The first published illustrations of New Zealand plants

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Introduction

European knowledge of the New Zealand flora started with the collection of herbarium specimens by Banks and Solander, who joined James Cook on his first voyage to the Pacific. The accompanying artist, Sydney Parkinson, prepared almost one thousand drawings and completed paintings of the still-fresh plant specimens collected. On Cook's second voyage George Forster likewise prepared many hundreds of drawings of the plants collected.

Such botanical illustrations are more than just enjoyable. To the non-taxonomist they can readily reveal much more about a plant than a formal diagnosis, until recently always in Latin. Even for taxonomists, botanical illustrations can be useful in making it clear exactly which particular plant is being described, as early diagnoses were often cursory and sometimes difficult to interpret. Illustrations can also be a useful complement to herbarium specimens.

Most of Parkinson's and Forster's drawings were not published in the late 18th century, in the years soon after the voyages. They were, however, available to botanists visiting Banks in his house in London and frequently the visitors could also look at the relevant herbarium specimens.

The initial drawings may well have been more useful than the plates sometimes engraved from them because there are many steps between first drawing and final published plate. Parkinson, for example, prepared his drawings under difficult conditions with Joseph Banks and Daniel Solander peering over his shoulder; he worked under great pressure as often he had time only to complete a preliminary sketch. After his death these were copied and completed by other artists frequently relying on herbarium specimens; then came the engravers, with images sometimes being manipulated to fit the page and frequently being modified to remove idiosyncrasies of the individual plant to produce instead an image of the archetypal plant (Rose, 2020).

Most illustrations published before 1800 are of plants collected during Cook's second voyages. However, there are also some published illustrations based on plants from New Zealand cultivated back in Europe. They are particularly interesting as they are evidence of when and where a plant species was successfully introduced.

Cook's first voyage (1768–1771)

The *Endeavour*, under the command of First Lieutenant James Cook, left Plymouth, England on 26 August 1768. It arrived in Tahiti on 13 April 1769, in time for scientific observations on the transit of Venus on 3 June 1769.

Two months later, in August 1769, following secret instructions from the British Admiralty, Cook sailed in search of the legendary "Great Southern Continent" or "Terra Australis Incognita", as it appeared on some early world maps.

Land, New Zealand, was sighted on 6 October 1769 and Cook spent the next six months circumnavigating and mapping the North and South Islands. There were many opportunities for Joseph Banks, Daniel Solander, and their party to go ashore and collect specimens from the plants, very different from those that they were accustomed to in Europe. They also collected seed. The *Endeavour* finally left New Zealand waters on 1 April 1770 and sailed westwards, reaching the southern tip of the east coast of Australia about three weeks later.

Cook landed at Botany Bay on 28 April 1770 and subsequently sailed up the east coast of Australia. Here his first expedition nearly came to an untimely end. The *Endeavour* ran aground on the Great Barrier Reef on 11 June, and it was extraordinarily fortunate that the ship could eventually be refloated and then beached for repairs. Cook managed to escape the trap of the Great Barrier Reef and the *Endeavour* finally returned to the United Kingdom on 12 July 1771.

Despite the jettisoning of much of the cargo in the desperate situation when the *Endeavour* ran aground, Banks and Solander managed to return with only some of their botanical specimens lost. Indeed, their collections included some 1,300 new species, increasing the flora of the world known to European botanists by nearly a quarter. This was astonishing as a few years earlier, in 1753, Linnaeus had calculated that the total number of plants in the world hardly exceeded 10,000 species (W.T. Stearn, quoted in Godley, 1983).

The published accounts of Cook's first voyage

The authorised account (Hawkesworth, 1773) of Cook's first voyage (1768–1771) did not contain any illustrations of plants despite the many hundreds of paintings and preparatory sketches made by Sydney Parkinson. He worked hard: the Natural History Museum collection of botanical subjects from the voyage contains about 952 botanical watercolours and unfinished sketches by or ascribed to Parkinson (Blunt, 1983). Presumably, Banks wanted to retain such illustrations of plants for his planned volumes on the new plants that he and Solander had collected. At vast expense, Parkinson's preparatory sketches were completed by artists such as Frederick Polydore Nodder and the Miller brothers, and 743 copper plates were engraved, 182 illustrating New Zealand

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plants. There the project stalled. Limited numbers of uncoloured prints were run off at various times, but it was only after almost two hundred years (Adams, 1986) that the engravings were finally published in colour as *Banks' Florilegium* ([Banks,] 1980–1990) by Alecto Historical Editions (Studholme, 2017) and some, reduced in size, in the book *Joseph Banks' Florilegium* (Mabberley et al., 2017).

