

Joseph Hooker, Charles Knight,
and the Commissioning of New Zealand's
First Popular Flora:
Hooker's *Handbook of the New Zealand Flora*
(1864-1867)

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ABSTRACT: The *Handbook of the New Zealand Flora (1864-1867)* was commissioned from Joseph Hooker at Kew by the New Zealand Government at a cost of £600. The project was supported and closely monitored by Charles Knight, New Zealand's Auditor-General, who helped provide Hooker with the financial means for this major botanical undertaking. Begun in 1863, the work appeared in two volumes. The first, published in August 1864, dealt with the flowering plants and ferns, while the second volume (which appeared in 1867) covered bryophytes, algae, fungi and lichens, and provided a list of introduced plants as well as an index of Maori names for New Zealand plants. The circumstances leading to the production of the *Handbook* have not hitherto been published. The process is now documented from contemporary correspondence held in archives at Auckland, Kew (Royal Botanic Gardens), and Wellington.

KEYWORDS: Joseph Hooker, Charles Knight, *Handbook of the New Zealand Flora*, New Zealand botanical history

Introduction

The *Handbook of the New Zealand Flora* or, to give it its resoundingly full title *Handbook of the New Zealand Flora: a systematic description of the Native Plants of New Zealand and the Chatham, Kermadec's, Lord Auckland's, Campbell's, and Macquarrie's Islands*, appeared in two parts in 1864 and 1867. Presented in its 797 pages is an extraordinarily comprehensive overview of the flora of the New Zealand region that was unique for its time, and which has

never been attempted subsequently. A large work, "published under the authority of the Government of New Zealand" as the title page confidently proclaimed, it was written by perhaps the finest botanist of his age, Joseph Dalton Hooker (Simpson 1990), then deputy director of the Royal Botanic Gardens at Kew. For a small colonial government to commission one of the scientific world's most illustrious botanists to devote at least three years of his life to such a task was no mean achievement.

Although several modern flora accounts and monographs (e.g., Allan 1961, Fisher 1965, Raven & Raven 1976, Healy & Edgar 1980, Webb *et al.* 1988) acknowledge the historical importance of the *Handbook*¹, in reality today it is not often consulted and, unfortunately, tends to be neglected as a compendium of largely superseded information. However, it is much more than this. It had as its major purpose the dissemination of knowledge on New Zealand plants and fungi, and of the progress of botanical discovery to the New Zealand community at large, or at least to the educated book-buying public of New Zealand in the latter half of the 19th century. This was a time when active botanical exploration of this country was reaping new discoveries at a surprisingly rapid rate.

The *Handbook* represents an overview of New Zealand botany at the end of a century of European exploration. It put New Zealand botany on the map, both nationally and internationally, in a manner that was accessible and interesting to a wide audience who were clamorous for information on the natural history of the colonies. In addition, its historical value is enhanced by an appended list of the naturalised plants of New Zealand (for recent discussions on Hooker's views on indigenous and naturalised taxa in the New Zealand flora see Healy & Edgar 1980 and Webb *et al.* 1988), and an "Alphabetical list of Native and Vernacular Names".

In his Preface, Joseph Hooker wrote:

The desirability of publishing a compendious account of the plants of New Zealand having been represented to the Colonial Government by Dr Knight, F.L.S., Auditor-General, and other gentlemen interested in the Natural History of the Islands, and in the development of their resources, that Government was pleased to entrust me with the preparation of such a work, and to place at my disposal the necessary funds for its publication, including a liberal remuneration for my services. (Hooker 1864)

The circumstances leading to the writing and publication of Hooker's *Handbook* have never previously been adequately researched. It is therefore important to place on record the sequence of events leading to the production of this major work. In doing so, the present work focuses attention on sev-

eral areas of enquiry: (1) The British botanist Joseph Hooker (1817-1911) and his interest in the New Zealand flora and his contacts with New Zealand scientists and New Zealand science; (2) Kew's "Colonial Flora" initiative applied to a New Zealand setting; (3) New Zealand's Auditor-General, Charles Knight (1808-1891), an informed, persuasive and influential civil servant who acted as a catalyst and link between Hooker in England and the Colonial Government in New Zealand; (4) funding of the enterprise; (5) preparation and publication of the *Handbook*.

Joseph Hooker and New Zealand Botany

In 1863, when called upon to write the *Handbook*, Joseph Hooker was at the height of his powers as a systematic, and field botanist. He had successfully undertaken two arduous journeys in regions formerly cloaked in obscurity: firstly, the Antarctic Voyage of 1839-1843, under the command of James Clark Ross; and secondly, to north-eastern India in 1847-1851. From these two extensive ventures he had accumulated masses of detailed field data, including sketches and drawings. He had written letters, diaries and systematic botanical accounts for publication, making him one of the most profusely published botanists of his generation.

He was Assistant Director of the Royal Botanic Gardens at Kew and, in 1865, would succeed his father, Sir William Jackson Hooker, as director. He was a leading figure in British and European science, and his exhaustive and meticulous writings on Antarctic, Indian and Arctic floras had firmly established his reputation both as a taxonomic botanist and as a pioneer of plant geography (Turrill 1953). Indeed, his "Introductory Essay to the Flora of New Zealand" (Hooker 1853) is now widely recognised as one of the major foundations of historical biogeography (Humphries & Parenti 1986, Brundin 1988), with Lars Brundin going so far as to write "to do him full justice, Joseph D. Hooker has to be designated as the real founder of causal historical biogeography" (Brundin 1988: 343).

¹ Throughout this account the *Handbook of the New Zealand Flora* will be referred to as the *Handbook*.

That he was the best person available to write a New Zealand Flora there was no doubt. As a young man he briefly visited the Auckland Islands and Campbell Island towards the end of 1840 and, more importantly, he spent three months at the Bay of Islands in 1841 during his time as assistant-surgeon on *H.M.S. Erebus*, one of the two ships commanded by Sir James Clark Ross on the Antarctic Voyage of 1839-1843. On his return from that long voyage, Hooker worked at Kew on his massive six-volume work, *The Botany of the Antarctic Voyage*, (Hooker 1844-1859). This was a sumptuously illustrated account produced in parts over a period of 15 years and commissioned by the British Admiralty, who underwrote the costs of this extremely expensive undertaking. The central part of this large work was the two-volume *Flora Novae-Zelandiae* (Hooker 1852-1855) which dealt with all fungi and plants then known from New Zealand, prefaced by the "Introductory Essay" already alluded to. In this, Hooker summarised the history of botanical exploration in New Zealand and added two further chapters which are of lasting biogeographical significance viz, "On the limits of species; their dispersion and variation" (Hooker 1853: vii-xxvii); and "On the physiognomy and affinities of the New Zealand Flora" (Hooker 1853: xxvii-xxxix).

Hooker had available to him not only his own copious New Zealand and subantarctic island collections, but those of the Kew and British Museum herbaria, supplemented by resources of his father's library and other London collections such as the British Museum, The Royal Geographical Society, The Geological Society and the Linnean Society. Not long after his return from the Antarctic Voyage he visited Paris to study the extensive collections of plants brought back from French expeditions to the South Pacific, which were lodged in the Paris herbarium. He met the botanists researching these collections, notably the cryptogamist Camille Montagne and the wealthy ex-patriate Englishman Philip Barker Webb, an assiduous purchaser of herbaria [including the important Australian collections of La Billardière (Galloway 1988)]. He was thus in a singularly fortunate - and unrivalled - position to be able to undertake the writing of a New Zealand Flora.

In addition, Hooker regularly received New Zealand plant material from a growing network of New Zealand collectors who received warm encouragement for their endeavours (and sometimes publication) from Hooker and especially from his father, Sir William Jackson Hooker. In order to understand Joseph Hooker's place in New Zealand botany a little more clearly, we must recall his visit to the Bay of Islands in 1841, a visit in which he made his first observations on New Zealand plants, met William Colenso (Bagnall & Petersen 1948, McKay 1990), and botanised with Colenso and Andrew Sinclair (Molloy 1990).

In 1839, Joseph Hooker, aged 22 and recently graduated as MD from Glasgow University where his father was Professor of Botany, was appointed by the Admiralty to be assistant-surgeon on *H.M.S. Erebus*, under the command of Captain James Clark Ross. The Admiralty commissioned Ross to take the ships *Erebus* and *Terror* on an expedition to the southern oceans. The voyage lasted from September 1839 until September 1843, and three times penetrated deep into Antarctic waters, visiting Kerguelen, Tasmania, the Auckland Islands (20 November-12 December 1840), Campbell Island (13 December-17 December 1840), the Bay of Islands New Zealand, the Falkland Islands and Hermite Island near Cape Horn (Godley 1965, Galloway 1985b).

On 18 August 1841, the expedition reached New Zealand from Tasmania, Hooker noting in his journal² for that day "Having lay to all night this morning the ship's head was put towards the land and though the weather was thick by 9 A.M. we had land on both beams consisting of rocky bare capes and bearing up we saw into the Bay of Islands with thick and very squally weather tremendous rain and violent gusts of wind so that we could see very little of the country" (Hooker 1849-1843). The following morning a south-west wind dispersed the morning mists and Hooker landed to meet William Colenso (1811-1819), the Church Missionary Society resident (Mackay 1990) who had, since 1834, sent plants to Hooker's father in Glasgow.

A canoe coming along side we with some difficulty rendered a wish to be landed intelligible to a tattooed gentleman...squatting in the bottom we reached the shore in safety though we rather overloaded the little craft which sped with fleetness over the bay. Landing on the W

²Quotations from Hooker's Antarctic Journal are exactly as they appear as written, and no correction of spelling has been made, punctuation added, or ordering into paragraphs.

shore of the bay we started for Paihia the missionary settlement where I had a letter to deliver to Mr Colenso *[sic]* the printer to the Establishment from Capt. King... Sandflies were very abundant and annoying they were small black flies that settle in swarms especially on the hands where after sucking their fill of blood they fly away leaving the spot of blood flowing.... The plant on the beach was the *Salicornia indica* [= *Salicornia australis* Sol. ex Benth.] growing on the rocks within highwater mark but the specimens were small. Above this and at the foot of the cliff were the *Metrosideros tomentosa* [= *Metrosideros excelsa* Sol. ex Gaertn.] and *Myoporum laetum* the former a very fine tree coming into flower which like the Auckland Island one [*Metrosideros umbellata*] has the flowers terminal and the bark furnished with large tufts of pendent schizomata. The bark is whitish the leaves deep green with tomentose undersides its whole habit was that of the southern one mentioned and they doubtless form a separate genus perhaps peculiar to these islands. Among the brushwood a pretty *Leptospermum* with white flowers is very common and beautiful. Turning sharp round a rocky point after a miles walk we suddenly opened Paihia bay and were much struck with the beauty of the spot. Above a long sandy beach on which a long surf was rolling in a beautiful curve of about 1/4 mile round were some pretty white and brick cottages hemmed in with gardens and a long low wooden breakwater opposite the water and backed by some swelling wooded hills and valleys; the spot was retired in the extreme and shut out from all publicity.... Asking from Mr Colenso's from an intelligent native we were directed to a square brick one storied cottage with a high roof in which was the printing establishment as well as the owner's dwelling. Entering the printing establishment I was surprised to find how complete all the arrangements were - they seemed all very busy and the sheets of native language well struck off and ready to be dried emitted a smell strongly reminding me of the time when in going backwards and forwards to School I was wont to act as printers devil to my Father. In the sitting room was a portrait of poor Allan Cunningham and a pretty *Zinc tree* in a bottle as also some of my father's Botanical works on a table - Mr Colenso received us very kindly and talked of some fine collections he had sent home and of the gratification this immediate acknowledgement gave him from Glasgow as also of Bidwill and Lady Franklin's visit.... In his little garden I saw the *Corynocarpus*, *Clianthus puniceus*; *Thebymitra Forsteri*, a little *Celmisia* from the southward - the *Phormium tenax* a curious fan shaped variety of it with striped leaves like gardener's garters and a new species of the same genus. A double sweet violet pleased me beyond anything not having seen the flowers since leaving home.... From his house we went to

look at the Church a very neat low square whitewashed building with benches, clean wood floor - pulpit and organ complete; it is generally well filled with about 100 natives who attend English service in the morning and Native in the afternoon. Some small horses in the neighbourhood seemed of a good breed and I was told they were Chilian."(Hooker 1839-1843)

Hooker spent many days in the field in Colenso's company over the succeeding weeks and encouraged a lively spirit of botanical enquiry which was to last throughout Colenso's life and a rich 50 years of botanical correspondence (Bagnall & Petersen 1948, Mackay 1990). Late in October, the Scot Andrew Sinclair (Molloy 1990) arrived and joined Hooker and Colenso on their botanical excursions. Hooker wrote of this to his father at Kew:

About a fortnight after the receipt of the letters, Dr Sinclair himself arrived in the *Favourite*, and right glad I was to find some one who could, viva voce, give me particulars of my friends. I have enjoyed his company extremely; though a homely thoroughbred Scotchman, he is one of great shrewdness and who has given me a great deal of information - of you he speaks in the most grateful of terms and likes to talk over all he said and saw with you and especially the new house near Kew, its comforts and beauties.... During his stay here I have given him as good a drilling as I could into the Botany of this part of the Island, so that he may collect to more advantage in others, his eye for plants is however not at all good, he can work very hard though, and is most anxious to do all he can for you especially. (Hooker 1841)

Several months after leaving New Zealand, Hooker wrote again to his father from an anchorage in the Falkland Islands, giving him some rather direct and honest opinions of personalities in New Zealand:

Mr Swainson [Galloway 1978, Swainson & Natusch 1987] I did not see in New Zealand, but I wrote to him. He has made a bad choice in coming out. Of all wretched colonies New Zealand is the worst, and of all the Departments of it, the New Zealand Company is the lowest. The soil is generally bad nor does any one of the three islands afford half the facilities for colonization afforded by Australia or V. Diemen's Land.... Poor Swainson I cannot but look upon him as a ruined man, though I heard no news of him.... As a class the Missionaries are the only good immigrants, though they do feather their nests rather too well considering their

calling. Our excellent friend Mr Colenso is indeed an ornament to the cause he has devoted himself to. Though only a printer to the *Church Missionary Society*, he is more useful than any two others; perfectly indefatigable, both among the heathen, and his own countrymen. With only a paltry pittance of a salary, he refuses to make another farthing, either by land or by selling fresh Beef and Poultry, by which means (Mr Williams at their head) most of his brethren realize, by their extravagant prices, very handsome profits from the shipping. Williams supplied both our ships with Beef every day, at 8d per lb, (!) but never asked one of us to his house; never offered to preach, even once on board: nor so much as sent a goose or a fowl for the Mess. All these Colenso did - giving us fresh eggs - and milk whenever we liked to send for it, from his only cow. Before we sailed, he started for the East Cape (where he will get some glorious specimens for you). As a parting gift, he sent me some Porter and Wine, with a most affectionate letter; the former were, I am sure, the whole contents of his cellar. Every evening which I spent with him whether at his own house or in the country he alluded to my circumstances and to the late afflictions to our family in his prayers. In this, if for nothing else - I could never forget him. (Hooker 1842)

Joseph Hooker's influence on the subsequent botanical exploration of New Zealand cannot be overestimated, for he provided a direct and personal link between the few, isolated plant collectors in New Zealand, and the wider botanical and scientific world of which the Royal Botanic Gardens at Kew was such a centre and focus. Between his visit to the Bay of Islands in 1841 and the publication of his *Flora Novae-Zelandiae* (Hooker 1852-1855), Hooker continuously encouraged local collectors in their endeavours by regularly sending them letters, making identifications and generally passing on news and information. All this allowed local collectors to make useful collections and observations in various parts of the country, all of which added greatly to the known flora of New Zealand. This local contribution he summarised thus in the "Introductory Essay":

It is however within the last twelve years, and since New Zealand has attracted the notice of colonists, that the most important accessions to its botany have been made, and it is to correspondents, most of them still alive, and actively engaged in pursuing their investigations, that I am

indebted for the materials of these volumes. The Reverend William Colenso, Dr Andrew Sinclair, R.N., my lamented friend J.T. Bidwill Esq., Dr Dieffenbach, M. Raoul, and Dr Lyall, stand pre-eminent as indefatigable explorers and collectors. Mr Colenso's researches have extended uninterruptedly over upwards of twelve years, during which he has traversed a great part both of the coast and interior of the Northern Island, and has been the principal contributor to our knowledge of its botany. Dr Sinclair has also devoted many years to the New Zealand flora, and has made numerous most interesting discoveries, most valuable for botanical purposes. Mr Bidwill and Dr Dieffenbach were the first explorers of the lofty mountains of the interior: Mr Bidwill ascended both Tongariro and the Nelson range, and formed collections of the greatest interest and value, accompanied by valuable notes on the elevations at which the plants were gathered, their variations, periods of flowering, and many other important points...Within the last three years, indeed since the announcement of this work being forthcoming, I have been favoured with more than a dozen collections from various parts of the island. Of new gleaners in the field I would especially mention Dr. Monro, Mr. Knight, the Rev. Mr. Taylor, Captain Drury, Mr. Jolliffe, Captain D. Rough, and Lieutenant-Colonel Bolton; all of whom have sent valuable contributions. It is true that these contain little novelty, but they throw light on the distribution of the species, and afford materials for tracing their geographical limits. (Hooker 1853)

With the publication of the *Botany of the Antarctic Voyage*, comprising *Flora Antarctica* (Hooker 1844-1847: published in 25 instalments between 1 June 1844 and 2 October 1847); *Flora Novae-Zelandiae* (Hooker 1852-1855: published in eight instalments between 10 June 1852 and 9 February 1855) and *Flora Tasmaniae* (Hooker 1855-1860: published in 11 instalments between 24 October 1855 and 29 December 1859) a whole new area of South Pacific botany was opened up. The sheer cost of such an extravagantly produced set of books, however, precluded all but the most wealthy from owning copies, although Lovell Reeve, the London publisher, also printed the work in parts as the various sections came to hand (Stafleu 1965, Stafleu & Cowan 1979 - see above). Even so, copies of *Flora Novae-Zelandiae* were available to very few New Zealanders and quite beyond the reach of the growing number of settlers and colonists who had

strong natural history inclinations and who would have been interested in learning more of the vegetation of their new land. What was needed was a cheap, widely available distillation of the *Flora Novae-Zelandiae* and, interestingly enough, the Director of Kew, Sir William Jackson Hooker, had exactly this sort of thing in mind when he began promoting the idea of Colonial Floras.

Colonial Floras

In 1861 William Hooker made a proposal to the Secretary of State for the Colonies:

...to procure a series of good but inexpensive, scientific works on the vegetable productions of the British Colonies....It is true that the Botany of several other colonies has been published, including some of the more important, as that of British America, 30 years ago, in the *Flora Boreali-Americana*, and more recently of Tasmania, New Zealand and the Falkland Islands, in the *Botany of Sir James Ross's Antarctic Voyage*, but these are all of them very expensive, illustrated, quarto works, too cumbrous and costly for the traveller, colonist, or man of science, and too scientific for general use; moreover they were not projected exclusively or primarily for the benefit of the colonies, but were ordered for publication by Government, on the recommendation of the Admiralty or Colonial Office, as national contributions to abstract science, and appendages to costly scientific expeditions, whose results, in discoveries and collections, reflected honour on the country that sent them forth. (Hooker 1861)

William Hooker suggested that regional floras should comply with a number of conditions that he had drawn up at Kew after consulting with several botanical colleagues, and cited *Flora honkongensis* (Bentham 1861) as a suitable model. The colonial floras were to include: South Africa, Australia, Canada, the West Indies, New Zealand, Ceylon, Hong Kong, Mauritius and the Seychelles, British Guiana, Honduras, the West African colonies, Ionian Islands, Malta, Gibraltar, Ascension, St Helena and Tristan d'Acunha. Heligoland, the Falkland Islands and Labuan were not included. This grandiose scheme was hoped originally to equal, if not surpass, Claudio Gay's botanical volumes of his monumental *Historia fisica y politica de Chile* (Gay 1845-1854). W.J. Hooker proposed that descriptions were to be in English and accompanied by a select synonymy with reference to works already pub-

lished, together with an account of the range of each species both in the region and beyond, and an indication of economic value. Further:

...a short compendium of Systematic and Descriptive Botany, including a Glossary of necessary technical terms, for the instruction of the Colonists, as well as for the guidance of the authors, will be issued with each Flora and be applicable to them all....On the completion of each Flora a brief introduction is to be appended by each author, and to contain a full acknowledgement of the kind and amount of assistance received during its preparation; an abstract of the labours of previous authors on that Flora; a notice of the principal collectors who have explored the Colony, and of the parts of it most requiring further examination. (Hooker 1861)

Sir William assumed that all of the Colonial Floras "could easily be comprised in 30, 8vo volumes of about 500 pages each, and the total cost to Government would be only £150 per volume, without plates, and £200 with plates, the price to the public would be 15s to 20s each volume without plates, and 20s to 25s with plates" (Hooker 1861). New Zealand was, within the space of four years, to help turn part of this imperialist plan of Sir William Hooker's into a concrete reality, with Dr Joseph Hooker writing the text to a New Zealand Colonial Flora supported by a grant sanctioned by the Colonial Government. This required considerable manoeuvring from the New Zealand end, and the official who provided the project's momentum, and who smoothed Hooker's path politically and financially - indeed the "enabler" of the whole project - was New Zealand's Auditor-General, Charles Knight FRCS. Since Knight is, alas, still something of a shadowy figure in published records of New Zealand colonial history, it is appropriate here to record some brief details of his life and work.

Charles Knight, Civil Servant and Botanist

Charles Knight was born in 1808 at Rye in Sussex, the youngest child of James Knight, who died the same year. In 1810, his mother married Thomas Godfrey of Hawkhurst, Kent (Scholefield 1940, Foster 1966). In October 1828, Knight enrolled at University College London, attending classes (1828-1830)

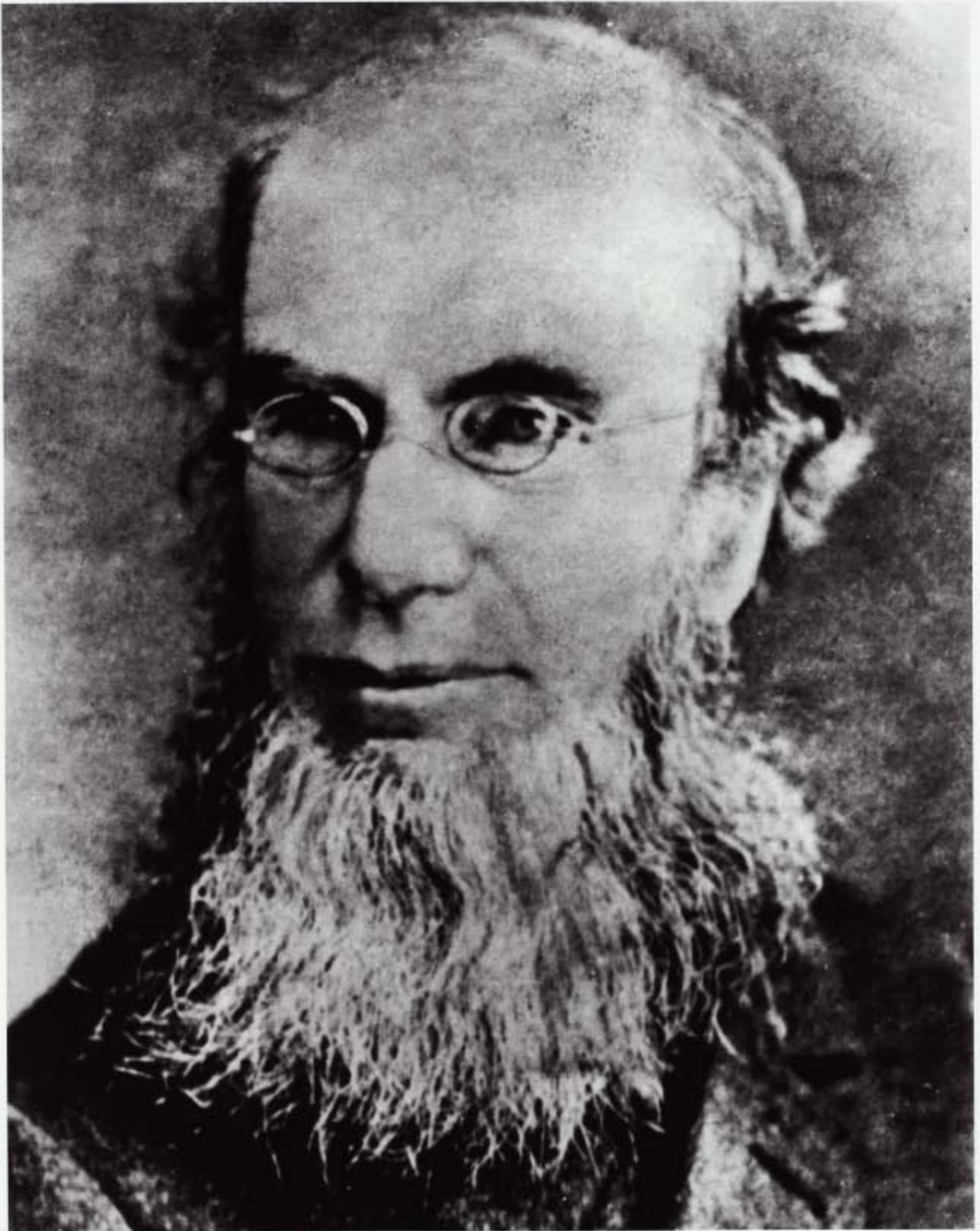


Figure 1: Dr Charles Knight FRCS

Botany Department Collection, Museum of New Zealand Te Papa Tongarewa

in midwifery, anatomy and dissection, physiology, surgery, chemistry, botany, materia medica and nature and treatment (University College, London, Library Records), residing at 92 Holborn Hill. There is no record of Knight having attended either Guy's or St Thomas's Hospitals. He gained Membership of the Royal College of Surgeons in 1840 and became FRCS in 1869 (Library Records, Royal College of Surgeons, London). Between 1830 and 1841 little is known of Knight except that he practised in the United States (Scholefield 1940).

