Maori land (Colenso to J. D. Hooker, 3 June 1865: KDC 174). It was Cunningham's promise that his "mass of most valuable information" would make him "important in the Eyes of Europe" that seems to have fired Colenso's imagination. His enthusiasm for the plants of New Zealand also encouraged a degree of what might be termed "botanical nationalism"—a concern that his adopted land not be seen as florally impoverished. He complained to Hooker that, "I do *not* altogether think, with you, that our 'Flora is a *scanty* one': undoubtedly, it is anything but gorgeous; and, I believe it will be found to be peculiarly *local*" (emphasis in original) (Colenso to J. D. Hooker, 3 February 1852: Colenso 1841–1852).

Although Colenso was generally deferential to Hooker, he believed that his collecting experience gave him the right to disagree. His confidence that the New Zealand flora was "peculiarly local" (i.e., rich in endemic species, those confined to a particular geographical region) was based on his firsthand knowledge, laboriously acquired: "No white man has tramped over more of N. Zealand ground than myself (I mean of the N. Island), and that, too, with open eyes; and I know that several plants are only to be found in one or two isolated spots throughout the whole island. Hence I am of the opinion, that when the immense & dense forests of N. Zealand shall have been opened, and her morasses &

glens explored, her Botany will shew itself to be of a proper magnitude, and bid fair to compete with the Botany of Islands of a similar size and parallel" (Colenso to J. D. Hooker, 3 February 1852: Colenso 1841–1852). Once again, the use of the phrase "Botany of Islands" suggests that Colenso, too, had "philosophical" interests, a suspicion borne out in other letters: "And to the question,—*What constitutes a really distinct genus, or species? I cannot give a satisfactory answer. I know not of any certain rule; and I find the first Botanists of the day opposing one another in their speculations; while not a few are laboriously undoing what their predecessors or compeers have toiled to rear*" (emphasis in original; bold italic indicates double underlining) (Colenso to J. D. Hooker, 24 August 1854: KDC 174).

However, "endemic" is not the only sense of "local" that is of interest. Colenso also defended his decision to name several species of the flax genus *Phormium* on the grounds that he had "taken the *universal* distinctive *uses* of the plants into consideration; and no New Zealander would (or could) ever use one sp. for the other" (emphasis in original; bold italic indicates double underlining) (Colenso to J. D. Hooker, 3 February 1852: Colenso 1841–1852). The phrase "New Zealander" referred only to the Maori at that time and Colenso was one of the few European botanists who took any interest in indigenous knowledge; the uses to which "the locals" put plants was seen as sufficient basis for a species name in his eyes.

A third sense of "local" refers to geographical locality. Colenso thought Hooker had "certainly erred in not publishing the precise habitats of several of my plants," especially because he had "very particularly mentioned their present, only known localities; in such a way, too,—by *correct* spelling of the native names,—as would be of great service to any future Collector": "You have, it is true, excused your not doing so, by pleading, that, my habitats are not to be found in any Map or Gazetteer! It would indeed be a curious thing if the all but unknown hills, streams, and hamlets of this new country were to be found in any Map or Gazetteer"

(emphasis in original) (Colenso to J. D. Hooker, 24 August 1854: KDC 174). Colenso's reference to the spelling of native names shows the extent of his knowledge of Maori culture and language; he was commissioned by the New Zealand government to produce a Maori dictionary in 1865, but money ran out before it was complete (Mackay 1990).

Colenso's local knowledge had at least three distinct facets: his familiarity with living plants allowed him to identify the New Zealand's flora unique species (*endemic knowledge*); his travels and collecting gave him detailed knowledge of the country's geography and of individual habitats (*topographic knowledge*); and his contact with the Maori gave him access to *indigenous knowledge*, unavailable to those who did not speak the local languages. However, Colenso was unable to persuade Hooker of the value of any of his local knowledges. Indeed, Hooker had commented that "I am often perplexed by collectors sending as localities the names of insignificant hamlets or streams, which are not to be found in attainable maps, and convey no meaning whatever" (Hooker 1855:5). His reason reveals the distance between the kind of universal knowledge he sought to construct and the local kind valued by Colenso. For Hooker, only a location *on a map in London* could give the information necessary for a plant distribution study, whereas Colenso was concerned with letting other New Zealand residents find the plant. Topographic knowledge, like indigenous knowledge, was irrelevant to Hooker's global project.

