

The  
**BOTANICAL ENDEAVOUR**  
of  
**SIR JOSEPH BANKS:**  
*Historic Prints from his*  
**FLORILEGIUM**  
*Now Available Like Never Before*

By Connor Yearsley

Almost 250 years after Captain James Cook's (1728-1779) *HMS Endeavour* circumnavigated the globe, *Joseph Banks' Florilegium: Botanical Treasures from Cook's First Voyage* (Thames & Hudson, 2017) has been published. The 320-page book showcases 147 stunning, full-page, color botanical prints that resulted from the extensive work of the English botanist and naturalist Sir Joseph Banks (1743-1820) and the small, highly skilled team he oversaw onboard the *Endeavour* from 1768 to 1771.<sup>1</sup>

When the *Endeavour* set out in 1768 on Cook's first of three around-the-world voyages, roughly a third of the world's map remained blank or filled with fantasies.<sup>2</sup> While Cook changed that, Banks and his team collected an estimated 30,000 plant and animal specimens during their nearly three-year voyage of

Sydney Parkinson's watercolor of breadfruit (*Artocarpus altilis*). On April 28, 1789, the *HMS Bounty*, led by William Bligh, was transporting 1,015 breadfruit saplings from Tahiti to the British West Indies when members of the crew famously mutinied near Tonga and set Bligh and 18 others adrift in a small boat, probably partly because they were thirsty (water was rationed for the plants). The mission was the brainchild of Banks, who thought to introduce the nutritious, high-carb fruit (which he encountered on the *Endeavour* voyage) to the West Indies to feed slaves on sugar plantations. A single tree can produce 450 pounds of fruit per season. After the mission failed, it was reattempted successfully in 1791 on the *HMS Providence*, also led by Bligh. (Amazingly, Bligh survived after the *Bounty* mutiny by navigating the overcrowded boat for 47 days and 3,618 nautical miles to the island of Timor using just a pocket watch, a sextant, and his memory [no charts or compass], and lost just one of the 18 crew members on the journey.) Bligh delivered 678 live breadfruit plants to St. Vincent and Jamaica. At first, the slaves refused to eat the fruit, feeding it to the pigs instead. Now, however, breadfruit is a staple of Jamaican cuisine. Artwork courtesy of JSTOR Global Plants Database. Source: Library & Archives, Natural History Museum, London.



discovery to the South Pacific and back. This collection yielded "some 3,600-odd described species, of which it is probable that the plant species new to science may exceed 1,400," according to Banks' biographer Harold B. Carter (1910-2005). To put this achievement in perspective, the Swedish botanist Carl Linnaeus' *Species Plantarum* (1753), which formed the basis of modern plant taxonomy (the binomial system for naming plants), included about 6,000 plant species known to Linnaeus at the time. Thus, the plant species that the *Endeavour* expedition introduced to Western botany expanded Linnaeus' list by almost 25% or more (if Carter's estimate is accurate) and helped disprove Linnaeus' belief that the world contained no more than 10,000 plant species.<sup>2-4</sup>

After the voyage, Banks had 743 copper-plate engravings made, at great personal expense, from the original artwork (finished watercolors and precise sketches) of the Scottish artist Sydney Parkinson (1745-1771), who was part of Banks' team on the expedition. The engravings, almost a literal ton of the finest copper in total, are known collectively as Banks' Florilegium, and each one depicts a plant species that was encountered on the voyage.<sup>1,5</sup> As far as is known, all of these species are still extant, and many, if not most, were new to European botany at the time. The new book's aim was to provide a representative sample of some of the most aesthetic of these 743 engravings, especially those that depict economically and ecologically important species. The 147 prints that were chosen are perhaps among the most beautiful and precise botanical prints ever created.<sup>1</sup>

According to Mel Gooding, art historian and co-author of the book, the motives of Banks and his team were to identify and

record as many plants as possible in the circumstances of the voyage (email, January 10, 2018). "Banks and [Swedish naturalist Daniel] Solander were driven by the demands of Linnaean taxonomy and the disinterested discovery and classification of plants rather [than] by any utilitarian criteria," he wrote. "That is why the selection of reproductions [in the book] was generally, and in the first place, arbitrary, determined by requirements of botanic variety and visual interest." However, many of the selected species do have ethnobotanical uses, and nine of these species are included in the following pages.

For a variety of reasons, Banks' Florilegium was never published in Banks' lifetime. In fact, the plates were printed and published in color for the first time between 1980 and 1990 by Alecko Historical Editions (a Salisbury, England-based publisher of limited edition prints, engravings, and facsimiles), in association with the Natu-



Portrait of Banks by Benjamin West, painted in 1771, after the *Endeavour* voyage. In his 20s, Banks stood six feet tall (unusually tall for his day) and weighed about 180 pounds. He is depicted with items from the voyage, including Māori weapons, and is wearing a Māori cloak made of woven *harakeke*, or New Zealand flax (*Phormium tenax*), fringed with dog hair. The book at his feet is open to an image of *harakeke*.

Artwork courtesy of Lincolnshire County Council, Usher Gallery, Lincoln, UK, and Bridgeman Images.



ral History Museum in Kensington, London. A limited number of complete sets were produced over this decade, and the selection in the new book comes from those prints, thus making them available to the general public for the first time.<sup>1,5</sup> All the plants in the Florilegium, except one (not included in the book), were depicted life-size, and the digital reproductions in the book are reduced to about 75% of the size of the original plates, which are almost all the same size (about 18 x 12 inches [approx. 46 x 31 centimeters]).<sup>1</sup>

In the book, commentaries by botanist David Mabberley, PhD, accompany each print, and these include information about the botany and utility of the depicted

species, and, in some cases, historical details about the expedition's observations of, and experiences with, the species. There are also detailed sections by Gooding about the voyage itself and the making of the Florilegium, and a section by Joe Studholme, the co-founder and director of Alecto Historical Editions, about the modern printing of the Florilegium.<sup>1</sup>

The term "florilegium" is derived from the Latin *flos*, meaning "flower," and *legere*, meaning "to gather" (literally a flower gathering or an anthology). This term was not used by Banks, but was adopted for the 20th-century publication of the engravings. As Gooding explains in the book, Banks intended the Florilegium to be "a major contribution to science...; the authoritative historical basis of a new taxonomy; the initiation of the publication of Australasian botany. For the modern viewer, however, it constitutes, above all, a work of outstanding graphic achievement and a radiant revelation of natural beauty in its infinite variety and particularity."<sup>1</sup>

### The Voyage

On August 25, 1768,\* the *Endeavour*, with 39-year-old Cook† at the helm, departed from Plymouth, England, with 94 people onboard and provisions (including pigs, poultry, and a milking goat) for 18 months.<sup>1-3</sup> The *Endeavour* was a type of vessel called a bark, which the British Admiralty chose at least partly because she

A replica of the *Endeavour*. The original was made mostly of hemp (*Cannabis* spp.), flax (*Linum usitatissimum*), elm (*Ulmus* spp.), oak (*Quercus* spp.), pine (*Pinus* spp.) tar, and bits of iron and brass. In 1778, during the American Revolution, the British formed a blockade by scuttling the *Endeavour* (then called *Lord Sandwich*) and other vessels in Newport Harbor, Rhode Island, when a French fleet threatened the harbor. Image courtesy of the Australian National Maritime Museum, which owns the replica.



\* According to a peer reviewer, in the 18th century, naval officers used ship's time instead of civilian time, meaning that each day began at noon (pm coming before am). The *Endeavour* left Plymouth at 2 pm, so Cook, a naval man, recorded that it was August 26, while Banks, a civilian, wrote that it was August 25.

