

BOOKS & ARTS

Command and control

A biography of botanist Joseph Dalton Hooker illustrates how science switched in the nineteenth century from being a hobby of aristocrats to a profession paid for by governments.

Imperial Nature: Joseph Hooker and the Practices of Victorian Science

by Jim Endersby

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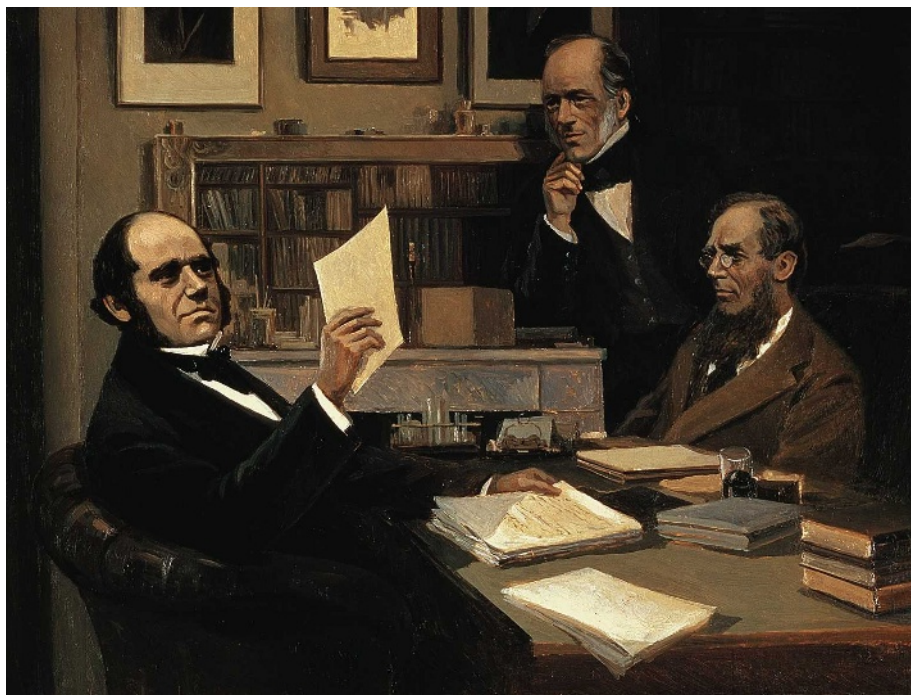
As we approach next year's frenzy of celebrations for Charles Darwin's bicentenary and the 150th anniversary of his publication *On the Origin of Species*, it is important to remember other naturalists who worked in the mid-nineteenth century. *Imperial Nature* chronicles Joseph Dalton Hooker, who transformed a royal pleasure park into the scientific institution now called the Royal Botanic Gardens at Kew in London.

Science, particularly natural history, switched at this time from an activity practised by aristocrats to one paid for by governments. Jim Endersby provides a refreshing record of how scientists worked during this transition, rather than an analysis of the theories they generated. His contention, with which I agree, is that the practice of science provides the context necessary for understanding how theories advanced; without this background, scientific progress looks too simple, and leaps seem extraordinary.

Hooker was a close friend of Darwin. At the Linnean Society of London, he helped to engineer the joint reading of Darwin's abstract of *On the Origin of Species* alongside Alfred Russel Wallace's paper on natural selection, which Wallace had sent from the field in southeast Asia. Like Darwin, Hooker is usually portrayed as a whiskered gentleman of the establishment. Unlike the independently wealthy evolutionist, Hooker had to earn his living from science. Endersby describes Hooker's desire to join the scientific élite and practise 'philosophical' rather than 'paid' science. Returning from an expedition to Antarctica on the ship *Erebus*, Hooker wrote to his father: "My hope and most earnest wish is to be able to on my return home devote my time solely to botany."

Hooker epitomizes the advent of the professional scientist, but he was at pains to give the impression that he worked purely for the love of science, not for pay. Perhaps the relatively low salaries in some modern fields are a legacy of the ambivalent attitude of Victorian scientists such as Hooker towards remuneration.