Such conflicts over plant names encapsulate processes that Latour described: as the Europeans record and transmit information, "the *local* knowledge of the savages becomes the *universal* knowledge of the cartographers," or—in this case—botanists (emphasis in original) (Latour 1987:216). Latour argued that as specimens moved—in this case, from the Maori to Colenso and then to Hooker—the ideas of one actor (or "actant," as Latour preferred) were translated into those of another. However, there is never direct equivalence between the meanings: "translation is by definition always a misunderstanding,

since common interests are in the long term necessarily divergent." Translation "defines a stronghold established in such a way that, whatever people do and wherever they go, they have to pass through the contender's position and to help him further his own interests" (Latour 1988:65–66, 253). Translation was the key to Hooker's ability to create and maintain his correspondence networks, which was in turn the basis of his ability to make Kew a center and thus to accumulate specimens. To achieve this, he needed to persuade Colenso and Gunn that their interests and his were the same; yet, according to Latour, they can never be (Latour 1988:253, Star and Griesemer 1989:389). These conflicts over translation are particularly apparent when the value of endemic knowledge is considered.

HOOKER AND COLENZO:
"THAT VERY PROTEAN FERN"

Hooker and Colenso's arguments about classifying and naming plants had many dimensions, not least of which were their differing conceptions of a species. For example, they disagreed over the New Zealand fern *Lomaria procerata*, which Hooker classified as a single species while Colenso applied his local knowledge to claim 16 species, giving "W.C." (i.e., William Colenso) as the namer of four of them (Colenso 1834–1841:504–505).

None of Colenso's names appeared in the *Flora Novae-Zelandiae* because, Hooker argued, a systematist could not "define [*Lomaria*'s] characters with sufficient comprehensiveness from a study of its New Zealand phases alone." Instead, what was needed was the "most laborious comparison" of "many hundred specimens of the plant, gathered in all parts of the south temperate hemisphere," before Hooker could decide that the apparently distinct New Zealand forms were merely varieties of a single species. Colenso commented that "I well knew that you would have difficulty with that very Protean fern, *Lomaria procerata*; it has for years puzzled me. Notwithstanding, I believe, that there are several vars. [varieties] of this sp[ecies].,—good, standard, well-marked & common vars."—which he evidently thought distinct

enough to be classified as species, because he gave them names (Hooker 1855:xiii–xiv; Colenso to J. D. Hooker, 24 August 1854: KDC 174).

Hooker relied on dried specimens for his work, but Colenso argued for the importance of recognizing field characters: those that could only be observed in living plants. After one of Hooker's colleagues at Kew, John Gilbert Baker, rejected Colenso's fern names, Colenso protested that: "I know my N.Z. ferns (sp. nov. [*species novae* or "new species"]) to be very distinct from those long known, & which he supposes them to be. At the same time, had I but *dried spns. only*, as you have had there, I am pretty sure I should have made the same, or greater, mistakes" (emphasis in original) (Colenso to J. D. Hooker, 27 December 1884: KDC 174).

Ferdinand von Mueller, director of the Melbourne Botanic Gardens, also argued that field characters were sometimes the only way to distinguish plants—for example, some of the eucalypts. However, because such features were impossible to discern in herbarium specimens, they were usually disregarded by botanists like Hooker and Baker, who accordingly disallowed Colenso's use of them. Even Hooker's collaborator, George Bentham, who was more sympathetic to their use, argued that field characters could not be used for an Australia-wide flora such as he was writing, but were relevant only to a local flora, such as the one Mueller was producing for Victoria (Stevens 1997:352).

Hooker's philosophical botanical agenda, particularly his focus on distribution, is obviously closely tied to his view of species. He argued that precisely delimited species were irrelevant, as long as those "treated conjointly really express affinities far closer than those which exist between those treated separately" (quoted in Stevens 1997:354). For Hooker, building up a broad picture of a flora's affinities was more important than deciding whether *Phormium* or *Lomaria* should be divided into two or more new species. Indeed, from Hooker's perspective, Colenso's endemic knowledge led to hairsplitting that obscured the very picture Hooker was trying to make out. Local knowledge could not be allowed to jeopardize global knowledge.