† One peer reviewer noted that Cook, at the time, held the rank of lieutenant, the minimum rank necessary for him to lead the expedition. But, anyone in charge of a ship is called captain, regardless of rank.

was more likely than a heavier vessel to float off if she grounded in shallow water, a fact that likely helped prevent disaster later when she grounded and almost sank on Endeavour Reef, part of the Great Barrier Reef off the eastern coast of Australia. The 368-ton, 105-foot-long vessel had ample room for stowage in her hold, which was necessary for the vast collections, botanical and otherwise, that would be gathered during the journey.<sup>6</sup>

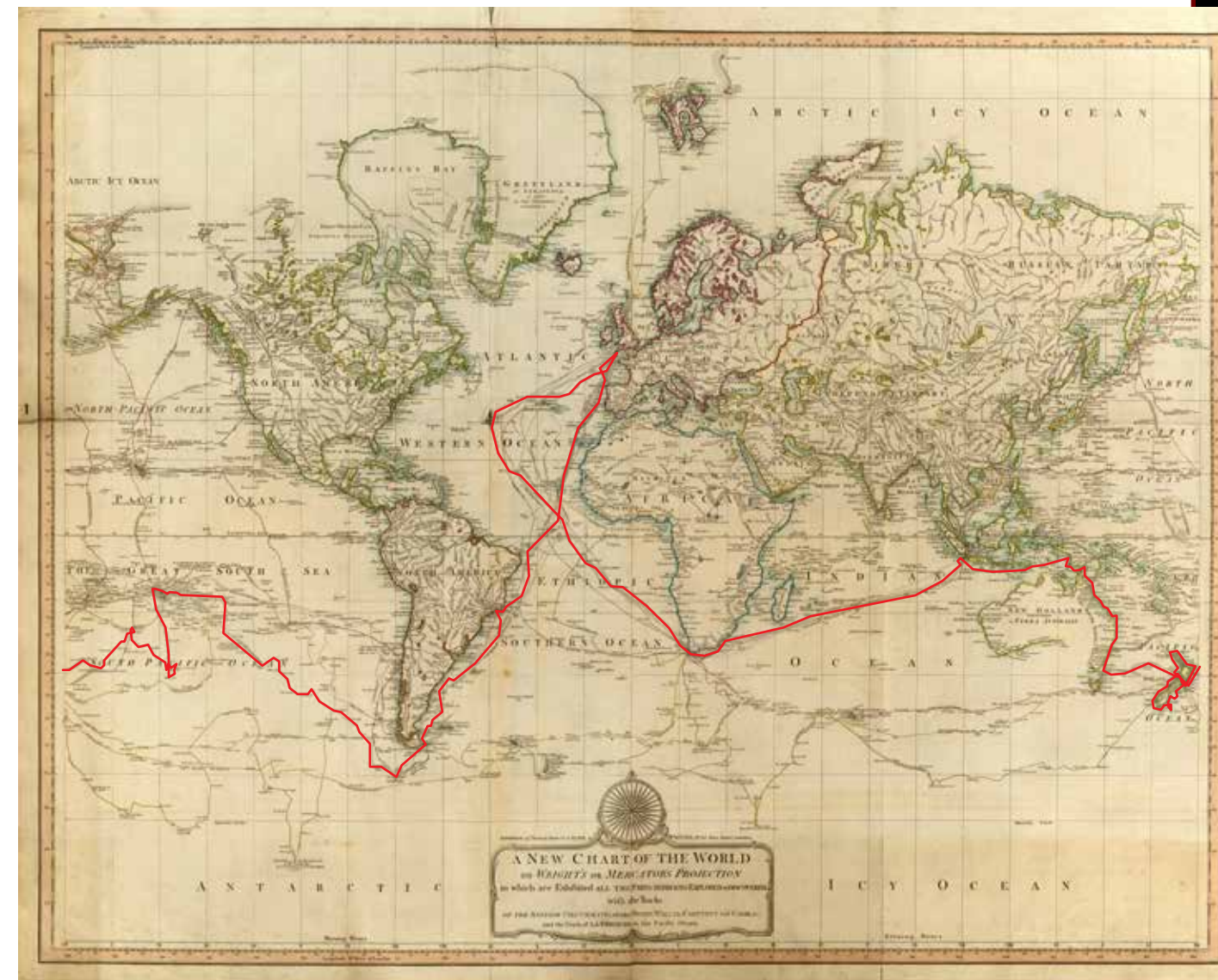
Cook's instructions from both the Royal Society and the Admiralty were to travel to King George's Island (Tahiti) in the South Pacific and observe the transit of Venus across the face of the Sun, which was expected on June 3, 1769.<sup>1-4</sup> Data from this observation would enable the calculation of the distance from Earth to the Sun, which, in turn, would make calculations of longitude more accurate and thus aid navigation.<sup>1</sup> Readings were needed in the Southern Hemisphere, and Tahiti was deemed a suitable viewing location.<sup>4</sup> Observations of Venus' previous transit in 1761 had failed, and the next transit would not occur until

1874. The Royal Society first met in 1767 to prepare for this rare occurrence and eventually gained the support of the government and King George III.<sup>7</sup>

Cook ultimately was chosen to lead the expedition, partly because of his naval service as well as his skills as a navigator and cartographer<sup>7</sup> (some of his maps reportedly remained in use as late as the 1990s<sup>2</sup>). The Admiralty purchased a merchant collier (a coal-carrying cargo ship), the *Earl of Pembroke*, which was refitted for the voyage and renamed *Endeavour*.<sup>7</sup> The Admiralty also gave Cook sealed instructions to find a mythical "Southern Continent," *Terra Australis Incognita*, which was thought by some to exist in the Southern Hemisphere, and claim it for Britain.<sup>1</sup>

Although the astronomical mission was the Royal Society's initial, main focus, it responded with some enthusiasm when Banks, one of the Society's fellows, asked to join the expedition. In an official application to the Admiralty, the Council of the Royal Society wrote: "Joseph Banks ... ,

The route that Cook followed on the *Endeavour* from 1768 to 1771. Map courtesy of David Rumsey Map Collection ([www.davidrumsey.com](http://www.davidrumsey.com)). Red line added.





a gentleman of large fortune, who is well versed in Natural History, being desirous of undertaking the same voyage, the Council very earnestly request their Lordships, that in regard to Mr. Banks's great personal merit, and for the advancement of useful knowledge, he also, together with his suite ... be received on board of the ship."<sup>8</sup>

Banks' friends generally were interested in the prospect of his voyage, but some tried to persuade him to make the "Grand Tour" of Europe instead (like many other upper-class European young men at the time), to which he responded: "Every blockhead does that; my Grand Tour shall be one round the whole globe."<sup>8</sup>

The high-spirited 25-year-old had been fascinated with nature and botany from a young age.<sup>1,4</sup> As a boy, he loved to explore the meadows, woods, stream banks, and fens that surrounded Revesby Abbey, the family's estate in Lincolnshire, England. He enjoyed fishing for trout and hunting ducks and wood pigeons, and was known to rub toads on his face to prove that they were harmless. At age 21, after his father died, Banks inherited the family's estates (totaling 9,000 to 10,000 acres) and a considerable fortune, which reportedly made him one of England's wealthiest men.<sup>4</sup> His expedition to Newfoundland and Labrador in 1766 had helped prepare him to oversee the *Endeavour's* scientific program.<sup>1</sup>