Early in 1841 Knight left England as surgeon of the *Lord Glenelg*, the ship taking Captain (later Sir) George Grey and his wife to Adelaide, where Grey was to be Governor of South Australia. Writing to his father-in-law on his arrival in Adelaide, Knight gives a lively account of the difficulties encountered with the captain of the ship during the latter part of the voyage:

It is impossible to express the mixed feelings with which I sit down to write to my dear friends at Hawkhurst; one's mind is filled with so many doubts, for how can I tell whether you are well or ill, in trouble or prosperity - I trust in Providence that you are in good health and happiness, and I hope you do not forget me. I know that you will be delighted to hear that *so far* I have done well, and that Capt'n. Grey and his lady are most kind to me. Capt'n. Grey wrote me a very complimentary note in which he expressed how much he was indebted to my kindness and attention to Mrs. Grey - I have every reason to believe I am in high favour with him, and that he will take advantage of the first opportunity to assist me - I have been two days in Adelaide: I am delighted with the country and full of hopes, with little however to justify them - The climate is so invigorating that one hopes with only a shilling in one's pocket: and pleased when we know not why....At present I will give you a brief outline of the extraordinary proceedings on board the *Lord Glenelg* with the History of my singular metamorphosis from Surgeon into Captain of that vessel and how I navigated her from King George's Sound to this port in perfect safety. - My last letter informed you of my safe passage of the Line and the mutinous state of the crew - Soon after that our Captain became a most shocking drunkard and was at last perfectly incapable of taking charge of the vessel, so that the safety of the vessel and our lives were endangered by his drunkenness and gross misconduct. (Knight 1841)

The Captain's continuing drunkenness became so outrageous that the ship's Mate applied to Knight for a certificate as to the Captain's competency to take charge of the vessel. Knight, naturally enough, declared the Captain to be wholly incompetent and he was forcibly restrained in his cabin just before the ship reached St George's Sound and the town of Albany. Knight continues:

Here Captain Orr gave up the vessel to me - After eating all the fresh provisions in the place; getting tired of kangaroo soup, and quite familiar with the natives, we bade adieu to our kind host and put to sea again. - Our voyage to Adelaide was now everything that one could desire; The Governor and the passengers had the most perfect confidence in their new Captain (hem!) the weather was delightful and we made Kangaroo Island in splendid style.... I have called on him [Governor Grey] twice since his sojourn at the Government House, and received many acknowledgments of his being much indebted to me both in my capacity of surgeon and Captain! William Knight [Charles Knight's brother, who had preceded him to Australia] is doing well; is highly respected and everybody says will *eventually* be a rich man - I leave off here with prayer for your health and happiness, and with the comfort of knowing that my conduct on the voyage has been such as to command the warmest praise of all on board and of the agents here at Adelaide, and that you will derive some pleasure from this assurance. (Knight 1841)

Knight was employed by Grey as a copying clerk, and in 1843 was in the Private Secretary's Office, Grey informing him by letter "[you] are to be allowed to draw the Salary of £200 a year which is allotted by the Estimates to the Clerk in that Department. I am happy to avail myself of this opportunity of expressing my sense of the cheerful and unwearying industry with which you have for the last two years discharged your duties, the nature of which has necessarily thrown you into the most frequent and confidential intercourse with myself, and thus afforded me full opportunity of observing and appreciating your merits" (Grey 1843).

He married Caroline Symes in 1844, by whom he had two sons and three daughters. In November 1845, Grey became Governor of New Zealand and brought Knight to Auckland where he was made Auditor-General in February 1846 and, in 1856, manager of the Colonial Bank of Issue. In 1858, he was ap-

pointed Auditor of Public Accounts, his office "a patent one; so that I can devote all my *own* time to favourite pursuits without anxiety for the future" (Knight 1859). In 1861, Knight was in charge of meteorological observations, setting up 10 met stations between Foveaux Strait and Mangonui (Knight 1861b, 1875; de Lisle 1984) and, in the same year, he was appointed to receive Petitions for Letters Patent. In 1863, he was appointed Commissioner to investigate Claims to Flax Rewards. In 1865, he was appointed Examiner of Southland Provincial Debts; and he chaired a commission which resolved that the Meteorological Department be transferred from Knight's control to James Hector of the Geological Survey (de Lisle 1984). Knight remained in Auckland as General Government Agent until mid-1865 when he moved to Wellington, his salary of £600 passed by an Audit Bill with only Colenso dissenting (Galloway 1990). In 1866, he was appointed Civil Service Commissioner and to the Loan Allocation Commission, and in 1867 he was appointed Trustee of the Post Office Savings Bank. In 1868-1869, he visited England with Grey and Australia with Vogel to negotiate a mail and customs agreement. In 1868, he was appointed a member of the Medical Board. Knight's love of exact measurement and an inexhaustible appetite for routine made him a widely respected civil servant, and he was on close personal terms with the major public and political figures of his day.

Being such an influential figure, Knight had enemies in the House, among them Henry Sewell (1807-1879) who wrote of Knight in his Journal for 2 October 1855:

Amongst the (incapable) men who form the present Executive, one has a modicum of brains more than the rest, Dr Knight, the (socalled) Auditor General. (By the bye let me record a pun I made upon him. He used to be in the habit of finding out, noting, objecting to, and then auditing in his Account all Sir George Grey's financial illegalities, which I said was according to the Rhadamanthian rule *Castigatque, auditque dolos* ['Chastises and listens to their crimes' - Virgil, *Aeneid*, vi. 567]. He was Surgeon on board the Ship which brought Sir George out, and became a protégé of his.) It is supposed that he has been the secret moving spring of much of the political machinery of the Colony - at all events he has had the sole command of the Finance. (Sewell 1980, Vol. 2: 186)

Besides his official duties and appointments, Knight was a dedicated botanist, his botanical work being done each morning before breakfast. Between 1860 and 1884, he published 16 papers on lichens, two on mosses, and one each in zoology and palaeontology (Galloway 1990). He was proposed for fellowship of the Linnean Society of London by Joseph Hooker on May 5 1857, the nomination reading as follows:

Charles Knight Esq, Auditor General of the Colony of New Zealand, a gentleman and strongly attached to the pursuit of Natural History, and distinguished for his successful researches in the Cryptogamic Botany of that Region, being desirous of becoming a Fellow of the Linnean Society, we the undersigned do of our personal knowledge recommend him as being eminently worthy of that honour; & likely to become a useful and valuable member. (Linnean Society Archives)

Hooker's fellow proposers were W.J. Hooker and Andrew Sinclair. On the ballot of 19 November 1857, he was elected to the Fellowship. He was appointed governor of the New Zealand Institute for three terms, in 1869, 1872 and 1875, and he was president of the Wellington Philosophical Society for 1873-1874, his Presidential Address for 1874 being published (Knight 1875).

Knight retired in 1878 and devoted himself to woodwork - he was an expert craftsman with the lathe - and to lichens. James Edward Fitzgerald, the first Superintendent of Canterbury and Knight's successor as Auditor-General attests to Knight's financial probity, writing on Knight's retirement:

I cannot allow our official friendship to cease, without writing to express my great regret at your retirement, or without thanking you very sincerely for the kindness and courtesy with which our intercourse has been marked, on your side.

I am painfully conscious of an impetuosity of temper which sometimes gives offence, and am therefore the more indebted to any one who, like yourself has perceived that unkindness or discourtesy was never intended. I hope you may yet live many years to enjoy the pension (small as it is) which you have worked for so long and so faithfully - and the world at large may benefit by your relief from office work, by the time it will afford you to devote to service. (Fitzgerald 1878)

Knight visited Australia three times, in 1881, 1883 and 1884, collecting lichens and also publishing his results. Using his strong political and scientific contacts, Knight promoted New Zealand botany with vigour and determination. In 1877, he despatched to Prof Jean Müller Argoviensis of Geneva a case of between 300 and 400 lichens that he had collected from Queensland, New South Wales and Victoria, and in 1878 he wrote "I shall next take up the Tasmanian lichens, and hope from time to time to send you further gatherings of Australian Lichens." (Müller Argoviensis Correspondence. Archives, Conservatoire et Jardin Botanique, Geneva. 2 March, 1887), at 80 his interest still undiminished. He died at his residence on The Terrace on 3 September 1891, aged 83, and was buried in Bolton Street Cemetery on 4 September 1891 (Galloway 1990).

Knight's extensive lichen herbarium (which contains many important European exsiccatae in near mint condition) plus his library of lichen books and collection of bound reprints were bequeathed by Knight's widow to the Biology Department of Victoria University College. His books are now in the Victoria University Library, and his reprint collection in the library of the former Botany Division, DSIR. (now Landcare Research New Zealand Ltd). The lichen collection was transferred to the Dominion Museum (now the Museum of New Zealand Te Papa Tongarewa) in August 1939, and is one of the major cryptogamic collections held by the museum. Knight also exchanged New Zealand lichens with many overseas lichenologists, and his New Zealand collections are found in a wide variety of museums and herbaria including the Natural History Museum, London, and in collections in Budapest, Edinburgh, Geneva, Genoa, Helsinki, Kiel, Lund, Melbourne, Munich, Paris, Stockholm, Turku, Uppsala, Vienna, Wroclaw and Zurich (Galloway 1985).

Charles Knight, Joseph Hooker and the *Handbook*

On 28 September 1852, Knight wrote a letter to Sir George Grey which was to have consequences both for Knight's development as a botanist, as well as for the progress of cryptogamic botany in New Zealand,

at that time pretty well a closed book to local investigators. Although both William Colenso and Andrew Sinclair, the Colonial Secretary, collected mosses and hepatics for the Hookers at Kew, it was to be Knight who would make the first long, detailed study of a New Zealand cryptogamic group (the lichens), publishing papers on his researches, accumulating a library of relevant books and papers, subscribing to European exsiccatae, and forming an extensive personal herbarium. While lichens were to be Knight's eventual field of study, it was the mosses which first aroused his interest, as his letter to Grey shows:

An emulative desire to try my strength, led me to investigate the mosses of New Zealand. I have very imperfect reasons for doing so, my microscope being imperfect, and useless for dissecting purposes. I send herewith a few tracings of the results, I do not know whether they are worth transmitting to the Hookers at a time when they are preparing under authority a complete descriptive work on the Botany of New Zealand; but if your Excellency is of the opinion that they are worth the trouble of transmission to Europe, I beg you would do me the honour of transmitting them. The idea only occurred to me a few days since; so that I had no time to complete anything other than slight tracings of my drawings....The microscope used in the preparation of the original drawings is of a very inferior description....I shall await the receipt of one of Smith & Beck's dissecting microscopes before proceeding in these investigations. (Knight 1852)

Grey duly sent off Knight's specimens with their drawings to Kew, and thus was Knight made known to the director and his deputy at the Royal Botanic Gardens; as it transpired, a very effective introduction. In his reply to Governor Grey, Sir William Hooker (himself a skilful botanical artist, especially with mosses) waxed enthusiastic about Knight's drawings:

I cannot tell your Excellency how much I am obliged to you and Dr Knight for the beautiful packet of Mosses, accompanied by the truly excellent drawings of that gentleman. They came too just in the nick of time, when Dr Hooker is preparing the Cryptogamic portion of his *Flora Novae Zelandiae* for the press.