Peter Stevens argued that Hooker could not have used field characters to make a global survey (such as that needed to determine the limits of *Lomaria*), and that this policy also privileged those who worked at large institutions (Stevens 1997:349). However, Latour might say that the plants refused to be dried without losing some of their characteristics and so prevented the metropolitan gentlemen from achieving one of the central goals of the natural system of taxonomy—the use of all a plant’s characters in classification. (The Linnean system of taxonomy classified plants by simply counting their reproductive organs. Antoine-Laurent de Jussieu founded the natural system to overcome what he perceived as the Linnean system’s flaws and hoped that by using all the characteristics of a plant the “true” picture of botanical affinities could be discovered [Stevens 1994, Koerner 1996].) From a Latourian perspective, Hooker’s argument—that resolving the exact limits of species was unimportant—looks like making a virtue of necessity; fixing *exact* limits may have been impossible without the use of field characters. The global survey from dried specimens was undoubtedly a result of Hooker’s philosophical program, but his taxonomic “lumping” may have been as much a product of the plants’ recalcitrance as of human preference.

These disputes over names are a useful reminder that scientific names are more than convenient, unambiguous labels; if that were the whole story, names could have been given in New Zealand as easily as at Kew. Yet, Hooker would not allow colonials to confer names, despite the fact that he worked to ensure that his colonial collectors used the natural system: insisted that specimen labels include the plant’s natural order; and recommended the works of John Lindley, Britain’s most vociferous advocate of the natural system, to his correspondents (KCC 8 1856; Hooker 1855:2–3). Knowing and using the natural system was not enough to allow a colonial to name plants, because Hooker’s opposition was largely prompted by his need to concentrate botanical authority in his own hands.

Latour argued that in sciences like botany, which rely on amassing specimens, the cycle

of accumulation can “leak” at any point; he gave example of cargoes, maps, or ships going astray (Latour 1987:222). The point at which plants were named could potentially leak, but in an even more serious sense, because taxonomy is more than merely “labeling”: by naming—or not naming—a species, Hooker was determining the flora of colonies; what he named existed, and what he refused to name did not (Latour 1999).

THE POWER TO NAME

Hooker wanted Adam’s power over plants: the power to name them. The possession of a herbarium conferred such power (just as Colenso’s *lack* of a herbarium was sufficient to deny it to him). As specimens accumulated at the center, so did the power to classify them, and Latour commented that the European networks endowed “a few scientists in frock coats, somewhere in Kew Gardens, with the ability to visually dominate all the plants of the earth” (Latour 1987:223–225). The sheer quantity of specimens at Kew permitted previously unimaginable comparisons and so allowed Hooker to accumulate authority simply by possessing a material resource that colonials like Colenso and Gunn lacked.

However, both Gunn and Colenso had their own collecting networks. Colenso regularly referred to his New Zealand correspondents in his letters, and Gunn’s collectors have been identified (Colenso to J. D. Hooker, 15–16 April 1895: HLR11; Buchanan 1990). Although Hooker claimed Colenso had “no herbarium,” he had been building one for many years. In 1840, Colenso sent William Hooker some plants and acknowledged, “some of them are but inferior Specimens, but my Herbaria have been so culled over by one friend and another, that I had not many Duplicates remaining” (Colenso to W. J. Hooker, 14 February 1840: KDC 73 1834–1851).

Indeed, herbaria were a key aspect of what made colonial collectors so useful to Hooker, and he never tried to restrict them to the metropolis. He told his colonial readers that “I would also recommend that the knowledge obtained [by studying botany], be fixed, accumulated and distributed, by forming and

naming collections of dried plants, and depositing them in private colonial schools and libraries" (Hooker 1855). Such collections were another way of teaching colonials the natural system of taxonomy, which would improve the quality of the collections Hooker received—by, for example, eliminating duplicates of familiar species. Educated collectors would also be better equipped to look for the particular kinds of plants that Hooker needed to complete his surveys. He told Gunn that "you have collected so ably & well that there cannot be a large amount of Phaenogamic [i.e., flowering] plants yet to be discovered, & we have as many duplicates of most as we know what to do with, I would therefore beg particularly to call your attention to the smaller things & lower orders, which can only be collected well by obtaining a little practical knowledge of their structures" (J. D. Hooker to Gunn, October 1844: GC8).