Banks and Cook could scarcely have been more different. According to *Blue Latitudes: Boldly Going Where Captain Cook Has Gone Before* (Picador, 2002): "The two men were fifteen years apart in age and hailed from opposite ends of the class system: Cook of peasant stock, with little schooling; Banks a nobleman's son, educated at Harrow, Eton, and Oxford.... Cook was a family man and naval careerist, Banks a rakish dilettante.... Yet the day laborer's son and the landed gentleman would forge one of the great partnerships in the history of exploration, akin to that between Meriwether Lewis and William Clark."<sup>2</sup>

Among Banks' entourage was Daniel Solander (1733-1782), an esteemed Swedish naturalist and taxonomist and a favorite pupil and colleague of Linnaeus. In 1760, Solander had come to London at Linnaeus' arrangement to give "instruction in Linnaean principles," and, in 1763, he began to catalog the collections, using the Linnaean system, at the then-new British Museum. In 1764, Solan-

der was elected to the Royal Society. He volunteered to accompany his friend Banks on the voyage and would be his close collaborator until Solander's death in 1782. Throughout the voyage, he collected specimens, which he then dried, recorded, and named. With Solander came his secretary, Herman D. Spöring (1733-1771), a Finn whose talents included botanical and topographical drawing and clock- and instrument-making.<sup>1</sup>

Banks also recruited, at his own expense, the young artists Sydney Parkinson and Alexander Buchan (d. 1769). Parkinson, a Quaker from Edinburgh and a child of the Edinburgh Enlightenment, was a skilled botanical artist. Buchan, also from Edinburgh, was a talented depicter of people and landscapes.<sup>1</sup>

The supernumeraries, or the "gentlemen," as Banks and his entourage were known onboard, had separate quarters, dined with Cook in the stern's great cabin (far removed from the mess deck), and were largely exempt from naval duties and discipline.<sup>2</sup>

Banks paid for himself, his staff, and the materials they used on the journey. According to Carter, Banks and his entourage may have brought some 20 tons of baggage and equipment onboard.<sup>3</sup> In a letter to Linnaeus, the English naturalist John Ellis wrote: "No people ever went to sea better fitted out for the purpose of natural history, nor more elegantly. They have got a fine library of natural history: they have all sorts of machines for catching and preserving insects; all kinds of nets, trawls, drags, and hooks for coral fishing; they have even a curious contrivance of a telescope by which, put into the water, you can see the bottom at a great depth, where it is clear. They have many cases of bottles with ground stoppers, of several sizes, to preserve animals in spirits. They have the several sorts of salts to surround the seeds; and wax, both bees'-wax and that of the *Myrica*.... [I]n short, Solander assured me this expedition would cost Mr. Banks £10,000."<sup>9</sup> This amount was more than twice what King George III contributed to the expedition, and is equal to roughly \$1 million today.<sup>2</sup> It is also significantly more than the £2,840 that originally was paid for the *Endeavour*.<sup>6</sup>

The "fine library" onboard comprised about 40 books, including, critically, Linnaeus' *Systema Naturae* and *Species Plantarum*, in addition to recent books about South Seas

### Great Bougainvillea (*Bougainvillea spectabilis*, Nyctaginaceae) – Brazil Landfall – [BF Plate 355]

Native to South America, great bougainvillea is a perennial, tropical, evergreen shrub or vine that climbs with the aid of thorns and can grow to 12 meters (39 feet) tall.<sup>1,11,12</sup> It has been introduced as an ornamental plant around the world, mostly in warmer climates.<sup>12</sup> The flowers come in clusters of threes inside the bracts (specialized or modified leaves) that vary in color (orange, bright red, purple-red, pink, or white) and resemble a single flower.<sup>1,12</sup> The species is pollinated mostly by butterflies and moths.<sup>1</sup> Leaf preparations of the plant reportedly have been used to treat diabetes, diarrhea, cough, and sore throat; to reduce stomach acidity; and as an expectorant and febrifuge. In addition, the leaves (boiled in water) have been used as a laxative, and the decocted dried stems have been used to treat hepatitis.<sup>11</sup> The genus is named for the explorer and scientist Louis-Antoine de Bougainville (1729-1811), who was the first Frenchman to circumnavigate the globe and visited Tahiti not long before the *Endeavour* arrived there.<sup>1,11</sup> The species name *spectabilis*, meaning "notable" or "remarkable," reportedly owes to the fact that it has the largest bracts of any cultivated *Bougainvillea* species.<sup>1</sup>

*Bougainvillea spectabilis*, Great bougainvillea, Nyctaginaceae, *Species Plantarum*. Copper plate by Gabriel Smith, based on Parkinson's 1769 watercolor. Artwork ©2018 Editions Alecto Ltd and the Trustees of the Natural History Museum, London





exploration by the French polymath Charles de Brosses and the Scottish geographer Alexander Dalrymple.<sup>1</sup>

#### **Madeira, Brazil, and Tierra del Fuego**

On September 13, 1768, the expedition made first landfall at Funchal in Madeira, a Portuguese archipelago in the North Atlantic. Parkinson depicted 21 previously unknown species collected here, 11 of which were later engraved. After five days, the *Endeavour*, with new provisions (including Madeira wine), headed for Brazil.<sup>1</sup>

On November 13, 1768, landfall was made at Rio de Janeiro, but the Portuguese governor allowed only Cook to go ashore, to the dismay of everyone, perhaps especially Banks and his team. However, unauthorized trips ashore and vegetation brought onboard for the livestock yielded some specimens. Of nearly 40 specimens that Parkinson was directed to depict, 23 were later engraved.<sup>1</sup>

From Brazil, the *Endeavour* sailed southwest toward Tierra del Fuego (the “Land of Fire,” an archipelago at the southernmost tip of South America), with the weather becoming progressively colder the further south she went.<sup>1</sup> Cook opted to avoid passing through the often-hazardous Strait of Magellan (named for the Portuguese explorer Ferdinand Magellan, who navigated it in 1520)<sup>7</sup> and would stock up on firewood and fresh water in Tierra del Fuego.<sup>1</sup>

On January 15, 1769, Cook anchored in the Bay of Good Success, which would not live up to its name.<sup>3</sup> Banks, Solander, and others went inland to gather plants, but bad weather trapped them on the hills above the shore for multiple nights. On the second night, two of Banks’ servants froze to death. Parkinson depicted 70 of the specimens collected here.<sup>1</sup>

#### **Society Islands**

The *Endeavour* then continued southwest, rounded Cape Horn, and headed northwest toward Tahiti. During this stretch, as with each later long leg of the journey,

Banks and his team worked in the great cabin. Parkinson spent his time depicting the specimens given to him and had to contend with the sea swell. Throughout the journey, he had to work quickly to depict the specimens before they wilted and lost their color in the tropical or subtropical conditions.<sup>1</sup>

After months at sea, Cook finally anchored in Matavai Bay on the north coast of Tahiti on April 13, 1769. Not long after arrival, Buchan died from epilepsy before he had been able to accomplish much on the voyage. Banks lamented this, not only because Buchan was “an ingenious and good young man,” in Banks’ words, but also because it prevented Banks from being able to bring back to England pictures of the landscapes and native people encountered on the voyage.<sup>1</sup>

Banks spent much of the expedition’s three-month stay in Tahiti engaged in diplomacy and ethnography, but he did find some time for botanical activities.<sup>1</sup> In his journal, on July 4, 1769, he wrote: “I employd myself in planting a large quantity of the seeds of Water melons, Oranges, Lemons, limes ... which I had brought from Rio de Janeiro.” This exemplified what scientists eventually called the “antipodean exchange” — the transportation of plants (and later animals) among European nations, the Americas, and the lands of the South Seas — which impacted the subsequent look of the world and played an important part in Banks’ later life and work.<sup>4</sup>