Although the engravings were not published in the lifetimes of Banks or Solander, botanists and enthusiastic amateurs visiting Banks at his residence in New Burlington Street and later at 32 Soho Square, London (illustrated in Gooding, 2017) would have had many opportunities to view the herbarium specimens of the Southern Hemisphere plants (Stearn, 1978; Taylor, 2018; Rose, 2019). For example, Joseph Gaertner used Banks' herbarium specimens to include some New Zealand plants in his *De fructibus et seminibus*: Volume 1 (1788), namely diagrams of *Chlamydia tenacissima* Gaertn. (1788) (*Phormium tenax* J.R.Forst. & G.Forst. (1776)) and three species of *Metrosideros*. It is also likely that visitors would have been able to see the various paintings and sketches of Parkinson as completed by a series of artists before engraving. Even so, visitors to the library at Soho Square were under close supervision: Banks was concerned at possible copying of images for publication (Rose, 2020).

It was common knowledge that Banks and Solander had collected a wealth of new plants, but their failure to see their accounts of the plants through to publication was frustrating for contemporary botanists. As early as 1771, Linnaeus wrote to John Ellis, "Do but consider, my friend, if these treasures are kept back, what may happen to them. They may be devoured by vermin of all kinds. The house where they are lodged may be burnt. Those destined to describe them may die. … I therefore once more beg, may I earnestly beseech you, to urge the publication of these new discoveries." Linnaeus was, unfortunately, percipient. The failure to publish the engravings and especially Solander's diagnoses of new species remain one of the great missed opportunities of New Zealand (and Australian) botanical research, although the herbarium specimens, the drawings and the engraved plates were preserved.

There are at least two unauthorised accounts of Cook's first voyage. One was prepared from the journal of Sydney Parkinson. On the way home from Australia the *Endeavour* stopped at Batavia, Dutch East Indies (now Jakarta, Indonesia), for repairs at the dockyard. The stopover proved disastrous as a third of the crew of the *Endeavour* died from disease either in Batavia or on the journey across the Indian Ocean. Amongst the fatalities was Sydney Parkinson on 26 January 1771, aged less than 30. Once the expedition returned to England, Sydney's brother, Stanfield, became embroiled in a bitter argument with Banks accusing him of withholding property, including Sydney's journal, which should have come to him. Stanfield Parkinson eventually managed to arrange for publication of his brother's journal (Parkinson, 1773). This contains many engravings based on Sydney's drawings but no illustrations of New Zealand plants. A second account, possibly by James Matra (1771), contains no plates.

In summary, none of the accounts of Cook's first voyage contains illustrations of New Zealand plants.

Cook's second voyage (1772–1775)

The second voyage began on 13 July 1772 with two ships, the *Resolution*, commanded by Cook, and the *Adventure*, commanded by Tobias Furneaux (Fig. 1). The aim was to circumnavigate the world at high southern latitudes, with Queen Charlotte Sound in New Zealand as a base. Much of the time was spent in Antarctic waters, months on end, further south than any recorded ship had been. The *Resolution* spent six weeks in Dusky Sound and then two periods of about three weeks each at Queen Charlotte Sound. Unfortunately, much of the time in New Zealand was late in the season and there were "innumerable plants & Trees, all new ones, none of which had flowers at this Season & the fruits either were quite unripe or already gone" (J.R. Forster, 1773, quoted by Sampson, 1985). The *Resolution* returned to England on 30 July 1775. The *Adventure* had become separated and had returned to England a year earlier.

Fig. 1 The *Resolution* and *Adventure* medal depicts the two ships used in Cook's second voyage. Commissioned by Sir Joseph Banks for presentation or barter. Medal 42.5 mm diameter, gold plated. Engraved by John Westwood, manufactured by Matthew Boulton – Soho (Mint) Soho, West Midlands, England, Great Britain, 1772. Photographer: Taryn Ellis, Museums Victoria. https://collections.museumsvictoria.com.au/items/1753925. © Museums Victoria CC BY (licensed as Attribution 4.0 International).