Colonial herbaria were tools with which Hooker persuaded colonial collectors to adopt his collecting and classifying practices. They also served as local centers of calculation: as Kew's herbarium attracted a network of collectors, so colonial herbaria helped Hooker's correspondents build their own networks. As local networks and herbaria grew, local collectors sent Hooker plants from a wider geographical area—a highly desirable outcome for him. But the undesirable side effect was that colonial botanists might feel that they, too, ought to be able to classify and name, and to challenge Hooker's authority.

In Colenso's case, an interest in philosophical issues added to Hooker's problems. Hooker tried to discourage his colonial audience from "speculation" and hoped he was "inculcating caution on the future botanists of New Zealand; I have endeavored to make it clear to those who may read these remarks, that systematic botany is a far more difficult and important object than is generally supposed" (Hooker 1855:xxvi). These tensions are a reminder of the limitations of Latour's model if it is taken to imply a single cycle with a single center.

Nevertheless, despite the competition from colonial herbaria, the sheer size of Hooker's library of plants gave him the authority to

settle arguments and impose his view of species upon New Zealand's recalcitrant plants and botanists. However, Hooker's ability to "dominate" had its limits, and the plants and botanists resisted in different ways. The colonial relationship was more often one of negotiation than of straightforward domination.

Although Gunn and Colenso had somewhat different agendas, Hooker was obliged to bargain to get what he wanted. Hooker's needs were clear: he told Gunn that "I would have given the world for the specimens from Auckland Isld. you have" and "if you have any Magellan plants & would not object to lend them pray send them by the first opportunity," adding "you have little idea of the immense rarity of these things, I would give a guinea for a single carpel of the umbelliferous plant" (J. D. Hooker to Gunn, 13 May 1844: GC8). However, it is likely that both Gunn and Colenso had a pretty shrewd idea of the "immense rarity" of their specimens.

Colenso wanted Hooker's help in joining both the Linnean Society and the Royal Society, and his refusal to be fobbed off is evidence that he knew what his specimens were worth. Colenso first mentioned his desire to join the Linnean in a letter to Hooker in October 1863. He asked about the Royal Society as soon as the Linnean admitted him in 1865, mentioned the Royal again in 1869, and finally added the coveted "F.R.S." to his name in 1893 (Colenso to J. D. Hooker, 24 October 1863, 3 January 1865, 23 November 1869: KDC 174; Colenso to J. D. Hooker, 21 July 1893: HLR11). And when Hooker criticized the condition of a consignment of Colenso's plants, the latter responded that "Without doubt, had N.Z. not become colonized, and the writer of this been your only N.Z. collector, his specimens, whether old or young—moldy or imperfect—would have been more highly valued." He evidently understood the value of exclusive access to specimens and regretted losing it (Colenso to J. D. Hooker, 24 August 1854: KDC 174).

Because of the need to maintain his collecting networks, Hooker was only partly successful in restricting Colenso to a subordinate role. Colenso wanted to name his plants himself and to publish such names in a British scientific journal; when Hooker dis-

couraged him, Colenso published in a “local” journal, the *Transactions of the New Zealand Institute*. Hooker tried to head off this challenge to his authority through the adoption of what became known as the “Kew Rule.” In cases of synonymy (one species given two or more names), the customary practice was for the earliest name to be retained and the later one discarded. However, Hooker and Bentham decided that if the later name was the one that botanists commonly used, it should be retained; because commonly used names were usually those that were published in widely circulated European journals, names that had first been published in the colonies were invariably eliminated (Stevens 1991: 1997:355).