I do not think that we have in England (at least I am sure I am not that person though I have dabbled a good deal in Mosses) who could observe so well with the

microscope and draw what he sees as Dr Knight. They are the very perfection of Cryptogamic Botany and the young Colony may well be proud of such a man of science and such an artist. He will I am sure continue his researches and kindly communicate with me or with Dr Hooker (for tis one and the same) portions of his discoveries. But I write to him myself, and venture to send him a Book where some of the earliest discovered New Zealand mosses (those found by Menzies in Vancouver's Voyage) [see Galloway & Groves 1987, Galloway 1995] were figured. (Hooker 1853)

Knight eagerly responded to this positive and constructive encouragement from Sir William Hooker:

An unexpected opportunity of enclosing a letter to you offering itself this morning, I made a few tracings of Mosses collected a fortnight since on the island of Kawhau - if new I trust they will arrive in time for Dr Hooker's interesting work....This was my first dissection with a new achromatic dissecting microscope of Beck and Smith, sent out to me - this admirable instrument has opened a new world to me - I may truly be said to have been working hitherto in the dark. (Knight 1853a)

At the end of 1853, Governor Grey was about to visit Britain and would take further cryptogamic drawings from Knight to the Hookers at Kew. Knight wrote again to Sir William Hooker:

You will see by the accompanying sketches that I have been busily engaged on the Hepaticae. I have had to collect and work at the drawings contemporaneously, so that what with my anxiety to do as much as possible before Sir George leaves for England, and my own official duties, I have not allowed myself sufficient time to arrange and complete what I have undertaken. I find on looking over the drawings many deficiencies and imperfections, indeed when I commenced on the Hepaticae about two months since, I did not even know what to search for in my dissections... You must make large allowances for a student entirely cut off from systematic works on the subject of his pursuits, and often without any clue to the characters. (Knight 1853b)

Sir William wrote Governor Grey and commented thus on Knight's work on mosses:

I have examined the Drawings & read the letters relating to them, of Dr Knight, with very great interest. Many of

these Mosses &c. ought to be published, if it can be managed: but the small sale for such productions, & the cost of engraving, or lithographing is so great, that it will require much consideration. But I shall write him very soon on this subject, Many of the species are recently engraved for Dr Hooker's Flora, & this could not be done but by Govt (in this case Admiralty) *aid*. Now why should not Dr Knight prepare a supplement of his new species? & why should not the Col. Office give £100 towards the publication? & it might be done. (Hooker 1854)

Thus, within two short years, Knight was mentioned as a moss collector in Joseph Hooker's *Flora Novae-Zelandiae*, accepted as a correspondent by Sir William Hooker and was about to begin a long correspondence with Dr Joseph Hooker. He had also entertained the botanist William Henry Harvey, a great friend of both Sir William and of Joseph Hooker, when Harvey visited Auckland in 1855. Indeed, Harvey remarked in a letter to his sister written on 5 July 1855, "I have also found a fellow worker in Mr Knight (Auditor Genl.) who has a fine microscope & is an excellent draughtsman and is to send me drawings and specimens of the smaller algae" (Ducker 1988).

Knight's first letter to Joseph Hooker was written in 1856 and documents the beginning of his (Knight's) interest in lichens. Although appropriately respectful in tone, Knight was not above robustly defending himself against Hooker's suggestion that, at age 48, Knight was possibly a little too old for taking on such a difficult group:

I have received your kind letter of 15th March 1855 and shall bear in mind the necessity of great care in working with the compound microscope and shall neglect no precaution to guard against similar deceptions. I had obstinately persevered in my botanical studies when I was overwhelmed as I still am, with official work consequent on the introduction of responsible government in New Zealand....I am not quite certain that you are correct in your opinion that hair splitting and species mongering is owing as you state to a deficiency of early education in 'Natural History as with all studies taken up late in life'. What is meant by 'late in life' I don't exactly know; but if you mean that when the intellect is sharpened by the work of years and when its tendency is to *doubt*, that it is then least fitted for original and new investigations then I believe you are mistaken. But I see clearly that it takes necessarily a long time to become acquainted with the

facts of natural history, and while ignorant of them, you cannot generalise, and are likely to attach undue value to minute differences but those are the fault of the young; not of the tried and practiced intellect that knows where and how to find errors. Even those who have given the better part of their lives to a particular pursuit have a strong love for species making. (Knight 1856)

In 1860, five years after the complete publication of *Flora Novae-Zelandiae*, it was obviously in Joseph Hooker's mind that a more popular account of New Zealand's plants might be written. While informing Hooker of the New Zealand Government's rather slow decision to make a grant for defraying some of Hooker's expenses involved in writing *Flora Novae-Zelandiae*, Knight mentioned having seen a letter that Hooker wrote to Dr Andrew Sinclair, suggesting that a more popular account of New Zealand's plants might be produced.

It is now nearly four years since Mr Archer's letter on the subject of compensation being made you for the heavy expenses you incurred on the New Zealand Flora [i.e. *Flora Novae-Zelandiae*], was laid on the Table of the House of Representatives; - no one took an interest in the matter; - Dr Munro [*sic* Monro] was not a member of the House; - and nothing was done. At that time I was myself being persecuted by a party in the House; I was a friend of Sir George Grey and not to be endured. Mr Archer's letter I had not seen; I had not even heard of it until a few weeks since. As soon as I heard of it I called attention to the fact that nothing had yet been done about the letter; and that on the ground of mere courtesy some notice should be taken of it. I am now in a different position; I have outlived the spite of a discontented faction; the General Assembly has passed a law making the office of Auditor a patent one and your claim would not now suffer by my taking an active interest in it.

I have this moment seen Mr Stafford [for a recent biography of Stafford see Bohan (1994)] our 'prime minister' and he promises to place a sum of £150 on the Estimates for next year. With this I am content, because through Dr Munro and others an amendment can be introduced increasing the amount to something more nearly equivalent to your extra expenses on account of the flora. I have debated with myself whether I ought to write to you on this matter. Nothing is more uncertain than the fate of a money vote for 'extraordinary services'; but I do in this case as I would like to be done by; - it is at least satisfactory that the present ministry recognize your services, and understand how much we are indebted to you.

Sinclair shew'd me your letter in which you allude to a popular work on the Flora of New Zealand. I did not tell him what I am doing with the Government; but I discouraged any application to the Government based on new labours to be undertaken by you. The old score should be cleared off, before we begin a new one. My own ideas about the new publication are - that you should prepare a work in English and you should supply one complete set of dried plants for the colony for £300. That you should offer to prepare as many more sets as might be desired not exceeding the number of provinces in New Zealand for each of which twelve guineas or whatever you think a proper sum should be given; and I would *con amore* assist in collecting such plants as you might need to complete the sets. (Knight 1860a)

Later in the year Knight wrote again to Hooker, telling him of the £200 which the New Zealand Government proposed to grant Hooker for his work on *Flora Novae-Zelandiae*:

Until the Act of Appropriation for the year 1860-1861 has passed the grant cannot be issued. The Act will receive the confirmation of the Governor in about a week, when I suppose the Government will communicate with you on the subject. It is principally owing to Dr Munro's exertions that the larger grant was obtained. I am sure you will concur with us that under the present circumstances of the colony the grant, as an acknowledgment of your services is satisfactory. I am quite certain that nothing but the strong impression of the obligations the colony is under to you for your Flora could have carried the vote at a time of such general depression and trouble. (Knight 1860b)

As Knight surmised, the New Zealand Government through the Premier, E.W. Stafford, communicated with Joseph Hooker on the vote in his favour:

It affords me very great pleasure to inform you that the New Zealand Legislature, in its recent Session, voted the sum of Two Hundred Pounds as a testimonial to you in recognition of your valuable services in the investigation of the Flora of New Zealand.

I regret that the resources of the Colony should not be such as to enable a larger amount to have been presented to you, but I trust you will receive it as a slight acknowledgement on the part of the Legislature, and this Government, of the benefits conferred on the Colony, by the issue of the first complete work of the Descriptive Botany of these Islands, a work which, both as proceeding from such an eminent Naturalist, and from its popular shape, will be of great practical utility, and will tend to

diffuse among the Colonists a love and knowledge of the Science of Botany. (Stafford 1861)

On 26 March 1861, Dr Andrew Sinclair, Joseph Hooker's old friend from days in the field at the Bay of Islands and a valued plant collector for Kew, was drowned while attempting to cross the Rangitata River during a collecting expedition with Julius Haast, the Canterbury Provincial Geologist. Haast wrote to Hooker telling him of Sinclair's death and offering to send plants to Kew in Sinclair's place. Thus began a flow of plants from the then largely unexplored Southern Alps to Kew, which was to add much to the knowledge of New Zealand's unique alpine flora (Galloway 1976).

Charles Knight also wrote to Hooker about Sinclair's sudden and tragic death, and in his letter raised questions, such as the content and likely cost of the proposed popular Flora:

Mantell has been talking to me about publishing our Flora in English but I do not think he has any practical notions on the subject....Will you tell me what the expense will be to get out a moderate edition. Reeve, I fancy is a dear man. You once said Reeve would do it at his own risk if the Colony would defray the authorship. If I once knew what a probable expense would be I would get an estimate of the probable number which would be immediately taken up here. I think we could almost immediately set about getting a grant to cover your claims as author. We should be sure of Sir George Grey's hearty cooperation if we only have to pay for authorship.

I have not seen the Hong Kong Flora but that I understand is the model you prefer. Supposing that work is taken as a model and that the proposed Flora includes the Ferns and the Mosses what would be the expense of publication? The Mosses I think ought to be included. I find people fond of collecting ferns and mosses, but very few take much interest in the Dicotyledonous or monocotyledonous plants. Next as to your own labours what would you think a fair remuneration. I think it should be so much for each species described - it suits my acquired notions of business to bring everything I can within a numerical calculation! Besides we might determine to have the Hepaticae and the Lichens and this might probably put you to some extra expense for it is out of the question that Babington's descriptions of Lichens can be taken; they are behind the times. (Knight 1861).

This rather slighting reference of Knight's was to the Rev Churchill Babington (1821-1889), Disney

Professor of Archaeology and Lecturer in Theology at the University of Cambridge (Galloway 1991). He was the author of the chapter on lichens in Hooker's *Flora Novae-Zelandiae* (Babington 1855), the first scholarly regional Southern Hemisphere lichen flora, complete with references to contemporary literature and citation of particular specimens which attest to his wide knowledge of lichenology.

Funding of the *Handbook*

In May 1862, Knight was already discussing definite proposals for funding with Hooker and agreeing with him matters of style and content:

Now that I have your *ultimatum*, I will propose to the several provincial Governments of New Zealand that a vote should be taken in each of the Councils for a grant of about £80 to defray the cost of a new Flora of New Zealand to be got up in the style of Bentham's *Flora Hong Kongensis* [*sic*] including an introduction to Botany and analytical keys to Genera and Species. Or, if I think it best I will make a proposal to the General Government for a grant of £450. This would in fact be nearly the same thing as the Provincial plan; but it would have this advantage that it would distribute the expense proportionally between the provinces. The General Assembly meets in June next....Mantell, Monro and Colenso have seats in the House. Monro is the Speaker. Altogether we have many friends who will support us. A trifling *contre-temps* may upset the best devised scheme when it is brought under the consideration of a representative body such as we have in the New Zealand Assembly. I shall take counsel with Mantell but will keep well in the background myself. Mr Stafford is in opposition but if he is not greatly tormented with the toothache he will give his earnest support. Still I fear we may not succeed this session; the Assembly will be called upon for extraordinary votes to carry out Sir George's native policy. (Knight 1862a)

In September 1862, Knight informed Hooker of the Government's decision to request the Governor to sanction a grant of £500, rising to £600 to cover the cost of writing the New Zealand Flora:

Last evening the House of Representatives passed a resolution 'that an address be presented to the Governor requesting him to recommend to the House to make provision to the extent of £500 for the expenses attending the publication of a manual of New Zealand Botany'. As

the Resolution alluded to is equivalent to a *grant* of £500, I am now writing to you as if a formal vote had been come to. As soon as the vote is taken, the Colonial Secretary will communicate with you on the subject. The amount for which you offered to write the Flora was £300; exclusive of £150 for 100 copies of the work on the day of publication. The work was not to include a description of the Algae. As I was anxious that it should not exclude those plants, I proposed that an extra £100 should be taken for the purpose. Dr Monro seemed to think an extra £50 would do and the resolution of the House was accordingly taken for £500 only. I have since – that is this morning – obtained a personal guarantee from all the members present *except one* to make up the sum to £550. Having protected myself as well as you with this guarantee I now hope that you will for £500 from the Government and £50 from private sources undertake the Flora, including the Algae; you taking upon yourself to make what arrangements you please with the publishers, who probably may require more than £150 for 100 copies of the work. At the same time I shall recommend to the Government on completion of the book to take an additional vote of £100 instead of £50 at the next sitting – making the total payment to you £600 – which I have not the least doubt the Government will carry. In fact I have taken the guarantee for £100 not on the understanding that though their *votes* are pledged for £100 their own pockets are liable for only £50. I hope this is clear to you.

I may mention that I have always understood that you would adopt as the ‘model’ the Flora of Hong Kong by Bentham and that you would give an introduction to Botany and keys to orders, genera and species as he has done. I enclose a copy of the guarantee. It would add greatly to the value of your labours if you would kindly undertake to furnish in *manuscript* a list of Colenso’s plants with his numbers for the purpose of identification. The last is a private suggestion and is in no way part of your undertaking; but if you will recollect that I once purposed you should supply with the book a suite of specimens from your museum; and you replied that you had not the material. The proposed list is now the only means by which we can obtain an identification of the species through Mr Colenso’s collections.