The plant illustrations resulting from Cook's second voyage

The first published European illustrations of some New Zealand plants came with the publications arising from Cook's second voyage (1772–1775). Reinhold Forster, accompanied by his son George and Andreas Sparrman, was naturalist on this voyage. George Forster, then only 17, was appointed as draughtsman and produced many hundreds of drawings of plants and animals. The Forsters' publication *Characteres generum plantarum* (Forster and Forster, 1776) appeared only a year after the expedition returned to England. It contains more than 70 plates illustrating the taxa described, including well-known genera that occur in New Zealand such as *Brachyglottis*, *Carpodetus*, *Coprosma*, *Corynocarpus*, *Haloragis*, *Leptospermum*, *Phormium*, *Ripogonum*, and *Thelymitra*. The images, prepared by George Forster, cannot be described as attractive being, instead, very technical, rather poor at that, giving diagnostic details of the flowers and fruits and generally no impression of the overall habit of the plants. They would be of interest to the taxonomist only if they were better. Production of the book was over-hasty and as Cheeseman (1906) complained "the illustrations [are] so badly executed as to be practically useless".

Much more attractive are the engravings of plants in the authorised account of the second voyage published a year later (Cook, 1777). Volume 1 contains many plates, three of which, made available through Banks, are of New Zealand plants: Plate No. XXII "Tea plant of New Zealand" (*Leptospermum scoparium* J.R.Forst. & G.Forst. (1776)), Plate No. XXIII "Flax plant of New Zeland" (*Phormium tenax* J.R.Forst. & G.Forst. (1776)), and Plate No. LI "The spruce fir of New Zeeland" (*Dacrydium cupressinum* Sol. ex G.Forst. (1786)). These three plants were probably chosen for illustration because they could be considered "useful" plants (Taylor, 2018). The young shoots of the "spruce fir" and the leaves of the "tea plant" were used for making "spruce beer" which, because of its vitamin C content, prevented or cured scurvy. Banks was very enthusiastic about the potential of flax as a source of fibre and subsequently often promoted its possibilities (Ferguson, 2008).

George Forster has often been suggested as the artist on whose drawings the engravings are based. They have also sometimes been attributed to William Hodges, the artist on the voyage, but according to St George (1986), Hodges was inexperienced in botanical illustration and copied plants from Forster's drawings to use them as working drawings of vegetation for his paintings. The studies of Nicolson (1998) and Nicolson and Fosberg (2004) confirm that these engravings are indeed based on work by George Forster. The Admiralty used his drawings but made them anonymous because of difficulties in dealing with Reinhold Forster. By contrast, the engravings of scenes by Hodges are fully attributed.

The illustration of the flax is possibly the finest of all early botanical illustrations of *P. tenax* with the life-sized inflorescence superimposed over a reduced image of the whole plant (Fig. 2). Nicolson and Fosberg (2004) conclude that the engraving is based on two Forster paintings held at the Forschungs- und Landesbibliothek, Gotha, Thuringia, Germany. As confirmation, they quote from George Forster (1777): "Desirous to promote every improvement which may turn out to be a real benefit to mankind, we did not hesitate a moment to permit an engraving to be made from our drawing [of *P. tenax*], at the request of the Earl of Sandwich [First Lord of the Admiralty], which is intended to ornament captain Cook's account of this voyage."

In the same work, George Forster (1777) wrote, "… we found a beautiful tree [*Leptospermum scoparium*] in flower, something related to the myrtle-genus, of which an infusion had been drank instead of tea in Capt. Cook's former voyage. … We have therefore very readily permitted Captain Cook to make use of our drawing of it, from which a plate has been engraved by order of the Admiralty, intended to accompany his own account of the voyage."

Another plate from Cook (1777, Vol. 1), No. LII, entitled "Poe-bird, New-Zeeland", is of a tūī, *Prosthemadera novaeseelandiae* Gmelin (1788), sitting on a branch of the tree fuchsia, *Fuchsia excorticata* (J.R.Forst. & G.Forst.) L.f. (1781) (Fig. 3). This engraving is based, with minor modifications, on a painting by George Forster, now in the British Library (Brown, 1988).