With the astronomical mission complete, Cook set sail on July 13, 1769, to explore the other islands that, along with Tahiti, form the archipelago he called the Society Islands.<sup>1</sup> The voyage brought many of these islands, including Tahiti, Bora-Bora, Moorea, and Raiatea, into the British sphere of influence.<sup>4</sup> Then, on August 14, Cook sailed south to search for the unknown Southern Continent, as the Admiralty had instructed. After sailing for about 1,500 miles, in increasingly bad weather, Cook finally turned west toward New Zealand, without finding the sought-for Southern Continent. During this stretch,

### **Sweet Potato (*Ipomoea batatas*, Convolvulaceae) – Society Islands Landfall – [BF Plate 627]**

This member of the morning glory family is cultivated for its starchy, edible, swollen tubers. It is indigenous to the New World and may provide evidence of trans-Pacific contact more than 1,000 years ago.<sup>1,13</sup> Excavations at Tangatatau, a rockshelter on Mangaia Island of the Cook Islands, uncovered sweet potato remains and reportedly established the presence of the species in central eastern Polynesia by about 1,000 CE, long before Europeans arrived there.<sup>13</sup> It has been proposed that sweet potato plant parts may have floated or been carried by birds across the Pacific, but it seems more likely that the Polynesians made landfall in South America and took the species back with them.<sup>13,14</sup> It is believed that they had sophisticated, double-hulled canoes similar to catamarans that could stay at sea for months and possibly carry up to 80 people.<sup>14</sup> Similarities between the terms for sweet potato in Polynesian languages (*kuumala* and its derivatives) and in Quechuan languages (*kumara*, *cumar*, or *cumal*) spoken by Andean natives may also indicate pre-Columbian interaction between these peoples.<sup>13,14</sup> The Māori, a Polynesian people, took the species with them to New Zealand.<sup>1</sup> Because they had no cereal crops, sweet potato became their staple crop. They also reportedly have used sweet potato-derived liquor to treat fever and sweet potato-derived lotion to treat skin conditions.<sup>15</sup>

*Ipomoea batatas*, Sweet potato, Convolvulaceae, *Tableau Encyclopédique et Méthodique*. Copper plate by Gabriel Smith, based on Parkinson’s 1769 watercolor. Artwork ©2018 Editions Alecto Ltd and the Trustees of the Natural History Museum, London





Parkinson depicted specimens from the Society Islands, from which 89 plates were later engraved.<sup>1</sup>

#### New Zealand

The *Endeavour* landed on the east coast of the North Island of New Zealand in early October 1769.<sup>1</sup> It stayed in New Zealand for almost six months,<sup>‡</sup> but spent only about a third of that time anchored near land. While ashore, the expedition had some tense encounters with the Māori.<sup>2</sup> “I suppose they live intirely [sic] upon fish dogs and Enemies,” Banks wrote of the Māori.<sup>4</sup> Parkinson, however, skillfully depicted their facial markings, carved weaponry, boats, and dwellings.<sup>1</sup>

Most of the time in New Zealand was spent charting the coastline.<sup>2</sup> Cook circumnavigated\*\* the two main islands and determined there was a strait between them (Cook Strait). With Parkinson’s help,<sup>1</sup> he charted the archipelago so skillfully that Julien Crozet, a French navigator who followed in Cook’s wake, remarked, “I doubt much whether the charts of our own French coasts are laid down with greater precision.”<sup>2</sup> The ship put in when and where possible, and Banks and his team gathered an impressive collection of specimens, with the islets and headlands of Queen Charlotte Sound (at the northern tip of the South Island) being especially fruitful.<sup>4</sup> Of the New Zealand specimens depicted by Parkinson, 182 were later engraved.<sup>1</sup>

#### Australia

From New Zealand, the ship sailed west to Australia (then called New Holland, so named by the Dutch explorer

Abel Tasman) and became the first European expedition to reach the eastern coast of the continent.<sup>1,4</sup> On April 28, 1770, Cook sailed between what he called Cape Banks and Point Solander and anchored in a large bay, just south of present-day Sydney.<sup>4</sup> This was the first of a series of landfalls on the eastern coast.<sup>1</sup> Here, Banks and his team collected hundreds of specimens, including the first species of *Banksia* (Proteaceae), a genus later named for Banks.<sup>4</sup> “The great quantity of New Plants ... Mr Banks and Dr Solander collected in this place,” Cook wrote, “occasioned my giving it the name of Botany Bay.” This bay later figured prominently in the establishment of the Australian penal colony.<sup>1,4</sup>

Cook continued north, charting the coast and naming landmarks as he went,<sup>1</sup> but on the night of June 11, 1770, about 13 miles offshore, the *Endeavour* struck the Great Barrier Reef,<sup>2</sup> which Cook did not know existed until then.<sup>1</sup> Surf thrashed the ship against the reef so violently that “we could hardly keep our legs upon the Quarter deck,” Banks wrote. At first, Cook sent out small boats, which were anchored and then wound up with winches to try to pull the ship off the coral. When the ship still didn’t budge, about 50 tons, including cannons, firewood, water casks, and food stores, were jettisoned.<sup>2</sup>

After the ship began to leak the next morning, the men, including Banks, took turns using suction pumps. By nightfall, water in the hold rose to almost four feet. Finally, after great effort, with men pulling cables and anchor lines, the ship lifted off the reef, at which point water rushed into the hold — or so one crewman reported. “Fear of death now stard us in the face,” Banks wrote. “I intirely gave up the

‡ Whether Cook claimed New Zealand for the Crown is debatable, according to a peer reviewer. After an event in Mercury Bay, North Island, in November 1769, Cook wrote, “after displaying the English Colours, I took formal possession of the place in the name of His Majesty.” But, Cook did not know he was on New Zealand at the time. He hoped he was on the mythical Southern Continent. It was not until later that he realized he was on land previously named by Abel Tasman. It is unclear if he was claiming Mercury Bay only, the North Island only, all of New Zealand, or the Southern Continent (which he did not find, thus making his claim invalid). Also, the Admiralty instructed Cook, “You are also with the Consent of the Natives to take possession of Convenient Situations.” There is no record that Cook received consent.

\*\* According to a peer reviewer, Cook circumnavigated New Zealand to determine whether it was part of the unknown Southern Continent. “He even sailed away south from New Zealand when people onboard thought they could see land,” the reviewer noted. “None was ever found, only clouds in the distance that looked like high mountains of ice.”

### Kava (*Piper methysticum*, Piperaceae) – Society Islands Landfall – [BF Plate 642]

Solander and Parkinson were probably the first Europeans to see and record kava,<sup>16</sup> which is in the large tropical genus *Piper* (with more than 1,000 species, including the widely familiar spice black pepper [*P. nigrum*]).<sup>1</sup> Solander named kava “Piper inebrians,” and Parkinson wrote: “The expressed juice of this plant they drink to intoxicate themselves.”<sup>1</sup> The term *kava* (or *kawa*) refers to both the plant and the narcotic (literally sleep-inducing) beverage made from its roots,<sup>16</sup> which has been used in ceremonies for more than 3,000 years in Oceania.<sup>1</sup> The drink historically has been so widespread throughout Oceania that it might be the one material cultural item that most Oceanic peoples have in common. Oceania reportedly was one of the only culture areas not to have had alcoholic beverages at the time of the first major contact with Europeans in the 18th century. Kava has been used as a social drink by chiefs and noblemen; to welcome distinguished guests; to celebrate important births and marriages; to treat illnesses; and as a prelude to tribal wars. It was highly valued in Hawaii, where, at one time, no drink besides water and coconut milk was known. There and elsewhere, kava was used to soothe the nerves, to relax, to stave off fatigue, and more.<sup>16</sup> Recent research has investigated kava’s ability to treat anxiety, insomnia, and stress disorders.<sup>1</sup>