Although Hooker largely thwarted Colenso’s desire to name plants, he took steps to ensure that he did not offend the sometimes prickly colonial and so lose access to the specimens he needed. He named plants after Colenso—thirty species or genera in all (Hooker 1855:6, 156, 165, 288, t. 65 a)—and also named 42 species after Gunn. Hooker also helped Colenso get into both the Linnean and Royal Societies, despite misgivings, as he told James Hector, director of the New Zealand Colonial Museum, “I am bothered with *Colenso* who . . . wants *me* to get him *made* F.R.S. which I have no *power* to do. Of course I should be most happy to forward his views in this matter provided that we could make out a case, but I do not think that his claims are strong enough” (emphasis in original) (J. D. Hooker to James Hector, 27 January 1850; Yaldwyn and Hobbs 1998). Nevertheless, Hooker did help Colenso by describing the admission procedures and the need to get New Zealand-based fellows of the Royal Society to sponsor him (Colenso to J. D. Hooker, 11 September 1865, 22 January 1883, 15 June 1883: KDC 174). And Hooker also sent Colenso numerous gifts of books, journals, and personal photographs, all of which must have helped maintain good relations (letters in which Hooker is thanked for gifts include Colenso to J. D. Hooker, 3 January 1865, 11 January 1877, 24 July 1882, 22 January 1883, 7 January 1896: KDC 174).

In Gunn’s case, it is obvious from his complaints about Lindley and Gray’s lack of

reciprocity that he also understood what his specimens were worth; and he made similar complaints about Robert Brown and Richard Owen—demanding that both Joseph and William Hooker should help him obtain books from the unwilling British naturalists (Gunn to W. J. Hooker, 14 September 1834: Burns and Skemp 1961:39–40; Gunn to J. D. Hooker, 8 December 1843: KDC 218; Gunn to J. D. Hooker, 17 October 1844: KDC 218). Gunn’s agenda was somewhat different from Colenso’s: he was more willing to accept a subordinate scientific role. I have found only one letter in which Gunn suggested a name (Gunn to W. J. Hooker, 6 December 1843: Burns and Skemp 1961:96), although he did occasionally argue with Hooker about delimiting species (Gunn to J. D. Hooker, 28 May 1845: KDC 218; Gunn to J. D. Hooker, 20 August 1844: KDC 218). Gunn was also secretary to a local scientific society and published its journal, *The Tasmanian Journal of Natural Sciences*, but does not seem to have thought of publishing new names in it (Baulch 1961:xv–xviii). Nevertheless, he was as stubborn as Colenso in insisting that his specimens be paid for with the books that would help him improve himself and become a gentleman.

CONCLUSION

For those with an interest in botany, the isolation of the Antipodes was frequently compounded by a lack of companions who shared their interests—one of the circumstances that made correspondence so important. The need for contact, even at a distance, may have persuaded Colenso and Gunn to tolerate Hooker’s occasionally high-handed behavior. But it must be remembered that isolation affected Hooker as well. Although he had botanical friends and contacts all around him, he was cut off from the plants he wanted to work on and men like Gunn and Colenso were the only means by which he could obtain adequate substitutes. Hooker needed to maintain correspondence as much as they did. The result was not a one-way flow of plants or authority from periphery to center, but a complex negotiation in which each side

bartered its assets according to its interests (Endersby 2000:334; also see Chambers 1991, Barton 2000).

I suggest that an analysis that attends to individual actors' motives and intentions is a necessary complement to Latour's approach to cycles of accumulation. Such an analysis reminds us that Colenso, Gunn, and Hooker had many conflicting motivations. For example, the surviving letters between Hooker and Colenso (more than 80, spanning nearly 60 years of correspondence) reveal a genuinely warm friendship between Hooker and Colenso that continued long after Hooker had stopped working on New Zealand's plants and Colenso was too old to collect. The same warmth is evident in Gunn's letters, of which dozens survive. Even though each man knew what he wanted from the relationship, these

friendships cannot be reduced to self-interested attempts to maximize the value of one's botanical assets.

At the same time, Hooker's negotiations over plant naming, such as the acceptance or rejection of field characters, serve to remind us that the history of nineteenth-century botany is not reducible to a one-way power relationship in which metropolitan gentlemen overrule colonial collectors. And Latour's conception of science in its colonial context reminds us that the plants are essential (if often overlooked) characters in the colonial relationship. Uncovering and analyzing colonial actors' stories can help us see how their ambitions, their stubbornness, and their loneliness were as important as their taxonomic and collecting practices in shaping the history of nineteenth-century botany.