I have no doubt that the Government will instruct you that the whole of the money is payable to you on receipt of 100 copies – and that no communication will be made to the publishers on the subject. Wishing you quickly through your work, if you undertake it. (Knight 1862b)

It was the Speaker of the House of Representatives, Dr David Monro, who moved that a respectful address be presented to the Governor, Sir George

Grey requesting him to recommend to the House to make financial provision of £500 for the expenses involved in publication of a manual of New Zealand botany. Monro made some explanations in support of his motion and then read the House the following memorandum drafted by Knight:

This work is to contain an introduction to botany, and descriptions of New Zealand plants., together with the ferns, mosses, hepaticae, and lichens. The whole to be written in English, and to include the latest discoveries. The work might come into one thick volume, to be sold for £1 10s., which Dr Hooker would do for £300. Dr Hooker would put off the flora of other countries which he has under consideration if the Government of New Zealand would decide early. Mr Reeves is the only publisher in London who would undertake the publication at all, and only on 100 copies being guaranteed on day of sale at retail price. The total cost of the work, including 100 copies, to be £450. It is also proposed that the work should be illustrated by a folio of plates; but this would be for after-consideration, and would necessarily be a work of time. The neighbouring colonies have reluctantly been compelled to abandon the idea of publishing plates at the same time as the letter-press. It may be worthy of notice that Mr. Bentham is at present at work on the Australian flora, for which the Australian colonies grant him £350 per volume; it will run to seven or eight volumes. Drs. Harvey and Sunder [*sic*] are busy at the Cape Flora, Griesbach at the West Indian flora, and the Ceylon flora is in the hands of Mr. Thwaites. If the proposed New Zealand flora were to include the seaweeds it would then form two volumes, and the additional expenditure about £100. Charles Knight. 3rd September, 1862. (Monro 1862)

On 31 October 1862, Dillon Bell, the Colonial Secretary (Dalziel 1990), wrote to Joseph Hooker inviting him to undertake the writing of the New Zealand Flora:

...Dr Knight having represented to the Government of this Colony that you had expressed your willingness to prepare for publication as early as possible a manual of the New Zealand Flora to be written in English for which the sum of Three Hundred Pounds (£300) would be payable by the Government to you for the labour thereby devolving on you and to purchase One hundred (100) copies on the day of publication, the Government, fully sensible of the importance, in the interests of Science, of such a work, proposed the necessary vote to the House of Representatives, who cheerfully granted it.

It was understood from the information furnished by Dr Knight that this work was not originally intended to include the description of the New Zealand Sea Weeds, and the Government were so impressed with the conviction that the usefulness of the work would be much increased by the comprisal of those plants that they took a vote of Five hundred pounds (£500) in all, being Fifty Pounds (£50) in excess of the sum which it was understood would be necessary to meet the expenses of the original work including the purchase of the one hundred (100) copies above referred to.

Should however, the sum of Five Hundred Pounds (£500) be insufficient to meet the expenses of the enlarged work, the Government will undertake to make good the deficiency provided the extra expense does not altogether exceed One hundred Pounds (£100). (Bell 1862)

Bell's letter and Hooker's reply to it were published in the *New Zealand Gazette* for Thursday, 25 June 1863. The same mail brought a note from Knight, bringing up the delicate matter of emolument for Hooker:

The Colonial Secretary has written to you by this mail a formal letter requesting you to undertake the proposed Manual of the New Zealand Flora. The Under Secretary, Mr Gisborne has requested me that no allusion has been made in the public letter as to the period when payment of the Honorarium due to you is made. If you will kindly let me know when the remittance should be made to you I will take care that it is duly forwarded. Any suggestions you make respecting the work I will use my best endeavours to carry out....It is necessary that I should add if you do not accede to the enlargement of the work by the addition of the Algae that you are to receive £450 for a work such as you originally agreed to... (Knight 1862c)

In case the House did not vote the extra £100 to Hooker for including the seaweeds in the *Handbook*, Knight successfully petitioned 20 members to provide the balance, among whom were the following: Reader Wood, Crosbie Ward, Alfred Domett, Thomas Russell, H. Carleton, J. Williamson, A. Saunders, W. Fox, A. Brandon, C.D. Carter, J. Cracroft Wilson, H.A. Atkinson, J.C. Richmond, Walter Mantell, Charles Knight, W. Colenso, E.W. Stafford, D. Monro, A.J. Richmond (Knight 1862c). Thus, with the strongest possible endorsement from the political establishment in New Zealand, Hooker was bade to start work.

Hooker's reply to Dillon Bell's letter (see above) was published in the *New Zealand Gazette* under "Correspondence respecting publication of a Manual of New Zealand Flora", released from the Colonial Secretary's Office in Auckland on 22 June 1863. Writing from Kew on 3 March 1863, Hooker expressed his satisfaction at being given the opportunity of writing a popular New Zealand Flora and also gave the Government an idea of how he envisaged the finished work:

I have to acknowledge the receipt of your letter of October 31st, 1862, informing me that the Government of New Zealand had done me the honour of directing that I should prepare and publish a Manual of the New Zealand Flora, and had placed on the estimates a sum of (£500) to meet the necessary expenses of authorship, and the purchase of 100 copies together with the liberal offer of another £100, should the former sum not be sufficient.

In answer, I have to request that you will make known to the Government of the Colony and the House of Representatives that I feel very much gratified by this mark of their confidence in my attainments and zeal in the cause of New Zealand science, and that I have already made some progress in the work in question which I shall hope to finish for the sum specified, viz., £500; also that I shall make it my endeavour to render the work in every respect worthy of their liberality and produce it at as cheap a selling rate as I possibly can, consistently with its containing full descriptions of the plants of the colony, their uses as far as is known to me, and their places of growth. I shall hope to finish it in two stout parts forming two small 8vo. vols, or one thick 8vo. volume; and if possible so to arrange it with the publisher, I will endeavour to have one part published before the end of the present year.(Hooker 1863)

Dunedin's newspaper, *The Daily Telegraph*, recorded on Wednesday 29 July 1863, the following: "A NEW ZEALAND FLORA. - A late Government *Gazette* contains a correspondence having reference to the publication of a manual of the New Zealand Flora, from which it appears that Mr. J.D. Hooker, the son of the eminent botanist, Sir John Hooker [*sic*], of the Royal Gardens, Kew, has undertaken to prepare one, for which he is to receive the sum of £500. The volume, when completed, will form a most valuable addition to our colonial library."

Preparation of the *Handbook*

In many ways Hooker began work on the *Handbook* at a particularly auspicious time, for it was in the early 1860s that a great increase in botanical collecting took place, especially in the South Island, concurrent with the geographical and geological explorations of the interior of the major provinces. Besides receiving encouragement and specimens from Colenso and Knight in the North Island, Hooker also obtained lowland and alpine plants from W.T.L. Travers in Nelson; the highest alpine plants from Julius Haast's travels among the mountains and glaciers of Canterbury and as far south as Haast Pass (Galloway 1976); and Otago plants from his friend the newly arrived Provincial Geologist, James Hector; as well as from the Scottish cryptogamist W. Lauder Lindsay who spent three months in Otago in 1861 and who subsequently published copiously on his botanical and geological discoveries there (see Lindsay 1868). All of these were alluded to in Hooker's Preface to Part I (dated at Kew 30 June, 1864) of the *Handbook*.

Hector reached Otago in 1862 and wrote to Hooker at Kew:

I have now been here since the end of April and excepting a short note informing you of my arrival I don't think I have yet sent you any account of my doings at the Antipodes. You have not been overlooked, however, but have only shared the fate of all of my correspondents and been the victim of my procrastination. I must again thank you for the splendid gift of the *Flora Zealandiae [sic]*. It has arrived in capital preservation and is in constant danger of being borrowed, but I never let it out of my sight. I had a duplicate of the Introductory Essay and that has been through several hands already - I have impressed upon Government the necessity of a thorough collection of the Botany of the Province being made without delay - and as spring has begun, I have set a collector to work to gather the Cryptogams privately until the matter is taken up by Government. I have engaged Buchanan (Adams 1990) the person you may perhaps remember you recommended to me at Mr Wilson's dinner. He seems to be a capital hand at it and I am making him write full notes with any specimens that require them.

I wish I only had time to devote to it myself but I must be content to mainly overlook in that and a good many other things. He shall have the best opportunities I can find for him. Until December he will be working in the

North-East Valley - close to Dunedin, which is one of the best and richest spots in the Province. After that I shall be going I hope to the West Coast and of course shall take him with lots of paper, so that I hope to have a fine harvest for you soon. (Hector 1862)

Such were the exciting new discoveries made by Hector and Buchanan from the Otago hinterland, that Hooker was to note in his Preface to the *Handbook*:

...and more recently very extensive and valuable collections, containing much novelty, from the Alps of the interior and the west coasts, by another eminent geologist. Dr. Hector, F.G.S., Government Geologist, and Mr. Buchanan, his assistant. The most important of these last collections arrived whilst the sheets of this work were passing through the press, and have materially delayed its publication; for the discoveries which they contained seemed to me to be of sufficient importance to render it desirable that they should be embodied in the portions that had already been printed, which had to be recalled for the purpose. Again, since the completion of the Flowering plants, I have received two more contributions from these surveyors, including various new discoveries and new habitats, which must be reserved for the Supplement. (Hooker 1864: 13)

Lauder Lindsay, a punctilious and stiffly formal correspondent wrote from Perthshire at the same time as Hector: "I have today despatched per rail a box full of Otago gatherings - anent which I have already written to you. In order that you might have as many plants as possible to examine for your supplement to the *N.Z. Flora*" (Lindsay 1862). Lindsay was keen to see Hooker's new work, finding the earlier *Flora Novae-Zelandiae* both expensive and hard to obtain.

I am extremely glad you are bringing out a *Synopsis Flora Nov.-Zel.* a work which will be of good service and will find ready purchasers among those who cannot afford your more expensive 'Flora'. The cost of the latter prevents it being found in many libraries, public or private ones, I have found to my regret - for though I have determined to borrow from Edinburgh a copy for reference - since my return from New Zealand, I have not been successful in procuring it. (Lindsay 1863a)

Lindsay also proposed an index of Maori and vernacular plant names to Hooker, especially those used in the South Island:

Allow me to suggest that in your 'Synopsis Florae Nov.Zelandiae' [for the use of colonists] an Index containing the Maori names and the names by which plants are known to the settlers, would be a great advantage! The names given in your 'Flora' may be those common in the *Northern Island*: but are quite unknown for the most part to the settlers of Otago: while it is in Otago that the Synopsis will first in all probability be carefully studied and utilised! Expecting soon to hear of the publication of at least Vol. I of your Synopsis. (Lindsay 1863b)

And further:

If by authority for *southern* names you mean a *printed* one; I certainly know of none, here or elsewhere. In regard to Maori names, I carefully noted in my Journal on the spot and at the time the native names as spelt and pronounced by the oldest settlers, who had been in intimate association with the natives [the latter themselves being now in Otago 'Rara Aves' - rarely to be met with]. I corrected these names by acquiring a certain knowledge of the Maori language as given in Williams' Grammar and Dictionary chiefly as well as from 'pakeha Maoris' - naturalised settlers in the North Island - some of whom have been living among the North Island tribes for 20 or 30 years and who are thus perfectly familiar with the language. I got one friend to check off another's statement and compared the whole with Williams' Dictionary:- wherein you will find the North Island names of a great many North Island species....In Otago where the settlers generally do not know the Maori tongue, their so-called native names are too frequently *nonsense*:- made up of letters that do not hold a place in the Maori language!

The names in your 'Flora' are, in many cases at least [I think you will find on reference to any reliable Maori Dictionary] erroneously spelt - if some are not altogether wrong: others are of local application - or at all events I have not met with any 'Pakeha Maori' who have ever heard them or could recognise plants by them. (Lindsay 1864a)

Later in 1864 Lindsay wrote again to Hooker:

I will gladly send you my list of Maori and settlers' names of N.Z. plants as soon as I can command the requisite leisure to compile it from my scattered notes...Tho' I need scarcely say the list, when sent, will be quite at your service, I do not see how it can be of any real use to you, and to *print* it in any form, - especially in conjunction with my name, - would surely be an infringement of

your own very excellent rule not to print anything that does not provend from sound *authority*! Now I do not consider myself [and I therefore do not wish others to consider me] as in any sense or degree an *authority* on the subject in question.

I am glad to learn the Biological Survey of Otago is doing good service to Botanical discovery:- tho' I regret that one result thereof should be to delay the publication of your Synopsis. (Lindsay 1864b)

By 1863, Hooker was obviously having second thoughts about the cryptogamic part of the *Handbook*, and Knight had to clear up misunderstandings about the intended inclusion of cryptogams in the project:

I have this minute received a note from Colenso in which he quotes from your letter to him dated 31 January last, as follows. 'About the New Zealand Flora I will gladly do my best and gratefully accept the commission insofar as I am able. There is however one hitch - a mistake somewhere either on my part or my correspondents. My proposal was intended to be confined to the flowering plants and ferns...if I have time to do the other crypts creditably I will do so and expend the other £250 on the 2nd volume.'

And in your letter to me of the same date you say 'with regard to the Cryptogams, I had thought that I excluded them in my proposal (you say that I excluded the Algae only) my reasons I thought were incompetency from want of time to study them properly - be that as it may I will if I find I am competent when the time comes gladly do my best to all, algae included getting such help as I can from Harvey and others'.