*Piper methysticum*, Kava, Piperaceae, *De Plantis Esculentis Insularum Oceani Australis Commentatio Botanica*. Copper plate by Jean-Baptiste Michell, based on Parkinson’s 1769 watercolor. Artwork ©2018 Editions Alecto Ltd and the Trustees of the Natural History Museum, London







**Candlenut (*Aleurites moluccanus*, Euphorbiaceae) – Society Islands Landfall – [BF Plate 654]**

In his journal, Parkinson wrote: “Of the bark of this tree, soaked in water, they make that gummy substance which they put upon their dark-coloured cloth to make it glossy, and keep out the rain. The fruit of this tree is a sort of nut, which yields a very fat kernel, of which they make their black dye, used in Tataowing [tattooing], by burning them, and receiving the smoke. Strung upon a reed or stick they serve instead of candles, and give a very good light.”<sup>1</sup> Candlenut is a culturally significant and widespread species in the Pacific and can thrive on otherwise useless land.<sup>1,17</sup> Almost every part of the plant can be used for some purpose. Prehistorically, the Polynesians introduced the species throughout much of Southeast Asia and Oceania as a so-called “canoe plant,” so its original range is unclear but is believed to be the Indo-Malaya region.<sup>17</sup> The nutlike seeds (candlenuts) are high in oil that can be burned for light (hence the plant’s common name) or used to make soaps and varnishes. The oil also has been used as a general folk remedy and laxative. All parts of the tree, however, especially the seeds, reportedly are toxic to humans if ingested.<sup>17,18</sup> The tree itself can be ornamental and a living fence or windbreak.<sup>17</sup> In 1959, it became the official state tree of Hawaii, where the plant was naturalized. In Hawaii, it is called *kukui*, meaning “light.”<sup>18</sup>

*Aleurites moluccanus*, Candlenut, Euphorbiaceae, *Species Plantarum*. Copper plate by Gerard Sibelius, based on Parkinson’s 1769 watercolor. Artwork ©2018 Editions Alecto Ltd and the Trustees of the Natural History Museum, London

ship and packing up what I thought I might save prepar’d myself for the worst.”<sup>2</sup>

To everyone’s relief, it eventually was realized that the situation was not as grave as reported, and the men continued at the pumps. In addition, Cook used a technique called fothering, which involved covering a sail with a mix of oakum (tarred rope fiber), wool, and “sheeps dung or other filth,” as Cook described. The sail then was guided under the ship to cover the largest gash. Finally, on June 18, a full week after the *Endeavour* ran aground, Cook sailed the crippled ship into a nearby, narrow river (which he called Endeavour River) and moored beside a steep bank.<sup>2</sup>

When Cook examined the ship, he found “a large piece of Coral rock that was sticking in one hole.” This had broken off and plugged the gash it created.<sup>2</sup> If not for this fortunate break and everyone’s extensive efforts, everyone and everything onboard, including the natural history collections, Parkinson’s artwork, and Cook’s charts, may have been lost to the sea and history.<sup>1,2</sup> The botanical specimens, stored in a bread hold in the stern, had been soaked in seawater during the ordeal, but Banks and Solander brought them ashore to be dried, and Cook wrote that most “were, by

[their] indefatigable care and attention restored to a state of preservation.”<sup>1</sup>

The ship was beached at Endeavour River for almost seven weeks while she was repaired.<sup>1,2</sup> In the meantime, the men became fascinated by the kangaroo, which they referred to as “the wild animal” or “the beast so much talkd of,” and had multiple encounters with the Aborigines.<sup>2</sup> In addition, Banks and Solander had a chance for a flurry of botanizing.<sup>1</sup> On August 4, 1770, the *Endeavour*, barely seaworthy, hauled out from the river and continued north.<sup>2</sup> Soon, she was in serious danger of wrecking again, but Cook eventually escaped through what he called Providential Channel.<sup>1,2</sup> On August 22, 1770, Cook claimed the entire eastern coast of Australia for the British Crown.<sup>1</sup> His charts of that coast filled in a major gap of the continent’s map and helped establish its true extent, which previously had been only speculated about.<sup>4</sup> Parkinson depicted almost 700 of the specimens collected in Australia, from which at least 337 plates were engraved.<sup>1</sup>

**Batavia**

Before landing at Batavia, Java (the primary port of the Dutch East Indies and site of present-day Indonesia’s capi-

Continued on pg. 68

**Beefwood (*Casuarina equisetifolia*, Casuarinaceae) – Society Islands Landfall – [BF Plate 663] – on Page 66**

Beefwood is a seashore pioneer that has been introduced to more than 60 countries.<sup>1,19</sup> In fact, it is now a common part of the coastal landscapes of most tropical and subtropical countries. Because its high rate of litter deposition, fast growth rate, and extensive shade prevent the growth of native flora, it often grows in single-species stands with little or no understory. The tree’s leaf litter can increase soil acidification to levels that are toxic to nearby plants. It therefore is considered highly invasive in some places.<sup>19</sup> However, it often is used effectively for sand dune stabilization, land reclamation, and erosion control, and is grown as bonsai.<sup>1,19</sup> It can tolerate strong winds and is used in shelterbelts to minimize damage from typhoons and cyclones. Root extracts of the tree have been used to treat dysentery, diarrhea, and stomachache. In New Zealand, the tree’s bark and twigs have been used to treat beriberi (thiamine deficiency).<sup>19</sup> Banks noted that the tree was a source of red dye, and Parkinson wrote: “This is one of the best woods they have; it is very hard and heavy, and coloured like mahogany. They make their clubs, lances, cloth-beaters, and several other knick-knacks and utensils of it.”<sup>1</sup> The species name derives from the Latin *equinus*, pertaining to horses, and *folium*, meaning “leaf,” because the drooping shoots resemble horse hair.<sup>19</sup>

*Casuarina equisetifolia*, Beefwood, Casuarinaceae, *Amoenitates Academicæ seu dissertationes variae physicae, medicae, botanicae*. Copper plate by Gabriel Smith, based on Parkinson’s 1769 watercolor. Artwork ©2018 Editions Alecto Ltd and the Trustees of the Natural History Museum, London

**Ti (*Cordyline fruticosa*, Asparagaceae) – Society Islands Landfall – [BF Plate 671] – on Page 67**

Native to the western Pacific, ti has been spread widely (as far as New Zealand, Hawaii, and Easter Island) by the Polynesians over the last 4,000 years.<sup>1,20</sup> It has been introduced to most tropical parts of the world and is grown for ornament in gardens, hedges, and indoors.<sup>20</sup> Ti is a thick-stemmed small tree whose leaves emerge pinkish-red and mature to deep green. Many small, scented, white to pale lavender flowers appear in panicles (loose, branching flower clusters).<sup>21</sup> Because it is sterile in a large part of its range, ti reproduces by stem pieces or rarely by seed, both of which can be spread by floods.<sup>20</sup> The sweet, swollen tubers are edible and can be fermented.<sup>1</sup> The juice of the squeezed leaves and stalks of ti (mixed with water) has been drunk to treat diarrhea and dysentery. Leaf infusions have been used for amenorrhea (absence of menstruation), tuberculosis, and blood clotting. Flower infusions have been used for fever, and poultices of ti have been used for wounds.<sup>11</sup> Ti is spiritually significant in the Pacific, and is associated with good luck and commonly found in cemeteries.<sup>1,20</sup> In Hawaii, it is planted at the four corners of a house, and the leaves are used to make *hula* skirts. Parkinson wrote: “Of this plant there are five different sorts, yielding a large root, which is eaten, and counted very good food, by the islanders of the South-seas.”<sup>1</sup>