Nicolson (1998) lists 12 plates based on drawings by George Forster in periodical publications. Three plates are of plants that are in New Zealand:

- *Gentiana saxosa* G.Forst. (1777), now *Gentianella saxosa* (G.Forst.) Holub (1968), a species endemic to New Zealand. In: *Kongliga Vetenkaps-Academiens Handligar*, Stockholm, Vol. 38 (1777): Tab. V (Fig. 4).
- *Forstera sedifolia* G.Forst. (1780), endemic to New Zealand. In: *Nova Acta Regiae Societatis Scientiarum Upsalensis*, Vol. 3 (1780): Tab. IX (Fig. 5). Forster's original drawing on which the engraving is based is reproduced in Rice (2017).
- *Mniarum biflorum* J.R.Forst. & G.Forst. (1775), now *Scleranthus biflorus* (J.R.Forst. & G.Forst.) Hook.f. (1852), a species indigenous to New Zealand, Australia and South America. In: Forster, G. *Fasciculus plantarum magellanicarum.* Gottingae (1787) reprinted in *Commentarii Societatis Regiae Scientarum Gottingensis*, Vol. 9 (1789): Tab. 1. https://babel.hathitrust.org/cgi/pt?id=hvd.32044106365232&view=1up&seq=70. This, however, is a description based on material collected in Tierra del Fuego.

In each case, whole plants, complete with roots, are shown.

The Natural History Museum, London, holds 80 drawings of New Zealand plants, amongst others, by George Forster, showing both the habit of the plant and the diagnostic details of the flowers. Banks planned a major work on the botany of Cook's second voyage, *Icones Plantarum in itinere ad insulis maris australis collectarum*, using the botanical illustrations that he had purchased from George Forster in 1776 (Rose, 2020). Double-sided copper plates were engraved from 131 of these drawings but only two almost complete sets of prints from these are known (Edwards, 1981). Once again, Banks went to the considerable expense of preparing engravings on copper but did not follow through with publication. Rose (2020) attributes this, in part, to the political differences between Banks and George Forster: Banks a rich conservative, Forster a keen supporter of the French Revolution. It may also be that Banks wished to restrict the plates to a select audience, to maintain control over the illustrations and descriptions (Rose, 2020).

Proofs of 28 of the Forster plates illustrating New Zealand plants were sent to New Zealand in 1895 (Adams, 1988). This was to assist Thomas Kirk in the preparation of his proposed new *Flora of New Zealand*. Sets are held in the Auckland War Memorial Museum, the Alexander Turnbull Library, and Te Papa Tongarewa. The prints are interesting, but are, in general, not particularly attractive. They are working drawings, essentially outlines only.

Reinhold Forster was not allowed by the Admiralty to publish a competing account of Cook's second voyage. His son, George, being then a minor, did not sign the original agreement, and was able to publish an account probably partly based on his father's observations: *A voyage around the world* … (Forster, 1777). This is now considered to be one of the first great travel books and resulted in George being elected a Fellow of the Royal Society while still in his early twenties. The original editions contain no illustrations. (The German translation, *Reise um die Welt*, was republished in 2007 and is illustrated by a number of paintings and drawings by Forster.)

Fig. 2 "Flax plant of New Zeland". Plate XXIII from J. Cook (1777). A voyage towards the South Pole, and round the world. Performed in His Majesty's ships the *Resolution* and *Adventure*, in the years 1772, 1773, 1774, and 1775. 36.6 × 21.8 cm. Engraved from paintings by George Forster held at Gotha. Published 1777, London, W. Strahan and T. Cadell. Ref: C-051-030. Alexander Turnbull Library, Wellington, New Zealand. https://natlib.govt.nz/records/23065042.

In summary, apart from the illustrations of flower and fruit details, seven of George Forster's illustrations of plants from New Zealand were published at the time.

