

Passion flowers

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Historians of science have often neglected the eighteenth century because it lacks famous figureheads like Isaac Newton or Charles Darwin, yet this was a crucial period when science started to become established and gain prestige, writes Patricia Fara in a new book*. With their Enlightenment contemporaries, Carl Linnaeus in Sweden and Joseph Banks in Britain illustrate how scientific research was intertwined with commercial development and imperial exploitation in this crucial century.

But the linked stories of Linnaeus and Banks unfolded very differently. Linnaeus clung to an older vision of imperial domination that ultimately failed as an economic and scientific experiment. In contrast, Banks emerges not as a disciple, but as the prophet of a scientific empire that came to rule the world. But in a twist of history it is the name of Linnaeus that is still known by most contemporary biologists while Banks has been lost in obscurity.

Linnaeus became celebrated as one of science's great heroes because he invented a revolutionary method for labeling plants that was easy to use. By 1799, over 50 different systems were available, but Linnaeus' was the one that survived. In his *Geography of Nature*, he divided living organisms into different groups and subsets arranged in an orderly five-tier pattern of categories – classes, species and so forth, every plant and animal should carry its own two-part label.

His scheme was enormously controversial when he first proposed it in 1732. Linnaeus decided to order plants numerically according to their reproductive organs. It was only at the end of the seventeenth century that naturalists realized that plants reproduce sexually.

Linnaeus gave priority to male characteristics. His first level of ordering depends on the number

of male stamens, but only the sub-groups are determined by the number of female pistils. His descriptions were full of sexual analogies. "The flowers' leaves... serve as bridal beds which the Creator has so gloriously arranged, adorned with such noble bed curtains, and perfumed with so many soft scents that the bridegroom with his bride might there celebrate their nuptials with so much the greater solemnity. When now the bed is so prepared, it is time for the bridegroom to embrace his beloved bride and offer his gifts," he wrote.

Critics were quick to denounce this sexual vocabulary. Linnaeus had clearly spelled out the analogies between the reproductive organs of flowers and people. "The calyx is the bedchamber" he explained in 1735, "the filaments the spermatic vessels, the anthers the testes, the pollen the sperm, the stigma the vulva, the style the vagina." Such explicit explanations seemed scandalous – "too smutty for British ears", one critic spluttered. As one clergyman protested, "Linnaean botany is enough to shock female modesty".

He believed all the world's plant species had originally been present in the Garden of Eden, which Linnaeus envisaged as a small island at the equator. Subsequently, he explained, although species had diversified to suit different environments, they remained fundamentally the same. By reversing this scattering process, and bringing foreign plants to Sweden, Linnaeus aimed to recreate God's original garden in Uppsala.

Linnaeus professed to be undeterred by the most obvious obstacle to his ambitious plans – the Swedish weather. The trick lay, he claimed, in fooling the plants by gradually getting them accustomed to colder and colder climates: after starting them off in southern Sweden, they could be moved northwards a bit at a time. Unsurprisingly, with hindsight, Linnaeus' plans came to nothing but interest grew in his classification system.

Gradually English translations and commentaries on Linnaeus' ideas started to appear. In the second half of the eighteenth century, Linnaean botany became very fashionable, so that botanists made money conducting field trips and popular magazines encouraged people to take up plant collecting as a hobby. One writer produced a guide that made it easy to apply Linnaean ideas to English flowers.

William Withering, a British physician famous for curing heart problems with medicines made from the foxglove, opted for a sanitized version of Linnaean botany. In his best-selling textbooks, he translated contentious words into harmless but meaningless English equivalents. Explicitly writing for women, he aimed to make botany 'as healthful as it is innocent' so that it 'leads to pleasing reflections on the beauty, wisdom, and the power of the great Creator'.

But one of Withering's most outspoken opponents was his friend Erasmus Darwin. Darwin faithfully translated Linnaeus by retaining many of his Latin terms and making clear the sexual basis of his method. Astutely, he dedicated his version to the new president of the Royal Society, Joseph Banks.

Banks had inherited a fortune from his family's estate in Lincolnshire at 21. Although undistinguished at university he had a fascination for botany and a reputation for women's company and lavish living. Nonetheless, what better way, he thought, to use his inherited wealth than on a scientific expedition with Captain Cook and the *Endeavour*. Pouring money into this private project, Banks assembled equipment and companions and the following year set off for the Pacific Ocean.

After his return, when the president of the Royal Society resigned in 1778, Banks managed to rally enough support to be elected, even though he was only 35 years old. Over the next 42 years, by exerting an authoritarian grip over the society, Banks made science central to British culture. He also corresponded with men

all over the world: the 20,000 letters that survive (out of an estimated 100,000) are striking evidence of how Banks worked.

He won the vote for President because he was a wealthy naturalist with aristocratic connections, but many members would have preferred a more intellectual man who was interested in physics, mathematics and the technological applications of science.

Banks made Linnaean botany central to British science. He'd vowed to visit the ageing Swedish botanist but never made it. He sponsored further overseas research, and the Admiralty started regularly including a naturalist on its expeditions. And that was why Charles Darwin came to travel with HMS Beagle.

As head of the Royal Society and confidant of the king, Banks was in a unique position to show how scientific research could make Britain's growing empire even more profitable. Thus he made himself an expert on tea-growing because he wanted to cut down the expense of Britain's imports from China. Writing long letters of technical advice to the East India Company, he encouraged them to grow tea on British land and also persuaded the king that a plant-gathering expedition to China would bring real advantage.

One of Banks' most ambitious projects was to transplant breadfruit from the southern Pacific to the West Indies. The plan was popular with plantation owners, who hoped the breadfruit would provide a cheap way of feeding their black slaves. After Banks had persuaded the Admiralty and the Home Secretary that his idea would work, he was allocated a Royal Navy ship – the *Bounty*, to be commanded by Captain Bligh. Converting the *Bounty* into a floating garden, Banks made it clear that survival of his Tahitian plants was far more important than the comfort of the naval officers. The expedition was a total failure. Although it reached Tahiti and the crew loaded hundreds of breadfruit trees and



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set off for the Caribbean, they never arrived. In the famous mutiny the sailors took over the ship, abandoning Bligh to find his way home without his botanical cargo.

But Bligh managed to get home and, surprisingly, a few years later, Banks and the Admiralty trusted Bligh enough to send him back again. Over 2,000 breadfruit trees were taken and many survived the journey and flourished in their new homes.

The slaves were initially reluctant to eat this foreign food being pressed upon them. But Tahitian breadfruit are now a Caribbean staple.

Despite his enormous importance for science and empire, Banks is now virtually unknown in Britain, but the name of Linnaeus lives on in Sweden and beyond. History has delivered a curious and quite different legacy for these two eighteenth century giants.