*Cordyline fruticosa*, Ti, Asparagaceae, *Catalogue des Plantes du Jardin Botanique de Saigon*. Copper plate by Gerard Sibelius, based on Parkinson’s 1769 watercolor. ©2018 Editions Alecto Ltd and the Trustees of the Natural History Museum, London







tal, Jakarta), on October 5, 1770, the expedition generally had remained in good health. In fact, despite being at sea for more than two years, only eight (8.5%) of the original 94 who left Plymouth had died from disease or accidents.<sup>2</sup> Cook showed commendable concern for the well-being of all those under his command. He insisted that the lower decks be aerated and fumigated and that all quarters be cleaned rigorously and regularly. He also enforced a dietary regime intended to prevent scurvy (a severe vitamin C deficiency).<sup>1</sup> This included regular amounts of sauerkraut, which contains vitamin C.<sup>10</sup> Although a few suffered mildly from scurvy, remarkably, none died from it on the journey.<sup>1</sup> In his journal, Banks noted that lemon (*Citrus limon*, Rutaceae) juice seemed to combat signs of his own scurvy.<sup>10</sup>

But landing at Batavia, where the ship was refitted and re-provisioned for the voyage home via the Indian Ocean and Cape Town, changed things.<sup>1,2</sup> The port's canals, in which dead animals and sewage were dumped, were breeding sites for mosquitoes and disease. Ships from around the world also brought their own diseases. During the three-month stay, many became sick or died.<sup>2</sup> Parkinson somehow managed to depict 43 plant specimens he collected, of which 30 were later engraved.<sup>1</sup> Not soon enough, the ship, now full of disease, left Batavia. On the way to Cape Town, Spöring, the astronomer Charles Green, and 25-year-old Parkinson (the artistic star of the voyage), died from dysentery.<sup>1,2</sup> Banks and Solander also suffered with, but ultimately survived, the "bloody flux."<sup>1</sup> Banks may also have had typhus.<sup>4</sup>

#### England

When the ship moored in England on July 12, 1771, only 56 (60%) of the original 94 had survived.<sup>1,2</sup> The *Endeavour* had traveled an estimated 82,000 kilometers (50,952 miles), according to the Captain Cook Society (email from Ian Boreham, editor with the Captain Cook Society, December 11, 2017). Banks returned to greater celebrity than Cook did.<sup>1</sup> He and his team had collected everything from insects to the shells of mollusks to the skins and skeletons of kangaroos. The collection, much of which was completely novel in Europe at the time, would not be matched until the expedi-

tions of the Prussian explorer and naturalist Alexander von Humboldt to tropical America 30 years later.<sup>4</sup>

When Linnaeus learned that Banks and Solander planned to accompany Cook on the *HMS Resolution* on Cook's second voyage, he feared that the "matchless and truly astonishing collection" from the first voyage, as Linnaeus described it in a letter to John Ellis, might be "thrust into some corner, to become perhaps the prey of insects and of destruction."<sup>4</sup>

Linnaeus did not need to worry, however, because the *Resolution* ultimately sailed in July 1772 without Banks, who had wanted to bring 17 people, including six servants and two horn players, and a pack of greyhounds onboard. Though the Admiralty agreed, refitting the ship to accommodate Banks' entourage made it so prone to capsize that it failed a sea trial. When the modifications were stripped out, Banks "swore and stamp'd upon the Warfe, like a Mad Man," according to one midshipman, and he took his entourage on a consolation trip to Iceland instead.<sup>2,4</sup>

According to *Blue Latitudes*: "Banks would spend the rest of his long life reaping the rewards of his youthful adventures, and dining out on them. Cook, lacking Banks' fortune and status, had more to prove. Even after his second voyage, which sealed his fame and brought him the offer of a comfortable retirement, Cook chose to set off again, ultimately at the cost of his life."<sup>2</sup>

Carter noted the uniqueness of the *Endeavour* voyage. It was "a collaboration of civilian science under royal patronage with royal finance, joined with private enterprise funded from a county rent roll and executed under Admiralty management," he wrote. "That these elements were compounded without undue heat of fusion into a three-year circumnavigation successful in its main intentions is a testimony to the character and abilities of Banks, the young landsman from Lincolnshire, and Cook, the older Yorkshire seaman."<sup>3</sup>

#### The Florilegium

During the voyage, Banks and Solander supervised Parkinson's work carefully. "We worked at the great table in the cabin with our draftsman opposite. We directed his

### Kohekohe (*Dysoxylum spectabile*, Meliaceae) – New Zealand Landfall – [BF Plate 425]

Kohekohe is the southernmost member of its genus (which includes about 80 species) and the only member of the mahogany family native to New Zealand,<sup>22</sup> where it grows in coastal forests throughout the North Island and in the Marlborough Sounds in the north of the South Island.<sup>1,23</sup> Banks and Solander first came across the tree at Tolaga Bay, North Island, in October 1769. The tree can grow to 15 meters (50 feet) tall, and, in late fall to winter, produces waxy, white, bird-pollinated flowers that are followed by seed capsules coated with orange to scarlet arils (fleshy coverings).<sup>1</sup> The flowers and fruit grow directly from drooping main stems, rather than from buds at the end of leafy new growth. This is called cauliflory (derived from the Latin for stem and flower<sup>1</sup>), an unusual habit of some tropical tree species.<sup>22-24</sup> The tree's large, glossy, green leaves are extremely bitter, and the Māori have used leaf extracts as a tonic, to stop milk secretion in women, and to treat gonorrhoea. They also have used bark and leaf extracts for cough, boiled leaves as a poultice, and leaves in baths. Kohekohe leaves reportedly are thought to have properties similar to gentian (*Gentiana* spp., Gentianaceae) and Peruvian bark (*Cinchona* spp., Rubiaceae), and have been used instead of hops (*Humulus lupulus*, Cannabaceae) in the making of beer. The attractive timber has been used to make furniture.<sup>25</sup>

*Dysoxylum spectabile*, Kohekohe, Meliaceae, *Handbook of the New Zealand Flora*. Copper plate by Gerard Sibelius, based on Frederick Nodder's undated watercolor, derived from Parkinson's surviving pencil drawing. ©2018 Editions Alecto Ltd and the Trustees of the Natural History Museum, London





drawing, and made rapid descriptions of our natural history specimens while they were still fresh,” Banks wrote later.<sup>1</sup>

By the end of the voyage, Parkinson had completed about 269 watercolor paintings of the collected plant specimens. However, the ever-increasing number of specimens collected and given to Parkinson prevented him from completing hardly any paintings from the later parts of the voyage. Instead, he made precise outline drawings (at least 674) with detailed color notes, intending to complete them in color, in preparation for engraving and publication after the voyage.<sup>1</sup>

Banks believed in the importance of fine art for the presentation of scientific findings. He personally was connected to many of the best botanical artists of his day, and, sparing no expense, employed some of them to work on the Florilegium. In all, he hired five artists (principally Frederick Polydore Nodder) to complete Parkinson’s sketches, and 18 engravers (principally Daniel Mackenzie, Gabriel Smith, and Gerard Sibelius) to create the copper-plate engravings. Banks insisted that every detail be cut into each plate, so that even when the plates were printed in black, the prints could still be used for scientific study. The engraving process involved cutting directly into the polished copper, a relatively soft metal, with different-sized tools called burins.<sup>1,5</sup> According to a peer reviewer, the process also typically involves other tools, such as etching needles, roulettes, and burnishers.