Literature Cited

Manuscript Sources

- Colenso, W. (1834–1841) *Glossarium Botanicum: Novae Zelandiae* (Manuscript [microfilm]: Mitchell Library, State Library of New South Wales, Sydney).
- Colenso, W. (1841–1852) *Botany of New Zealand manuscripts* (MSS: Royal Botanic Gardens, Kew, Richmond).
- CP4 *Colenso Papers* (1833–1881): vol. 4 (MSS Letters: Alexander Turnbull Library, Wellington).
- GC8 *Gunn Correspondence* (1833–1854): vol. 8 (MSS Letters [microfilm]: Mitchell Library, State Library of New South Wales, Sydney).
- HLR11 *Letters to J. D. Hooker* (1844–): vol. 11 (MSS Letters: Royal Botanic Gardens, Kew, Richmond).
- KCC 8 *Kew Collector's Correspondence* (1856): vol. 8 (MSS Letters: Royal Botanic Gardens, Kew, Richmond).
- KDC 73 *Kew Director's Correspondence* (1834–1851): vol. 73 (MSS Letters: Royal Botanic Gardens, Kew, Richmond).
- KDC 174 *Kew Director's Correspondence* (1854–1900): vol. 174 (MSS Letters: Royal Botanic Gardens, Kew, Richmond).
- KDC 218 *Kew Director's Correspondence* (1865–1900): vol. 218 (MSS Letters: Royal Botanic Gardens, Kew, Richmond).

Printed Sources

- Barton, R. 2000. Haast and the moa: Reversing the tyranny of distance. *Pac. Sci.* 54:251–263.
- Baulch, W. 1961. Ronald Campbell Gunn. In T. Burns and J. Skemp, eds. *Van Diemen's Land Correspondents: Letters from R. C. Gunn, R. W. Lawrence, Jorgen Jorgenson, Sir John Franklin and others to Sir William J. Hooker, 1827–1849*. *Rec. Queen Victoria Mus.* 14:xiii–xix.