Fig. 3 "Poe-bird, New-Zeeland". Plate LII from J. Cook (1777). A voyage towards the South Pole, and around the world. Performed in His Majesty's ships the *Resolution* and *Adventure*, in the years 1772, 1773, 1774, and 1775. 22.2 × 17.7 cm. Published 1777, London, W. Strahan and T. Cadell. Ref: C-051-028. Alexander Turnbull Library, Wellington, New Zealand. https://natlib.govt.nz/records/22910527.

Fig. 4 *Gentiana* (*Gentianella*) *saxosa*. *Kongliga Vetenkaps-Academiens Handligar*, Stockholm, Vol. 38 (1777): Tab. V. Image: http://plantillustrations.org/species.php?id_species=460628.

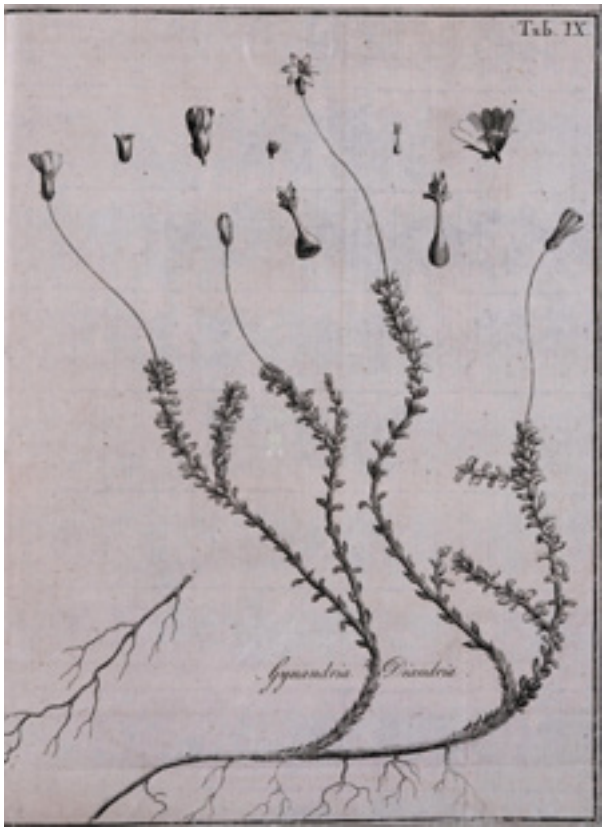

Fig. 5 *Forstera sedifolia*. *Nova Acta Regiae Societatis Scientiarum Upsalensis*, Vol. 3 (1780): Tab. IX. Image: http://plantillustrations.org/species.php?id_species=442806.

Cook's third voyage (1776–1780)

The main purpose of Cook's third voyage was to chart the north-west coast of North America and to search for a passage from the Pacific to the Atlantic around the north of what is now Canada. Cook captained the *Resolution* and Charles Clerke the *Discovery*. The expedition spent only two weeks in New Zealand at Queen Charlotte Sound. There was no naturalist aboard, probably because Cook had found the Forsters, particularly Reinhold, so difficult. Instead, David Nelson, employed as a gardener, was paid by Banks to join the *Discovery* under a contract which said in part "… I will under Capt. Clerkes orders collect & preserve all such plants & Seeds of plants as I shall be able to find in all such places as the ship may touch …". His main plant collections were at Hawaii. The publications arising from the third voyage do not contain illustrations of New Zealand plants.

The first New Zealand plants grown in England from seed collected during Cook's voyages

Only some of the herbarium specimens of Banks and Solander had been lost when, on Cook's first voyage, the *Endeavour* ran aground on the Great Barrier Reef. The seed they had collected did not do so well. According to a letter from the linen merchant and distinguished naturalist, John Ellis (1772), to Linnaeus: "Many of their seeds are destroyd by the boxes being obligd to be exposd on the Shore to the heat of the sun, and bad weather, when they had like to be lost on the coast of New Holland [Australia]." Nevertheless, some seed survived (Brooker et al., 1988). Aiton (1789) in the first edition of *Hortus Kewensis* records nine New Zealand plants growing at Kew, and the dates of accession and the fact that Banks was the donor indicate that they must have come from seed collected during Cook's first voyage:

- *Haloragis cercodia* Aiton (1789), now *H. erecta* (Banks ex Murray) Oken (1841), introduced by Joseph Banks in 1772, *Hortus Kewensis*, 1st edn. Vol. 2: 37.
- *Mesembryanthemum australe* W.T.Aiton (1789), now *Disphyma australe* (W.T.Aiton) N.E.Br. (1930), introduced by Joseph Banks in 1773, *Hortus Kewensis*, 1st edn. Vol. 2: 187, 188.
- *Philadelphus aromaticus* Sol. ex Aiton (1789), *P. scoparius* var. *linifolius* Sol. ex Aiton (1789), and *P. scoparius* var. *myrtifolius* Sol. ex Aiton, all now treated as *Leptospermum scoparium* J.R.Forst. & G.Forst. (1776), introduced by Joseph Banks in 1772, *Hortus Kewensis*, 1st edn. Vol. 2: 156.
- *Solanum laciniatum* Aiton (1789), introduced by Joseph Banks in 1772, *Hortus Kewensis*, 1st edn. Vol. 1: 247.
- *Sophora microphylla* Aiton (1789), introduced by Joseph Banks in 1772, *Hortus Kewensis*, 1st edn. Vol. 2: 43.
- *Sophora tetraptera* J.F.Mill. (1780), introduced by Joseph Banks in 1772, *Hortus Kewensis*, 1st edn. Vol. 2: 43. According to Curtis (1791) it was also planted at the Chelsea Physic Garden about 1774.
- *Tetragonia expansa* Murray (1783) (nom. illegit.), now *T. tetragonoides* (Pall.) Kuntze (1891), introduced by Joseph Banks in 1772, *Hortus Kewensis*, 1st edn. Vol. 2: 178.

It is possible that other plants were successfully raised from seed collected during Cook's first voyage but either the plants were not sent to Kew or died before the first edition of *Hortus Kewensis* went to press. A small number of Australian plants was also growing at Kew (Nelson, 1983), resulting from collections during Cook's first voyage.

The second edition (Aiton, 1810–1813) of *Hortus Kewensis* recorded an additional New Zealand plant: *Phormium tenax*, introduced by Joseph Banks about 1789, *Hortus Kewensis*, 2nd edn. Vol. 2: 84.

Hooker and Cunningham (1832) wrote of *P. tenax*, "The seeds brought home by Sir JOSEPH BANKS in 1771 did not succeed, but the *New Zealand Flax* was introduced to the Royal Gardens at Kew, through the medium of the same enlightened individual in 1789 …". However, Wulff (2008) gives an earlier date of 1772 for the introduction of *P. tenax*, citing Ellis (1772), who wrote to Linnaeus, "I hope I shall be able, in the Spring, to raise the seeds of a most valuable plant which they call Chlamydia [*Phormium*] … As the seeds of it were all destroyed by the sunshine & bad weather, I beg'd Solander to let me look at the Specimens which they had preserved in papers, and was so fortunate as to find several seed vessels perfectly sound and full of ripe seeds. I have got some of them from him, and given them to our best gardeners …". The origin of the plants of *P. tenax* introduced by Banks "about 1789" is simply not known. Possibly Ellis had been successful in raising plants from the seed given to him by Solander.

There seems no information on seed collected in New Zealand during Cook's second voyage.

On the third voyage, David Nelson and William Anderson, the surgeon on the *Resolution*, collected seeds of 386 species of plants, including about 47 from Queen Charlotte Sound (Brooker et al., 1988). These were widely distributed, many to European botanists and gardeners (Brooker et al., 1988; Mabberley, 2019), but there seems no information on how many were successfully raised.

The first European illustrations of New Zealand plants growing in Europe

In 1780, John Miller (previously known in Germany as Johann Sebastian Müller) published a fascicle usually called *Icones novae* (Britten, 1913, 1919). This was intended as the start of an ambitious work but instead consists of only seven plates sometimes found in libraries bound at the end of his previous publication *Illustratio systematis sexualis Linnaei* (Miller, 1770–1777). John Miller was an outstanding artist and engraver. Linnaeus himself had great praise for Miller, stating that the plates were "more beautiful and more accurate" than any he had ever seen.