By 1784, all 743 plates had been completed, but Banks never saw them published for various reasons.<sup>1,5</sup> First, Solander’s death in 1782 hit him especially hard. In addition, the American Revolution took a toll on his finances, and he often was burdened by public duties (having become the president of the Royal Society, for example). Furthermore, he may have believed he had already fulfilled his obligation to science.<sup>1</sup> After all, his large London home at Soho Square had become a sort of salon-museum where scholars and the merely curious could visit and admire his collections.<sup>1,4</sup> It is worth noting that if Banks had published his discoveries, some of the plants depicted in the Florilegium would be the type specimens (i.e., specimens on which the descriptions

and names of new species are based) for some species now recognized, according to Mabberley.<sup>1</sup>

It was not until October 1979 that Alecto Historical Editions signed an agreement to print and publish the plates in full color, in association with the Natural History Museum. Before then, the plates were stored on the bottom shelf of a cupboard in the Botany Library of the Museum, still in their original wrappers. The book is dedicated to Christopher Humphries, PhD, whose idea it was for the Natural History Museum (where he worked for most of his career) to collaborate with Alecto Historical Editions and finally bring Banks’ Florilegium, a significant but largely unknown scientific and artistic achievement of the Enlightenment, to a broader audience. Humphries was a highly respected taxonomist, biogeographer, and theorist, and a passionate lover of botanical art.

After some dedicated trial and error, printers at Alecto Historical Editions realized the stunning results that could be achieved by printing the plates *à la poupée* (French for “with the dolly”). Basically a sophisticated exercise in “printing and coloring by numbers,” this technique involves using a twist of cloth (the *poupée* or “dolly”) to selectively and carefully apply, by hand, the appropriate color of ink into specific areas of the plate.<sup>1,5</sup>

After a plate is inked up with the various colors, it is laid on the press with a sheet of damp paper over it. The plate is cushioned by cover tissue and blankets to even out the pressure as it passes through the press rollers. The immense pressure from the rollers pushes the damp paper into the recesses of the plate, pulling the ink into the paper. The paper is then carefully and evenly peeled off to reveal the print. Each plate is printed (or “pulled” in printmaking terms) just once before it needs to be cleaned of leftover ink residue and re-inked for the next pull.<sup>1,5</sup>

Between 1980 and 1990, the 25-person team at Alecto Historical Editions produced more than 86,000 prints from the Florilegium using this method, and some individual prints are still available for sale on Alecto Historical Editions’ website. On average, each print took just under one hour to

### Black Bean (*Castanospermum australe*, Fabaceae) – Australia Landfall – [BF Plate 84]

Black bean, also called Moreton Bay chestnut, belongs to the legume family and is the only member of its genus.<sup>26</sup> The tree can grow to 40 meters (130 feet) tall and occurs in coastal forests and on beaches along the eastern coast of Australia, and on the nearby islands of New Britain, New Caledonia, and Vanuatu.<sup>1,26</sup> The tree develops a dense, rounded canopy when cultivated, making it an ideal shade tree.<sup>26</sup> It is used extensively along streets, in parks and gardens, and sometimes indoors. Showy red and yellow flowers appear in sprays that are partly hidden by dense foliage and attract lorikeets, which may become intoxicated. Large, thick pods that each contain three to five bean-like seeds sometimes are used by children as toy boats.<sup>26,27</sup> The leaves and seeds may be toxic to livestock and humans,<sup>11</sup> but the Aborigines sometimes eat the seeds after careful preparation that involves leaching in water and roasting.<sup>27</sup> Castanospermine, an alkaloid derived from the seeds, has demonstrated in vitro inhibitory effects against dengue virus (which causes dengue fever) and HIV.<sup>28,29</sup> The tree has a strong root system that enables it to help prevent erosion along stream banks.<sup>26</sup> It is also a food plant for pencilled blue butterfly larvae and produces a decorative and durable timber ideal for carving.<sup>27</sup> The genus name derives from *castanea*, Latin for “chestnut,” and *spermum*, Greek for “seed.” The species name *australe* is Latin for “southern.”<sup>26</sup>

*Castanospermum australe*, Black bean, Fabaceae, *The Picture of Australia*. Copper plate by Gerard Sibelius, based on Frederick Nodder’s 1779 watercolor, derived from Parkinson’s surviving pencil drawing made at “Endeavors River.” Artwork ©2018 Editions Alecto Ltd and the Trustees of the Natural History Museum, London





complete, but some took considerably longer, depending on complexity. The “dollies” used to apply the inks were made from strong, coarse cotton, and the inks were made from boiled linseed (*Linum usitatissimum*, Linaceae) oil and pure ground pigment. Often, ten or more inks were applied to one plate. The printers used a master print, which had been marked with the proper colors for each area of the plate, as a reference when inking each plate.<sup>1,5</sup>

“Ever since we first embarked on the Florilegium project in 1980, it was always my ambition to publish a well-illustrated accompanying book,” wrote Studholme, who helped oversee the printing process (email, March 1, 2018). “I am delighted that Thames & Hudson has now fulfilled this ambition in such style, even though it took another 38 years. But such *longueurs* do seem to be a feature of the 250-year history of Banks’ Florilegium!” HG