As you fancy there is some mistake either on your part or mine I will indicate from your letter of 22 December 1861, the paragraph in which your offer was made. 'Again looking over your letter about the New Zealand Flora I may add that we found Reeve the only publisher who would undertake them at all and only on 100 copies being guaranteed on day of sale at retail prices not exceeding 20/- per volume of 500-700 pages or so. The volumes will cost 15/- - 20/-, (depending on prospects of colony purchasing) I think the N.Z. Flora with Ferns, Mosses, Hepatics and Lichens might come into one thick volume to be sold at 30/- which I would be glad to do for £300 - I would get Nylander to do the Lichens and do much of the Musci and Hepaticae myself. If the separate colonies were to combine for author's remuneration and purchase of 100 copies, it would be easily managed; only I should like to know soon.'

I find that this offer was made after you had, in the same letter, called my attention to the fact that 'the terms

according to the scheme drawn up by Sir William Hooker and yourself were not for the Cryptogamiae which would require much higher pay, for these must be done by various authors who it is difficult to get to work at all. The crypts in short were not to be done at all in the scheme.'

I think that you will allow that there has been no mistake on my part. Your proposal required a grant of £450, the House gave £500 and I sent you the guarantee that it should be £600 if the Algae were included. The guarantee is as good as the vote – that is for the extra £100. If you are quite decided in your doubts about the 2nd volume I should wish you to authorise me to state to the Government the difficulties in the way of completing the commission – and it most likely you have already done so in reply to the official communication which was made to you on the subject. I am writing in haste but I must add that I shall be disappointed if we cannot complete the Flora. I am a man *tenax propositi*, and like to carry out my schemes completely. I intend sooner or later, to have a Manual of the Geology of New Zealand. That is a Manual of Geology, in which the illustrations and text will be drawn as much as possible from the N.Z. Field. (Knight 1863a)

With Knight standing firmly to the Government agreement which he had engineered, Hooker could do no other but concur. On hearing from Hooker of his intention to undertake the cryptogams, Knight responded:

I have to acknowledge your letter of 3rd March last and to express my gratification on hearing from you that you have agreed to do the Manual for £500. I shall not rest content with such insufficient remuneration for the labour of getting out the complete work you have now formally undertaken. In respect of your enquiries it would be an advantage to keep down the selling price to 30/- by squeezing the work into 900 pages; but do not attempt this if it will seriously impair the usefulness of the work. As to native names, the best plan is to give a list at the end of the book arranged alphabetically. The habitats of common plants are not worth giving in detail. (Knight 1863b)

In October 1863, Knight wrote to Hooker telling him that the new work, formerly loosely discussed as a manual of the New Zealand Flora, must now be termed a handbook.

The title of the new Flora must be 'a Handbook of the New Zealand Flora', unless you wish for the sake of uniformity to adopt one uniform with the Hong Kong

Flora. I like the title 'Handbook' it is suggestive of its real object and it is one which Monro chose, I like to please Monro in these small matters, as he has taken much interest in your work. As to the native names they should be added at the end of the last volume, and we'll take care to obtain as many as possible and see to the correction of those given in the Flora. Colenso will be up here at the end of the month. I have no time to collect nor do I believe there is much new in the Northern Island. There is no likelihood of any one visiting Mt Egmont the people of Taranaki cannot pass beyond the military post i.e. about 4 miles from the town; and even in times of peace the natives are extremely jealous of white men visiting or exploring the mountain. (Knight 1863c)

On 2 October 1863, William Gisborne, Under-Secretary at the Colonial Office, wrote to Hooker about official arrangements for paying his honorarium in connection with the *Handbook*:

I am directed by Mr Domett to acknowledge the receipt of your letter of the 3rd March last, and, in reply, to inform you that the Agent for this Colony in London (Mr Morrison) has been instructed to pay you the sum of three hundred (£300) as an advance on account of the "Manual of the New Zealand Flora", as soon as the first part of the work is published and one hundred (100) copies have been delivered to the Agent for transmission to the Colony. (Gisborne 1863)

Later the same month Knight reassured Hooker, "I write to inform you that every thing is in train for the additional grant of £100 for the Manual. I have no doubt the House will vote the money; and I am not a little pleased that the Government has behaved so well in the matter" (Knight 1863d).

In December, Knight wrote to Sir William at Kew to tell him of progress with the *Handbook*:

You will be pleased to learn that we have secured for Dr Hooker an additional vote of £100 making altogether £600 for the Handbook of the New Zealand Flora which is to include all the Crypts and the Seaweeds. This will be in accordance with your original proposal to the British Government that the author should receive higher remuneration for the Crypts. Dr Hooker will now be able to secure the valuable aid of Dr Harvey for the seaweeds. Mr Stafford on his return from Europe said that you blame us here for doing so little in acknowledgement of Dr Hooker's services. I am sure you are better pleased with us now. (Knight 1863e)

Sir William, writing in *The Natural History Review*, was warm in his praise of the New Zealand Government's commitment to the *Handbook*:

The Colonial Government of New Zealand have promptly responded to the proposal, and commissioned Dr Hooker to prepare a manual of the Flora of its territories upon the same plan, form and size etc., as the Hong Kong Flora, but to include the Cryptogamic as well as Flowering Plants. This is the more liberal on the part of this energetic Colony, as it had on the completion of the volumes of the Botany of the Antarctic Expedition, which described all the New Zealand plants then known, spontaneously proposed a grant of £350 to its author, in recognition of the scientific service he had thereby rendered to the Colony. The Manual of the New Zealand Flora is now in progress, and it is hoped that a volume will appear in the present year. (Hooker 1863)

On 7 May 1864, the *Otago Witness* recorded "The Lyttelton Times says: - This mail brings satisfactory evidence of Dr. Hooker's diligence in preparing his promised work on the Botany of New Zealand, towards the expense of which the General Assembly of the colony a short time ago contributed a grant of public money. We have had the satisfaction of seeing the proof sheets of part of the 'Hand Book', which Dr. Hooker has sent to a scientific friend in this Province [Julius von Haast], as an earnest of the coming work. We learn also that the publication has been delayed a little in order to take in the results of Dr. Hector's and Dr. Haast's late labours, for which object we may be content to wait."

Publication of the *Handbook*

In June 1864, a memorandum was drawn up between Joseph Hooker and the publishers Messrs Lovell Reeve of Henrietta Street, Covent Garden:

The said Dr Joseph Hooker having a work in preparation to be entitled "Flora of New Zealand" hereby agrees to give to the said Lovell Reeve & Co., the exclusive right of printing and publishing at their own expense and risk and for their own profit an Edition of Five hundred copies of the said work. And it is to be understood by the said Lovell Reeve & Co., on entering upon this agreement that one hundred copies will be purchased by Her Majesty's Colonial Government immediately on its publication at the full retail price, such price being

according to the number of pages fixed at the rate of 20/- per 600 pages. The Author to be entitled to two free copies, and to purchase any additional copies at the made price. (Reeve 1864)

The first volume of the *Handbook* was off the press in August 1864 [Stafleu & Cowan (1979: 274) give the dates of publication as September-October 1864]. On the 31st of that month, Lovell Reeve wrote to Hooker: "We have instructions from Mr Morrison to pack the 100 New Zealand Flora in a box, lined with tin, and send it to the East India Docks for shipment by the *Mataoka* which sails about the middle of September for Auckland" (Reeve 1864). In September, the New Zealand Government Agent in London, John Morrison, wrote to Hooker: "I am informed that the case containing the 'New Zealand Flora' is on board the *Mataoka* having been shipped by your publisher according to my directions. I have now the pleasure to state that in accordance with instructions received from the Government in New Zealand, I paid on the 14th inst., to your credit (as requested by you) with Messrs Barclay Bevan & Co., the sum of Three hundred pounds, in payment for 100 copies of this work. As it will be necessary to transmit a voucher for this payment to Government, I have to request the favour of your furnishing me with the same in duplicate" (Morrison 1864).

By November, the *Handbook* had reached New Zealand, though Knight appeared at first to be more interested in Hooker's dedication of the work, than in the descriptive text: "I see you have dedicated the Handbook to Sir George Grey. He was scarcely entitled in this instance to your compliment as he has taken no interest or trouble in the matter. However I do not see whom you could have dedicated it to, except to Dr Monro as the Speaker of the House of Representatives - and to him as the representative of the House" (Knight 1864). Six months later Knight wrote again to Hooker about Sir George Grey as dedicatee of the *Handbook*:

Perhaps you are right about the Dedication - but we should have been better pleased had you dedicated your work to the Speaker of the House of Representatives and had recognised the desire the House has shewn to promote Science. The Governor has nothing to do with it and I do not think he would do anything for the mere

love of Science. He is dreadfully cold and selfish. I have known him many years, and I am sorry to write hard things of him. Why do you include the Fungi? Is it any part of the engagement? I know that I intended to exclude them. It might be well to look to the official correspondence. (Knight 1865a)

In August 1865, Knight wrote to Hooker telling him of the passage of the Audit Bill through the House, and of the increase in salary it would bring:

An Audit Bill to give me a permanent salary of £800 a year has passed the second reading - I see by the papers that Mr Colenso is the only person in the House who opposed the Bill. Mine is a Patent Office but up to the present time the salary provided by the Act was only £500. This *permanent* increase will make me exceedingly comfortable and independent. Monro is still Speaker of the House he is admirably fitted for the office. He was in my office a few days since to talk over the Handbook - he was afraid you were insufficiently paid for your labours. I am sure that you are badly remunerated, at the same time you know how difficult it is to get public grants for scientific purposes. Dr Hector is engaged by the General Government, he will move his establishment to Wellington and I will see more of him....Travers and I and Rough talk of a trip over the Nelson Ranges this summer. The last time I was there Monro and myself nearly came to grief. We were spinning down the tramway from the Dun Mountain at a fearful pace - the cars jumped off the rails; Monro went head over heels about a dozen times down a hill nearly perpendicular. I and a companion sprung from the car as it was going over the precipice, unfortunately my companion jumped *on* me and broke one of my floating ribs - but though I could scarcely draw my breath I laughed till the tears ran down my cheeks to see Monro's extraordinary somersaults. He lost his hat which he never found again and sprained his ankle. (Knight 1865b)

On 14 August 1865, the *New Zealand Gazette* carried the following notice from the Colonial Secretary's Office:

The General Government are able to dispose of, by private sale, a few copies of Dr. Hooker's 'Handbook of the New Zealand Flora'. The price is 15 s. a volume for two volumes. The first volume only is at present published. Purchasers will be required to pay for both volumes, and the second volume will be forwarded to them as soon as it is received by the Government. Application to be made to this Office. By command, W. Gisborne Under Secretary.

At the end of August, Knight wrote again to Hooker on *Handbook* matters.

The Government here is selling some 30 or 40 copies of the Handbook to private parties who have urgently applied for them. What is Lovell Reeve about; he might have sold many copies of the work had he sent them out to the booksellers. When such a work is new, many are anxious to have an early copy of it - not caring perhaps much for the content - but choosing to have novelties of the kind on the drawing table. It is something to talk about with visitors. When the work is better known, people are less curious about it, and only those purchase it who really are in want of the work. The difficulty with the publishers perhaps is, the not knowing who are respectable booksellers to whom the copies should be consigned for sale....I am afraid the New Zealand Handbook will not pay you for the trouble you are taking. Monro was concerned about it; and I think if I had suggested another £100 being paid to you he would have jumped at the notion. But I do not think the House would grant it; and both on your account and on account of our friends in the House I would not like a refusal. I write this with some compunctions of conscience as I am afraid it was through my urgency you were induced to extend the work to the Lichens and Seaweeds. Heaven save you from your friends!...On my recommendation the Government has presented copies of the Handbook to those whose names are honourably mentioned in the preface. My copy is lying before me in the office. (Knight 1865c)

Lovell Reeve advertised Part I of the *Handbook* in their list of publications on Natural Science, Travels, Antiquities etc. at a selling price of 16 shillings, the same as *Flora bonkongensis*. This compared with £13.2.6 for a coloured two-volume set of Hooker's earlier *Flora Novae-Zelandiae* (plain, uncoloured sets were offered by Reeve at £9.5.0).