Icones novae (Miller, 1780) illustrates six plants: *Sophora tetraptera* J.F.Mill. (1780), *Phormium tenax* J.R.Forst. & G.Forst. (1776), two plates of *Heliconia bihai* J.F.Mill. (1776) (now *Strelitzia reginae* Banks (1788)), *Stewartia malacodendron* L. (1753), *Lagerstroemia indica* L. (1759), and a species of *Fothergilla*. All the plants, except *P. tenax*, are listed as having been introduced to England and as growing in English gardens or in hothouses in English gardens. Thus, *S. tetraptera* is recorded in the accompanying text as:

> Tab. I. "*Sophora tetraptera*. Is a native of New Zeeland. Flowered and maturated seeds in the open ground in the Botanic Garden at Chelsea [Chelsea Physic Garden], and in the garden of W. Pitcairn, M.D., at Islington. An. 1779."

The account of *P. tenax* gives no indication that it was growing in England:

> Tab. II. "*Phormium tenax* Forster; *Nov. Gen. 24*. Kekkēē-é, the name given by the natives. Is a native of New Zeeland, where the natives make use of the fibres of the leaves instead of flax and hemp."

It therefore seems probable that Miller had not seen a living plant of *Phormium tenax* but instead based his illustration (Fig. 6) on the sketches of Forster and Parkinson, then in the collections of Joseph Banks, and the Forster plate (Fig. 2) in the authorised account of Cook's second voyage, *A voyage towards the South Pole …* (Cook, 1777). As noted above, the second edition of *Index Kewensis* recorded that *P. tenax* was introduced to Kew about 1789, nine years after the publication of *Icones novae*.

Miller's plate of the kōwhai, *Sophora tetraptera* (Fig. 7), is very attractive to me, preferable to that in the *Banks' Florilegium*, because of the more natural positioning of the seed pods, whereas that of *Phormium tenax* (Fig. 6) is rather "busy" and inelegant.

Miller's *Icones novae* is so rare and is held in so few libraries that there has been doubt as to whether it was ever formally published. However, Sprague (1936)

Fig. 6 *Phormium tenax*. *Nov. Gen. 24:* Tab. II, in Miller's *Icones novae* (1780). 45 × 30 cm. RHS Lindley Collections. The original plate legend reads: "Hexandria monogynia. Explanations of the figures: Fig. 1. The base of the *Leaves* equitant. –2. The lower part of a *Leaf*. –3. The upper part of a *Leaf*. –4. The upper part of the *Stem*, before the expansion of the flowers. – (A.) The *Bracteas* deciduous, including the branches. –5. The *Panicle* terminal and expanded. –6. The *Flower*. –7. The three *exterior Petals*. –8. The three *interior Petals*. –9. The *Stamens*. –10. The *Pistil*. –11. The intire *Capsule*. —12. A transverse section of the *Capsule*. –13. The Capsule opening. –14. The *Seed*."

Fig. 7 *Sophora tetraptera.* Tab. I, in Miller's *Icones novae* (1780). 45 × 30 cm. RHS Lindley Collections. The original plate legend reads: "Decandria Monogynia. Explanations of the figures: Fig. 1. The flower-bearing *Branch*. –2. The *Vexillum* [the standard] seen on the external side. –3. The same on the interior side. –4. and 5. The *Alæ* (or *Wings*). –6. and 7. The dipetalous *Carina* [the keel]. –8. The *Stamens*. –9. The *Anthera* magnified on both sides. –10. The *Style* with a *Stamen*. –11. The *Style* with the *Calyx*. –12. The *Legumens* (or *Seed-pots*). –13. Two joints of the *Legumen* dissected, so that the membranes (A.) appear, which include the seeds. –14. The *Seed*."

concluded that it was indeed actually published. It is therefore probable that the plates of *Sophora tetraptera* and *Phormium tenax* are the first coloured illustrations of New Zealand plants ever to be published, even if available to only a limited number of people. The plate of *S. tetraptera* is probably based on a specimen from a plant growing in London, a plant raised from seed collected during Cook's first voyage.

Subsequent coloured illustrations of New Zealand plants before 1800

Miller's *Icones novae* must have been available to the notorious plagiariser, Joseph Pierre Buc'hoz (Ferguson, 2000). He had trained in medicine so it may well be he is the "Buchor M.D. Paris" who is listed as a subscriber to Miller's *Illustratio systematis sexualis Linnaei*. Buc'hoz's plates of *Heliconia bihai*, *Phormium tenax,* and *Sophora tetraptera* in his *Le grand jardin de l'univers* … (Buc'hoz, 1785) are very obviously based on parts of Miller's plates with only minor modifications or rearrangements.