- Bourdieu, P. 1977. *Outline of a theory of practice*. Cambridge University Press, Cambridge.
- . 1984. *Distinction: A social critique of the judgement of taste*. Routledge & Kegan Paul, London.
- Brockway, L. 1979. *Science and colonial expansion: The role of the British Royal Botanic Gardens*. Academic Press, New York.
- Brown, R. 1814. *General remarks, geographical and systematical, on the botany of Terra Australis*. William Bulmer and Co., London.
- Browne, E. J. 1979. *C. R. Darwin and J. D. Hooker: Episodes in the history of plant geography, 1840–1860*. Ph.D. thesis, Imperial College, University of London, London, U.K.
- Browne, J. 1980. *Darwin's botanical arithmetic and the "principle of divergence," 1854–1858*. *J. Hist. Biol.* 13 (1 [Spring]): 53–89.
- . 1983. *The secular ark: Studies in the history of biogeography*. Yale University Press, New Haven.
- Buchanan, A. 1990. *Ronald Campbell Gunn (1808–1881)*. Pages 179–192 in P. Short, ed. *A history of systematic botany in Australia*. Australian Systematic Botany Society, South Yarra, Victoria.
- Burns, T., and J. Skemp, eds. 1961. *Van Diemen's Land Correspondents: Letters from R. C. Gunn, R. W. Lawrence, Jorgen Jorgenson, Sir John Franklin and others to Sir William J. Hooker, 1827–1849*. *Rec. Queen Victoria Mus.* 14.
- Cawood, J. 1979. *The magnetic crusade: Science and politics in early Victorian Britain*. *Isis* 70:492–518.
- Chambers, D. W. 1991. *Does distance tyrannize science? Pages 19–38 in R. Home and S. Kohlstedt, eds. International science and national scientific identity: Australia between Britain and America*. Kluwer Academic Publishers, Dordrecht.
- Dettelbach, M. 1996. *Humboldtian science*. Pages 287–304 in N. Jardine, J. Secord, and E. Spary, eds. *Cultures of natural history*. Cambridge University Press, Cambridge.
- Endersby, J. 2000. *A garden enclosed: Botanical barter in Sydney, 1818–1839*. *Br. J. Hist. Sci.* 33 (118): 313–334.
- Hooker, J. D. 1847. *Flora Antarctica*. Vol. 1 of *Botany of the Antarctic voyage*. Reeve Brothers, London.
- . 1855. *Flora Novae-Zelandiae*. Vol. 2 of *Botany of the Antarctic voyage*. Lovell Reeve, London.
- . 1859. *Flora Tasmaniae*. Vol. 3 of *Botany of the Antarctic voyage*. Lovell Reeve, London.
- Huxley, L. 1918. *Life and letters of Joseph Dalton Hooker*. Vol. 1. John Murray, London.
- Koerner, L. 1996. *Carl Linnaeus in his time and place*. Pages 145–162 in N. Jardine, J. Secord, and E. Spary, eds. *Cultures of natural history*. Cambridge University Press, Cambridge.
- Latour, B. 1987. *Science in action: How to follow scientists and engineers through society*. Harvard University Press, Cambridge, Massachusetts.
- . 1988. *The Pasteurization of France*. Harvard University Press, Cambridge, Massachusetts.
- . 1999. *From fabrication to reality: Pasteur and his lactic acid ferment*. Pages 113–144 in B. Latour, Pandora's hope: *Essays on the reality of science studies*. Harvard University Press, Cambridge, Massachusetts.
- Mackay, D. 1990. *William Colenso*. Pages 87–89 in *The dictionary of New Zealand biography*. Vol. 1. Allen & Unwin, Wellington.
- MacLeod, R. 1987. *On visiting the Moving Metropolis*. Pages 1–15 in N. Reingold and M. Rothenberg, eds. *Scientific colonialism*. Smithsonian Institution Press, Washington, D.C.
- MacLeod, R., and P. F. Rehbock, eds. 1988. *Nature in its greatest extent: Western science in the Pacific*. University of Hawai'i Press, Honolulu.
- McCracken, D. 1997. *Gardens of empire: Botanical institutions of the Victorian British Empire*. Leicester University Press, London.
- McMinn, W. G. 1970. *Allan Cunningham*:

- Botanist and explorer. Melbourne University Press, Melbourne.
- Miller, D. P. 1996. Joseph Banks, empire and "centers of calculation" in late Hanoverian London. Pages 21–37 in D. P. Miller and P. H. Reill, eds. *Visions of empire: Voyages, botany, and representations of nature*. Cambridge University Press, Cambridge.
- Moore, J. 1997. Green gold: The riches of Baron Ferdinand von Mueller. *Hist. Rec. Aust. Sci.* 11 (3): 371–388.
- Pratt, M. L. 1992. *Imperial eyes: Travel writing and transculturation*. Routledge, London.
- Rehbock, P. 1983. The philosophical naturalists: Themes in early nineteenth-century British biology. University of Wisconsin Press, Madison.
- Secord, A. 1994. Corresponding interests—Artisans and gentlemen in 19th-century natural history. *Br. J. Hist. Sci.* 27 (95, pt 4): 383–408.
- Star, S. L., and J. R. Griesemer. 1989. Institutional ecology, "translations" and boundary objects: Amateurs and professionals in Berkeley's Museum of Vertebrate Zoology, 1907–39. *Soc. Stud. Sci.* 19:387–420.
- Stevens, P. F. 1991. George Bentham and the Kew Rule. Pages 157–168 in D. L. Hawksworth, ed. *Improving the stability of names: Needs and options*. Koeltz Scientific Books, Königstein.
- . 1994. *The development of biological systematics: Antoine-Laurent de Jussieu, nature, and the natural system*. Columbia University Press, New York.
- . 1997. J. D. Hooker, George Bentham, Asa Gray and Ferdinand Mueller on species limits in theory and practice: A mid-nineteenth-century debate and its repercussions. *Hist. Rec. Aust. Sci.* 11 (3): 345–370.
- Yaldwyn, J., and J. Hobbs, eds. 1998. *My Dear Hector: Letters from Joseph Dalton Hooker to James Hector 1862–1893*. Museum of New Zealand, Wellington (*Te Papa Tongarewa*).