By the middle of 1866, all copies of the *Handbook* sent out to New Zealand were sold, and Knight was concerned about progress on Vol. II which dealt with the cryptogamic groups, mosses, hepatics, fungi, algae and lichens. He enquired of Hooker, "The Government has disposed of the whole of its copies of the Handbook. How are you getting on with the second volume?" (Knight 1866a). In November 1866, Knight, now reassured of satisfactory progress, wrote warmly to Hooker:

I am glad to hear that you are printing the 2nd volume of the Handbook. There are many enquires for it. The more I see of the 1st volume the better I am pleased with it. Our Under Secretary abuses me for sharp practice in recommending the Government to sell the first volume only on condition of the 2nd volume being paid for in advance. We have sold a great many copies on those terms and the purchasers are becoming impatient for the 2nd volume. You have been decidedly successful in making a very difficult matter extremely simple by means of your analytical tables....I don't know whether you feel any pride in your work; but it certainly is not a small matter to be, as you are, the first to lead the young people of a distant colony to the cultivation of an interesting and useful science. Your name will go down to the latest times in connection with it - are you a very hard man and do these things give you no satisfaction? (Knight 1866b)

Although Joseph Hooker collected a wide diversity of cryptogamic plants during the Antarctic voyage and published the results of his collections of Antarctic hepatics (Hooker & Taylor 1844a, 1845), mosses (Hooker & Wilson 1844), lichens (Hooker & Taylor 1844b) and algae (Hooker & Harvey 1845a, 1845b, 1847, 1848), he was first and foremost a flowering plant systematist. For the second volume of the *Handbook* he was reliant upon, and grateful for, the help of several cryptogamists in the preparation of his accounts. His acknowledgements are worth recording here, for they put his own involvement in perspective, as well as detailing where the taxonomic expertise for particular groups was to be found.

Of the mosses, Hooker wrote:

The Musci were worked up by Mr. Wilson, the most able British muscologist, for the 'Flora of New Zealand'; and I have for the most part adhered to his generic characters and limitations; having myself studied the species which I had collected, both in the Bay of Islands and in Lord Auckland's group, and prepared the analyses of the greater number figured in the 'Flora Antarctica', we published under our joint names. Since that period many new species have been described by Mr. Mitten, to whom I am indebted for most cordial assistance in the following pages, and who has examined and named for the Hookerian Herbarium all the specimens that have been received from recent New Zealand collectors....I extremely regret that my friend Mr. Wilson's health has prevented him from undertaking a revision of the New Zealand Mosses for this Handbook. (Hooker 1867: 394)

Prefacing his account of the hepatics, Hooker explained:

Of the *Hepaticae* (about 212) here enumerated, the greater majority were discovered by Mr. Colenso and myself, and were new to science on the return of the Antarctic Expedition to England. They were placed, at the late Dr. Taylor's request, in his hands for immediate publication, and the descriptions of many appeared in 1844....At that time...the difficulty of ascertaining and defining species was very great indeed. Owing to this cause and to Dr. Taylor's precipitancy in publication, much confusion crept into his work; the same plant appearing under several generic names, and some descriptions answering to subsequently cancelled species, having been also published as good species. It is still more unfortunate that Dr. Taylor did not return to the Hookerian herbarium specimens of all the species which he received for publication, and his herbarium having been sold since his death, there is now little chance of his New Zealand species ever being recognized. [Taylor's herbarium was purchased in 1849 by John Amory Lowell, the Boston financier and friend of Asa Gray. It was presented to the Boston Society of Natural History in 1857 and, subsequently, in 1941, donated to the W.G. Farlow Herbarium at Harvard (Sayre 1987).] Whilst feeling it is my duty to make these facts clearly known, I must add, that those who study this extensive Order of plants by the aid of modern works, can have no conception of the difficulties which Dr. Taylor had to overcome, twenty-two years ago, in classifying and naming 300 or 400 *Hepaticae* with which I supplied him, and of which not fifty had been published; imperfect and hasty as his work was, it showed great skill, no little sagacity, and indomitable perseverance as a microscopic investigator.

In the present work I have followed in Mr. Mitten's footsteps, he having drawn up all the descriptions for the 'Flora Novae-Zelandiae', with great care; and to him, too, I am indebted for naming the species of this Order received since the publication of that work; he has also detected many of Dr. Taylor's errors, and rediscovered, in later collections, many of his lost species." (Hooker 1867: 498-499)

Regarding the lichens, Hooker comments:

The New Zealand Lichens were first hastily named and published by Dr. Taylor; since his death, my friend the Rev. C. Babington, a learned and most sagacious Lichenist, worked then up with great care and skill for the 'New Zealand Flora'; and, more recently, Dr. Nylander has reviewed the majority of them, and verified Mr.

Babington's determinations. A considerable number of species are introduced from a manuscript, kindly lent me by Dr. Lindsay, which contains the botanical results of his visits to the islands. Lastly, many additions are due to Dr. Knight's skilful researches amongst the corticolous genera, the results of which, by Mr. Mitten and Dr. Knight, are published in the Linnean Society's Transactions, illustrated by microscopic drawings of great beauty, made by Dr. Knight.

The following pretends to no more than a sketch of New Zealand Lichenology, and I expect that fully as many species remain to be discovered as are now known to exist in the islands. Since the following descriptions were written, Dr. Lauder Lindsay has communicated to the Botanical Society of Edinburgh, a list of Lichens found by himself at Otago, in which a good many new species are indicated but not described. With regard to the other species there mentioned, having seen no specimens, I do not venture to introduce them, except by name at the end of each genus, as many may be identical with species described under other names by Babington, myself, or others. For myself, I frankly confess that I find it impossible to determine even the foliaceous Lichens satisfactorily, except by comparison of specimens; whilst the species of the crustaceous and corticolous genera are so difficult to examine, and impossible to describe in definite language, that I doubt any two independent workers coming to a tolerably close agreement regarding their limits and nomenclature, even if they worked upon the same species. (Hooker 1867: 552-553)

For help with fungi, Hooker turned to the Rev Miles Joseph Berkeley of Kings Cliff, Northamptonshire, whose wide-ranging and detailed book on cryptogamic botany (Berkeley 1857) contains several references to New Zealand cryptogams collected by Colenso and Hooker. He writes, "For all we know of the fungology of New Zealand, we are indebted to the Rev. M.J. Berkeley, the most eminent English author, who worked up this Order for the Floras of the Antarctic Expedition. From that of New Zealand, the following descriptions are chiefly compiled, and I am further indebted to that gentleman's good offices for revising this compilation from his own labours" (Hooker 1867: 595).

Of the algae, Hooker observed:

New Zealand is very rich in *Algae*, its deep waters and quiet sounds especially abound in species of this interesting and beautiful Order, which have been most admirably collected by my old friend Dr. Lyall. Amongst the

microscopic unicellular and filamentous tribes, there must still be many hundreds, perhaps thousands, of species to be discovered in the sea and in freshwater ponds, rivers, and the islands. These are subjects of special research, far beyond the scope of a student of general botany, or of a handbook like the present. To study them advantageously would require a powerful microscope and a very good library, infinite patience, and considerable manual skill....To my late friend Dr. Harvey I am indebted for the determination and description of the New Zealand *Algae* in my Flora of these islands. His widely and deeply deplored death during the present year has deprived me and this work of the benefits of his revisal of the following compilation. (Hooker 1867: 638-639)

Early in 1867 Hooker's task was finished and, in January, he was writing to his friend James Hector in Wellington, "The N.Z. Handbook is now all out of my hands and should be out in a few days. I will get the copies sent out without delay" (Hooker 1867a). In mid-February, Hooker wrote again to Hector:

At last I have the pleasure of sending you Part II of the Handbook, a child of much anxiety, and it is my hope it may do credit to its parentage. The best evidence I can give of my desire to complete it fully, is that the insertion of incessant additions of habitats and species, chiefly yours and Haast's, has entailed on the publishers and self a printer's bill of £55.14. for extra work; which we half between us. I do not grudge the money, but it is a dreadful pull on the author. Of many sheets 2 reviews were needed besides the proofs. This not only that the additions add to the habitats but they entail little alterations in specific limits. The easy solution would have been a monstrous supplement; and this would have been disgusting. (Hooker 1867b)

With publication of Part II of the *Handbook* successfully accomplished, Hooker, instead of breathing a sigh of relief that his years of donkey work were over and looking forward to some optimistic reviews, found that he was not even going to be paid his honorarium for the second volume, since arrangements for this had been overlooked by the Colonial Government. Morrison, the New Zealand Government Agent, wrote to Hooker at the end of February 1867 pointing out this unfortunate situation.

Referring to your letter of the 23 Inst., I am sorry to say I have no authority from the Government of New Zealand

to pay you £200. The only instructions I received appear to have been in December 1863 and they only refer to £300 to be paid to you on receiving 100 copies of your 'Manual of the New Zealand Flora'. When the delivery of books was made I paid you that amount, concluding that I had received the complete work. I must therefore, in the absence of instructions, refer your application to the Colony and get leave to pay you the £200 before I can do so. A copy of your letter will be sent to the Government by the Panama Mail. (Morrison 1867a)

Rather ruefully, Hooker confided to Hector about his lack of payment:

I find that no arrangements were made with the Govt Agent about paying the remainder of the grant of £500 (my £200) for Part II of the Handbook.

I have written to Mr Stafford officially to this effect and asked whether any part of the further sum of £100, set aside to meet any extra expense might not be applied to reimbursing the publisher and myself the £53.14. overcharge for corrections and additions during the progress of the work. Reeve has allowed 20/- a per sheet for corrections in the original estimate; but thanks to you and Haast's and Travers' and Colenso's collections, Lauder Lindsay's potterings, and the multitude of letters with specimens and notes; additions and corrections, which I thought it right to alter as they came, have resulted in said bill. I have gone into it and find it moderate....Of course I make no claim for the time and trouble it contain, though they were excessive. The additional value of the work and interest recompensed me for that. Meanwhile I have to pay the publisher, who is hard up and of course at present heavily out of pocket as is now your affectionate friend, J.D. Hooker. (Hooker 1867c)

To Hooker's letter about non-payment of the agreed honorarium, W.E. Stafford, the New Zealand Premier, replied in conciliatory terms:

I have the honour to acknowledge the receipt of your letter of the 1st of March last stating that the second part of the 'Handbook of the New Zealand Flora' is now completed, and that One hundred copies are lodged with Mr Morrison, and to state that in conformity with the arrangement made with you, Mr Morrison has been instructed to pay you the balance of Three Hundred pounds (£300). The Government fully appreciated your efforts to make the work complete by incorporating in it the descriptions of the plants discovered during its progress, and will place a sum of Fifty three pounds fourteen shillings (£53.14.) on the Estimates in the next

session of the General Assembly to cover the actual expense which you have incurred in this additional labour. I desire to express the sense entertained by the Government of the very valuable addition to the Scientific History of New Zealand contained in the complete Handbook, and of the great care and ability displayed in its compilation. (Stafford 1867)

Knight also was at pains to reassure Hooker that any outstanding expenses would be met in full.

The Colonial Treasurer has overlooked the necessity of instructing Mr Morrison to pay for the second volume of the Handbook. Your note to me of the 1st of March I have sent to the Colonial Secretary with the following minute 'The arrangement is, that £300 is to be paid to Dr Hooker for the 2nd Volume of the Handbook on delivery of 100 copies to the Agent of the Colony in London. £300 was paid for the first volume; the second has, there can be no doubt, given Dr Hooker twice the labour and anxiety of the first volume. Mr Morrison should be instructed to pay Dr Hooker £300 in full of all claims on account of the Handbook, — that sum being held in reserve by the Colonial Treasurer to meet the present claim. The copies of the Handbook held by the Government realised £48. The extra expense of £53.14., defrayed by Dr Hooker out of his private funds has been incurred for the purpose of incorporating the discoveries of Haast, Hector and Travers in the 2nd volume.'

I understand from the Colonial Secretary, that he is willing to put this sum of £53.14. on the Estimates at the next meeting of the Assembly. There is always great uncertainty in these money matters. Mr Stafford the present Premier may be "out" long before the Estimates come on. (Knight 1867a)

Knight closed his correspondence with Hooker over the *Handbook* in terms of warmth and friendship, bringing to an end an extraordinarily fruitful piece of political manoeuvring which has not been seen subsequently in New Zealand in the promotion of a single scientific project of like scope.

I am gratified to find you so entirely satisfied with our financment in the matter of the Handbook. Dr Hector will have already informed you of the Cabinet³ - so that Mrs Hooker as well as yourself, will hold us in kind remembrance when you possess our specimen of New Zealand cabinet work. Sir George Grey has taken an interest in it. In this we all feel that we are not only recognising your services in the advancement of scientific enquiries, but those of Sir William Hooker. As regards

³ The cabinet, a sumptuous example of inlaid work by the immigrant Bohemian craftsman Anton Seuffert, was purchased for the nation at auction in London in 1987 for £8,000 on behalf of the Museum of New Zealand Te Papa Tongarewa where it was restored to its original splendour by Detlef Klein, after suffering years of neglect at Kew. (Judd 1990)



Figure 2: The Seuffert cabinet presented to Joseph Hooker by the Government of New Zealand on his completion of the *Handbook of New Zealand Flora* in 1867, and now in the Museum of New Zealand Te Papa Tongarewa.