## References

1. Gooding M, Mabberley D, Studholme J. *Joseph Banks' Florilegium: Botanical Treasures from Cook's First Voyage*. New York, NY: Thames and Hudson; 2017.
2. Horwitz T. *Blue Latitudes: Boldly Going Where Captain Cook Has Gone Before*. New York, NY: Picador; 2002.
3. Carter HB. *Sir Joseph Banks*. London: British Museum (Natural History); 1988.
4. Watkins TH. The Greening of the Empire: Sir Joseph Banks. *National Geographic*. Nov. 1996;28-53.
5. Banks' Florilegium. Alecto Historical Editions website. Available at: [www.alecto-historical-editions.com/pages/about-banks-florilegium](http://www.alecto-historical-editions.com/pages/about-banks-florilegium). Accessed March 4, 2018.
6. Endeavour. Captain Cook Society website. Available at: [www.captaincooksociety.com/home/detail/endeavour](http://www.captaincooksociety.com/home/detail/endeavour). Accessed March 5, 2018.
7. Act I: The First Voyage. Princeton website. Available at: [libweb5.princeton.edu/visual\\_materials/maps/websites/pacific/cook1/cook1.html](http://libweb5.princeton.edu/visual_materials/maps/websites/pacific/cook1/cook1.html). Accessed March 5, 2018.
8. Smith E. *The Life of Sir Joseph Banks*. London: John Lane Company; 1911.
9. Banks J, Hooker JD. Journal of the Right Hon. Sir Joseph Banks. London: Macmillan and Co., Ltd.; 1896.
10. Hamilton JC. Scurvy: How a Surgeon, a Mariner, and a Gentleman Solved the Greatest Medical Mystery of the Age of Sail. Captain Cook Society website. Available at: [www.captaincooksociety.com/home/detail/scurvy-how-a-surgeon-a-mariner-and-a-gentleman-solved-the-greatest-medical-mystery-of-the-age-of-sail-bowen-stephen-r-2003](http://www.captaincooksociety.com/home/detail/scurvy-how-a-surgeon-a-mariner-and-a-gentleman-solved-the-greatest-medical-mystery-of-the-age-of-sail-bowen-stephen-r-2003). Accessed March 21, 2018.
11. Quattrocchi U. *CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology*. Boca Raton, FL: CRC Press; 2012.
12. Lim TK. *Edible Medicinal and Non-Medicinal Plants: Volume 8, Flowers*. Dordrecht, Netherlands: Springer; 2014.
13. Jones TL, Storey AA, Matisoo-Smith EA, Ramirez-Aliaga JM, eds. *Polynesians in America: Pre-Columbian Contacts with the New World*. Lanham, MD: AltaMira Press; 2011.
14. Doucleff M. How the Sweet Potato Crossed the Pacific Way Before the Europeans Did. NPR website. Available at: [www.npr.org/sections/thesalt/2013/01/22/169980441/how-the-sweet-potato-crossed-the-pacific-before-columbus](http://www.npr.org/sections/thesalt/2013/01/22/169980441/how-the-sweet-potato-crossed-the-pacific-before-columbus). January 23, 2013. Accessed February 26, 2018.
15. *Ipomoea batatas*. Māori Plant Use website. Available at: [maoriplantuse.landcarere-search.co.nz/WebForms/PeoplePlantsDetails.aspx?firstcome=firstcome&PKKey=024A9344-0375-4080-B628-0F08D5CBAC94](http://maoriplantuse.landcarere-search.co.nz/WebForms/PeoplePlantsDetails.aspx?firstcome=firstcome&PKKey=024A9344-0375-4080-B628-0F08D5CBAC94). Accessed February 26, 2018.
16. Singh YN, Blumenthal M. Kava: An Overview—Distribution, Mythology, Botany, Culture, Chemistry, and Pharmacology of the South Pacific's Most Revered Herb. *HerbalGram*. 1997;39:33.
17. *Aleurites moluccanus* (candlenut tree). CABI website. Available at: [www.cabi.org/isc/datasheet/4124](http://www.cabi.org/isc/datasheet/4124). Accessed March 1, 2018.
18. *Aleurites moluccanus*. Missouri Botanical Garden website. Available at: [www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=364364&cisprofile=08c](http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=364364&cisprofile=08c). Accessed March 1, 2018.
19. *Casuarina equisetifolia* (casuarina). CABI website. Available at: [www.cabi.org/isc/datasheet/16718](http://www.cabi.org/isc/datasheet/16718). Accessed March 14, 2018.
20. *Cordyline fruticosa* (ti plant). CABI website. Available at: [www.cabi.org/isc/datasheet/11866](http://www.cabi.org/isc/datasheet/11866). Accessed March 17, 2018.
21. *Cordyline fruticosa*. Missouri Botanical Garden website. Available at: [www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=b585](http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=b585). Accessed March 17, 2018.
22. Braggins JE, Large MF, Mabberley DJ. Sexual arrangements in kohekohe (*Dysoxylum spectabile*, Meliaceae). *Telopea*. 1999;8(3):315-324.
23. *Dysoxylum spectabile*. New Zealand Plant Conservation Network website. Available at: [www.nzpcn.org.nz/flora\\_details.aspx?ID=1825](http://www.nzpcn.org.nz/flora_details.aspx?ID=1825). Accessed March 17, 2018.
24. Kohekohe *Dysoxylum spectabile*. Bushmansfriend website. Available at: [www.bushmansfriend.co.nz/dysoxylum-spectabile-kohekohe-xidc17756.html](http://www.bushmansfriend.co.nz/dysoxylum-spectabile-kohekohe-xidc17756.html). Accessed March 17, 2018.
25. *Dysoxylum spectabile*. Māori Plant Use website. Available at: [maoriplantuse.landcarere-search.co.nz/WebForms/PeoplePlantsDetails.aspx?firstcome=firstcome&PKKey=2F50FE1A-D3FF-40D7-AC65-693B0C946607](http://maoriplantuse.landcarere-search.co.nz/WebForms/PeoplePlantsDetails.aspx?firstcome=firstcome&PKKey=2F50FE1A-D3FF-40D7-AC65-693B0C946607). Accessed March 17, 2018.
26. *Castanospermum australe*. Australia National Botanic Gardens website. Available at: [www.anbg.gov.au/gnp/interns-2002/castanospermum-australe.html](http://www.anbg.gov.au/gnp/interns-2002/castanospermum-australe.html). Accessed March 18, 2018.
27. *Castanospermum australe*. Australian Tropical Rainforest Plants website. Available at: [keys.trin.org.au/key-server/data/0e0f0504-0103-430d-8004-060d07080d04/media/Html/taxon/Castanospermum\\_australe.htm](http://keys.trin.org.au/key-server/data/0e0f0504-0103-430d-8004-060d07080d04/media/Html/taxon/Castanospermum_australe.htm). Accessed March 18, 2018.
28. Whitby K, Pierson TC, Geiss B, et al. Castanospermine, a Potent Inhibitor of Dengue Virus Infection In Vitro and In Vivo. *J. Virol.* 2005;79(14):8698-8706. doi: 10.1128/JVI.79.14.8698-8706.2005.
29. Walker BD, Kowalski M, Goh WC, et al. Inhibition of human immunodeficiency virus syncytium formation and virus replication by castanospermine. *Proc. Natl. Acad. Sci.* 1987;84:8120-8124.
30. *Grevillea pteridifolia*. Australia National Botanic Gardens website. Available at: [www.anbg.gov.au/abrs/online-resources/flora/stddisplay.xsql?pnid=45336](http://www.anbg.gov.au/abrs/online-resources/flora/stddisplay.xsql?pnid=45336). Accessed March 19, 2018.
31. *Grevillea pteridifolia*. Australian Native Plants Society (Australia) website. Available at: <http://anpsa.org.au/g-pte.html>. Accessed March 19, 2018.
32. Castillo U, Harper JK, Strobel GA, et al. Kakadumycins, novel antibiotics from *Streptomyces* sp. NRRL 30566, an endophyte of *Grevillea pteridifolia*. *FEMS Microbiology Letters*. 2003;224(2):183-190. doi: 10.1016/S0378-1097(03)00426-9.

## Golden Grevillea (*Grevillea pteridifolia*, Proteaceae) – Australia Landfall – [BF Plate 277]

This small tree or large shrub, rarely a prostrate shrub, can be 14 meters (46 feet) tall and is one of more than 350 species in its genus.<sup>1,30</sup> Banks and Solander first came across the tree near Endeavour River.<sup>1</sup> It occurs in tropical northern Australia, where it grows in eucalypt woodlands, heaths, and openings just outside of rainforests. It often is found in moist locations, and tolerates a range of soil types (usually sandy).<sup>30</sup> The tree sets large amounts of seeds,<sup>30,31</sup> which contain cyanogenic compounds and may cause cyanide poisoning, but its seed-wings (sometimes called helicopters) are rich in lipids and protein that benefit ants that disperse the seeds.<sup>1</sup> The tree may become weedy in some climates.<sup>30,31</sup> It has grayish-green, divided foliage<sup>31</sup> that was used by European settlers to stuff pillows.<sup>1</sup> It produces clusters of elongated, bright orange flowers that are secund (arranged on one side only).<sup>30,31</sup> The nectar is important to the Aborigines, who either take it directly from the flowers or make a sweet drink by soaking the flowers in water.<sup>31</sup> The nectar and pollen also are favored by blossom bats.<sup>1</sup> A *Streptomyces*-like bacterium found in the cells of the stems of a golden grevillea specimen from the Northern Territory, Australia, yielded novel compounds, called kakadumycins, which have demonstrated strong antibacterial and antimalarial effects in cell cultures.<sup>32</sup> This tree is also cultivated for ornament and is the parent of many *Grevillea* hybrids now popular in horticulture.<sup>1,30,31</sup>

*Grevillea pteridifolia*, Golden grevillea, Proteaceae, *On the cultivation of the plants belonging to the natural order of Proteaceae*. Copper plate by Gerard Sibelius, based on John Miller's 1773 watercolor, derived from Parkinson's pencil drawing made at "Endeavors River." Artwork ©2018 Editions Alecto Ltd and the Trustees of the Natural History Museum, London