The first issue of *The Botanical Magazine, or Flower-Garden Displayed*, later to be known as *Curtis's Botanical Magazine*, was published in 1787. It proved to be very popular with an initial circulation of almost 3,000. In 1791 (Curtis, 1791), it contained an illustration of its first New Zealand plant, *Sophora tetraptera*. According to the text, this had been "planted by Mr FORSYTH about the year 1774" in the Apothecaries' Garden at Chelsea (Chelsea Physic Garden). It is therefore very likely that this was the same plant that Miller had illustrated, about ten years earlier, in *Icones novae*. Furthermore, "… from some of the seeds which have ripened in this country, plants have been raised, and by these the plant is to be found to be propagated with the most success; it may also be increased by cutting and layers". Plants were soon available in Europe as shown by numerous illustrations, clearly based on different flowering shoots (Junghans, 1787; Curtis, 1791; Meerburg, 1798; Kerner, 1800). There were also several illustrations of *S. microphylla* before 1800: e.g., Römer and Usteri (1790) (misnamed as *S. tetraptera*), Schneevoogt (1793), and von Jacquin (1798). Both species were illustrated in Lamarck (1793). *Sophora microphylla* and *S. tetraptera* were undoubtedly popular because of their spectacular flowers and plants became widespread since they were easily propagated.

Other New Zealand genera were also illustrated by colour plates before 1800, e.g., *Solanum laciniatum* Aiton (1789) (Curtis, 1796) and *Leptospermum scoparium* J.R.Forst. & G.Forst. (1776) (Canvilles, 1797) as *L. multiflorum* Cav. (1797), and Schrader and Wendland (1797) as *Melaleuca scoparia* (J.R.Forst. & G.Forst.) L.f. (1782). A systematic survey of *Index Londinensis* might reveal other plants. During the next century increasing numbers of New Zealand plants were illustrated, particularly in the publications resulting from journeys of exploration (Sampson, 1985) or as a result of the plants being introduced into cultivation in Britain (Matthews, 1977).

The failure of Banks to publish

Banks owned the works of Parkinson from the first of Cook's voyages; he had the sketches completed and the plates engraved. Eventually, he also owned many of George Forster's illustrations from the second voyage and likewise had many of the plates engraved. He planned very ambitious publications but despite the huge expense already incurred these did not come to fruition. Many suggestions have been made as to the reasons (Sampson, 1985; Gooding, 2017). Banks was not an author – indeed he considered it was not a "gentlemanly vocation"; the death of Solander meant that he could not rely on him to see the work finished; he had many other commitments as President of the Royal Society; his income fell because of the agricultural depression; or perhaps he lost interest. Rose (2020) suggests that ultimately, he did not want to publish, that he preferred to keep control of the images. People who wished to use them had to come to him and use them under his conditions.

Mabberley (2019) has an interesting alternative suggestion. Banks had actively encouraged Roxburgh in his magnificent, illustrated work on the plants of India, and the Bauer brothers, possibly the greatest of natural history artists of the time. Perhaps Banks realised that compared with these artists, Parkinson and especially Forster were somewhat ordinary, somewhat pedestrian. Whatever the reason, the result was that most of the plant illustrations coming from Cook's first and second voyages remained unpublished for many years.

Acknowledgements

I acknowledge the pioneering studies of the late Bruce Sampson (1985) of Victoria University of Wellington on early New Zealand botanical art and the late Bob Cooper (in Brooker et al., 1988) of the Auckland Institute and War Memorial Museum on the early introduction of New Zealand plants to the United Kingdom. It is remarkable what they were able to achieve before the digitisation of many early publications and before resources such as plantillustrations.org of Missouri Botanical Garden were available.

I thank the librarians of the New Zealand Institute for Plant and Food Research Ltd, the staff of the Botany Department of the Auckland War Memorial Museum, C. Forstina of the Royal Horticultural Society for their assistance, and the editors for their careful attention to detail.

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