Museum of New Zealand Te Papa Tongarewa photographic collection

Hector, Travers, and myself it is most gratifying to have such an opportunity of shewing our friendship and of acknowledging our indebtedness to your kind courtesy. (Knight 1867b)

Morrison in London concluded financial arrangements for the *Handbook* with Hooker in July 1867: "I am now instructed by the Government of New Zealand to pay to you the sum of three hundred pounds (£300). A cheque is ready for you for that amount upon presentation of your receipt (in triplicate) at this office" (Morrison 1867b).

Joseph Hooker, greatly pleased at finally being paid for the *Handbook*, and at its reception in New Zealand wrote to Hector, "Your Govt have treated me handsomely, sent on £300 for Part II of the Handbook and purpose to pay the £53.14, printer's bill for corrections due to constant intercalations; Morrison has had the 100 copies from us three months ago" (Hooker 1867d).

Part II of the *Handbook* was uniform with Part I, both octavo volumes (216 x 138 mm) bound in dark green stiffened cloth covers, the title stamped in gold on the front, and the fly leaf giving the following details: "...Part I, pp. 1-392, published 1864. Part II., pp. 393 to end [p. 798], published 1867". Reeve & Co also published the two parts bound together in dark blue-green boards, edges untrimmed, lettered in gold on the spine with two gold bands top and bottom. Contemporary bindings in half or quarter leather were also made both in the United Kingdom and in New Zealand, from the two paper-bound parts. Both parts came with up to 24 endpages listing Reeve & Co.'s publications in Botany, Conchology, Entomology, Chemistry, Travels and Antiquities. Bibliographical details of the *Handbook* are given in Bagnall (1980).

Public Reception of the *Handbook*

Several reviews of Part I of the *Handbook* were published in England shortly after its appearance (Anon. 1864, 1865; Seeman 1864). The *Journal of Botany* (Seeman 1864) commented:

The 'Flora Novae Zelandiae' consists of two large quarto volumes, admirable in a library, but little suited for being

carried about in the baggage of the travelling naturalist, amongst the unexplored wilds of the country of the Maoris. The present handbook, by its shape and portability, is a far better travelling companion, and by its lower price is placed within the reach of all of those who could not afford to purchase the larger and earlier Flora of the author's. We are indebted, it appears, to Dr Knight, F.L.S., Auditor General, and other gentlemen interested in the natural history of the islands for suggesting the present publication and obtaining the necessary funds for it, including a liberal remuneration for the author's services.

The Handbook may be regarded as a second revised edition of the 'Flora Novae-Zelandiae', with the illustrations left out, and all the new discoveries of Messrs. Haast, Travers, Sinclair, Rough, and other botanists added. It will therefore prove acceptable to even those who already possess the quarto work. In Part I., now before us, we have six new genera and 140 new species, a list of which will at once show the real value of the additions....In this list have been omitted all the species known from other localities, and now for the first time admitted into the New Zealand flora. Want of space also compels us to refrain from pointing out the numerous changes of names which older species have necessarily undergone. We are pleased to see a good many plants, regarded as mere varieties in the quarto edition, now raised to the rank of independent species, - a change for the better in an author who is far in advance of nearly all his contemporaries in a tendency to lump species together....The general plan of the work is that adopted in Bentham's 'Hong-kong Flora'. It is written entirely in English, and there is an analytical key prefixed to the Natural Orders and genera extremely useful to the student. The second part, containing the lower Cryptogams, is shortly to appear, and will enable us to return once more to this valuable work.

At the same time, a seven-page review of the book appeared in the last issue for 1864 of the *Natural History Review*:

We sincerely congratulate our New Zealand readers - and we trust that we have more than a few of them - on the publication of their Flora in an accessible and inexpensive form. Especially do we congratulate them that its preparation has fallen to Dr. Hooker, whose delight, ever since his memorable voyage as Naturalist to Sir J. Ross's Antarctic Expedition, has been in the intensely interesting problems of plant-distribution offered by the Islands of the Southern Hemisphere, and above all by the New Zealand Flora; - upon questions linked with which he has expended an infinity of loving labour and profound thought. His essay upon the Flora

of New Zealand appeared eleven years ago, and it is no exaggeration to say that its appearance marked an epoch in botanical literature. This essay, our readers are aware, served as the Introduction to the author's larger Flora of New Zealand, included in the series upon the Botany of the countries visited by the Antarctic Expedition - an illustrated 4to. series entitled 'Botany of the Antarctic Voyage'. Two of the volumes, illustrated by 130 admirable plates, were devoted to the New Zealand Flora. The cost of this magnificent work places it beyond the reach of most students and much limits its practical usefulness, and it was a wise decision of the Colonial Government when they acquiesced in the proposal of Sir W.J. Hooker that the Flora of their Islands should again be worked up and published in octavo, uniform with the series of Colonial Floras, noticed in previous volumes of this Review, which we owe to the indefatigable exertions of that eminent Botanist. During the eleven years which have elapsed since the publication of the 4to. Flora of New Zealand, the Colonists and visitors have not been idle. The total number of species of flowering plants Dr. Hooker reckoned at 730 in 1853, now they number 935, an approximation to the estimate which he made in his earlier work of the probable extent of the Phanerogamic Flora. With this increase of material we have a wider basis than before for those comparisons which help us to a correct appreciation of the general relations and peculiarities of the New Zealand Flora. These we can but glance at, for Dr. Hooker in his preface states his intention to enter upon these considerations in an independent essay at an early day, and he alone can invest the details with their true importance and secure from them generalizations of value.

In the book now before us, Dr. Hooker has closely followed the plan laid down by his venerable father, described in our volume for 1861 (page 255) - the plan followed in the Floras of Hong Kong and Australia prepared by Mr. Bentham for the Colonial series. This New Zealand Flora is styled a 'Handbook.' The word does not appear upon the title-page of the other Floras, so the author explains that it was adopted in conformity with the wishes of the Colonists themselves, who have manifested an eager interest in the progress of the work, besides passing in their legislature, on the requisition of Dr. Knight, the Auditor-General of the Colony, and other gentlemen interested in science, a sum of money for the author's remuneration. (Anon. 1864)

In New Zealand, the *Lyttelton Times* reviewed the *Handbook* in their issue for Tuesday, December 6 1864 in a three-column account: "We have received Part 1 of Dr. Hooker's Handbook on the Flora of New Zealand. We extract those portions having more immedi-

ate reference to this province, as contained in the author's remarks in the preface to the work which gives an account of its preparation, and a history of the progress of botanical research in New Zealand from the period of Cook's first visit to the present time." Hooker's Preface (pp. 7-15) is printed in full, and the review concludes:

The book is exceedingly well arranged, and the description of the various plants and their habitats, together with the names of the discoverers, are minutely given. In addition to the detailed accounts of the various flora, 'Outlines of Botany', written by Bentham, the Nestor of the English botanists, to accompany the colonial florae, are published with the work. There is also an index of terms, or glossary, referring to the outlines and classifications of the orders and genera. Amongst the late additions to the New Zealand flora might be mentioned those interesting and curious plants belonging to the orders Ranunculaceae, Compositae, Scrophulariaceae, and Umbelliferae, which have been discovered in the Alpine ranges of Canterbury.

The 'Handbook' is valuable not only to the student of botanical science but to those of the general public who take an interest in it; and it is to be hoped that the publication of this work will give an impetus to botanical discovery in New Zealand, which affords a rich field for exploration and where so much yet remains to be done.

The publication of Part II of the *Handbook* was apparently not reviewed in either botanical journals or newspapers of the time, cryptogamic botany generally failing to receive the attention and interest lavished on flowering plants.

A separate printing of the Maori-Latin Index to the *Handbook* [Maori-Latin Index to the Handbook of the New Zealand Flora. Wellington: Printed under authority of the New Zealand Government by George Didsbury, Government Printer, 1866] was reviewed in the *Journal of Botany*, the editor making the following comments:

We were glad to receive this useful 'Index', and should have responded to the invitation of reprinting it in our Journal, if the whole of it had not been incorporated in the recently published part of Dr. Hooker's 'Handbook of the New Zealand Flora'. We understand that it is the intention of the editors to bring out a new edition of it, and that being the case, we would direct their attention to several points that appear to us important....The spelling

of the scientific names is frequently incorrect, and we notice several slips of the pen in the native names also; for instance 'Popopora' instead of Poroporo (*Solanum*, sp.pl.)....

All these points are far from trifling if the list is to serve for critical purposes. These Maori names will help us materially to fix, not only the exact country whence the New Zealanders emigrated, but will also be, in many instances, a guide to the spots whence many New Zealand plants were derived. We are told that the first canoes that landed in New Zealand brought with them the seeds of the Karaka (*Corynocarpus laevigata*, Cunn.), [see Enys 1867] which would thus be a naturalized, not an indigenous plant of New Zealand....But few plants of tropical Polynesia are identical with New Zealand ones. Hence but few of their names could be affixed by the first settlers, when, after leaving their tropical home, they landed in New Zealand. They did so in the case of the Kumara (*Batatas edulis*); but in many more instances they gave the tropical Polynesian names to New Zealand species, which closely resembled in look certain tropical ones with which they were familiar in the cradle of their race....That the Maoris at one time inhabited a country where cotton grew is clear from their importing the Polynesian name (Vau = Whau) for cotton, and giving it, in the absence of all species of *Gossypium*, to the only New Zealand plant that somewhat resembled Cotton in leaf, viz. *Entelea arborescens*. We should have been glad to know the vernacular name of *Morus papyrifera*, as the plant is one of the few tropical ones introduced by the early Maori settlers, and was cultivated in the Northern Island at Captain Cook's time; for which we have the testimony of Forster in his 'Prodromus,' and that of Banks and Solander, whose specimens exist at the British Museum.

Now that by the help of Dr. Hooker's excellent 'Flora' and 'Handbook,' the study of New Zealand plants has been placed on a sound footing, we would advise New Zealand botanists not only to persevere in making this 'Index' as complete and correct as possible, but also endeavour to obtain, perhaps through traders or missionaries, a list of the vernacular names of Raratonga and Humphrey Island plants, for the purpose of critical comparison. We have shown what importance attaches to this study, and we thank the compilers of this 'Index' for the useful materials they have already placed at our command. (Seeman 1867)

Sir George Bowen, in his inaugural address to the newly formed New Zealand Institute, warmly praised Hooker's *Handbook*:

Next to Geology, botanical research will command the attention of the Institute. Here we have an admirable

model for our guidance in Dr Hooker's 'Handbook of the New Zealand Flora', a work which proves how much cordial co-operation furthers the advancement of science. The author was enabled, through his genial spirit and personal influence, to secure the zealous assistance of numerous independent observers labouring in harmony with his own efforts, and thus to produce a book which, if we look to the sparse population and the inaccessible nature of a large portion of these islands, is regarded by all competent judges to be almost marvellously complete. (Bowen 1869)

Probably no botanist since Hooker has had such a complete overview of the known flora (and mycobiota) of New Zealand, even though the number of described plants and fungi in the early 1860s were much fewer than are known today. It is a vision that has never since been realised again and quite possibly a vision or statement now unattainable by any sole author. In our own day, only regional accounts such as Hugh Wilson's *Stewart Island Plants* (Wilson 1982) approach the same breadth of outlook that Hooker's *Handbook* and the earlier *Flora Novae-Zelandiae* embraced. The *Handbook* was also something of a watershed in New Zealand botany, for it marked the decline of the imperialist dominance of British and foreign taxonomists in the description of New Zealand plants, and also provided a solid baseline for future work by New Zealand botanists themselves.

In 1906, T.F. Cheeseman prefaced his *Manual of the New Zealand Flora* with this paragraph:

Forty-two years have elapsed since Sir J.D.Hooker published the first part of his 'Handbook of the New Zealand Flora'. Although no complete account of the plants of the colony has since been prepared, botanical investigations have been actively and zealously carried on, and a large amount of fresh material obtained. No less than four hundred separate communications or short papers dealing with botany of New Zealand have been published, and the number of new species proposed is considerably over a thousand. The literature and descriptions of the new species are scattered through the thirty-seven volumes of the 'Transactions of the New Zealand Institute' and other publications, some of which are not readily available to the majority of workers in the colony. To make satisfactory use of such a mass of unarranged and undigested material is beyond the power of any except a few experts: in any case any attempt to do so would prove both tedious and troublesome. In short, the want of a compendious Flora has long been a serious

hindrance to the study of the indigenous vegetation, and a bar to inquiries of any kind connected therewith. (Cheeseman 1906)

Cheeseman also made the salient observation that "Every botanist who prepares a flora starts from the standpoint reached by his predecessors in the same field" (Cheeseman 1906), a sentiment often echoed by others over the last 80 years. It is fitting to close with Cheeseman's assessment of the influence of Hooker's *Handbook* on New Zealand botany:

In point of execution the *Handbook* realized all the expectations which could have been entertained. The clearness and excellence of the descriptions and their general accuracy are most noteworthy, especially when it is considered that a large proportion of the species have been examined and described by the author alone. Its publication gave an immense impetus to the study of the indigenous vegetation, and it must always remain the foundation for future systematic work on the botany of the colony. (Cheeseman 1906)

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