Hooker managed Kew Gardens, which was



Joseph Hooker (right) and Charles Lyell (standing) discussed evolutionary theory with Darwin (left).

government funded and part of the UK civil service, as a private fiefdom. In the early 1870s, this style caused a stand-off between Hooker and Acton Smee Ayrton, essentially head of the civil service in prime minister William Gladstone's government. Ayrton attempted to impose civil-service hiring and procurement rules at Kew, but Hooker fought against it. Hooker's friends defended him in letters published in *Nature*, describing him as a selfless man working for the greater good, who was owed a living by the nation.

Hooker backed down and was forced to apologize to Ayrton for insinuating he was a liar. Gladstone commented on Hooker's behaviour, observing that "scientific men ... have a great susceptibility" and are "not accustomed to enter in our sturdy conflicts". A scientist giving evidence to parliaments today might agree.

In trying to join the scientific élite, Hooker had the additional burden of being a botanist. Botany and natural history were then low-status disciplines, below the physical sciences, chemistry and geology, but above medicine. Botany was not taken seriously because it was accessible to anyone, including

women, and was not considered intellectually demanding. It was also associated with gardening and horticulture. Hooker realized that to make his name, he must invent a 'philosophical botany', a science of plants that laid out general rules rather than describing details. But he needed more data than one man could generate — he needed an army of collectors.

Hooker's relationships with these collectors are the most fascinating part of Endersby's book. As a young man, Hooker collected plants in Antarctica and India, and some of the men he met on his travels remained correspondents and collectors for Kew throughout his career. Hooker rarely paid for material sent to Kew but operated a barter system. He exchanged books and equipment for plants from New Zealand and Australia, ensuring that the collection of dried plants at Kew became global. Collectors, however, occasionally showed independence. Hooker reprimanded those who dared to describe new plant species from their area — species could be described only at Kew, after comparison with its collections. That this was accepted seems extraordinary, but the collectors

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needed Hooker and his gifts: they earned status by being involved in the new science.

Hooker had a strong vested interest in being the sole person to define a species. Like Darwin, he deplored 'species-mongers', today known as splitters, who described variants as species in their own right. Hooker's theories of plant distribution depended on a broad species concept, so it was important that he maintained control of the definitions. He also defined localities. Collectors of the time recorded broad regions of sample origin, such as southern India, rather than specific



Hooker's drawing of a red alga, *Delesseria*.

coordinates. Today we do the reverse using georeferencing.

According to historic accounts, Hooker was a reluctant convert to the theory of evolution by natural selection. Enderby shows that the story was more complex. Hooker supported Darwin but did not think that evolutionary theory affected botany in prac-

tice, noting that the evolutionist must "employ the methods and follow the same principles that guide the believer in their being actual creations". This view sounds familiar to anyone who was involved in the pattern-cladistics furore of the 1980s, when a set of systematists

were accused of being 'anti-evolution'. Evolution by natural selection remains the most robust explanation for the generation of biological diversity. Study of what that diversity entails can be theory-free, as Hooker contended, but studying diversity in the light of evolution is more satisfying.

It is surprising how familiar the debates of nineteenth-century science sound today. By concentrating on practice, *Imperial Nature* reminds us that although theories are important, the evidence on which they are based comes from many sources and through many cultures. One hopes that Hooker's attempt at central control could never happen today, with our vibrant, diverse and more equitable communities.

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Staving off the global food crisis

The End of Food

by Paul Roberts

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Sometimes an author gets lucky, or is truly prescient. He can work for years researching a complex and obscure topic, only to see it hit the headlines just as his book is published. Suddenly, the topic is hot.

Food is hot. If high supermarket prices have not grabbed the average citizen's attention, the world food crisis surely has. With food riots from Haiti to Egypt and panic-buying of rice in Hong Kong and Vietnam, food scarcity is the topic of the day. Following on from his earlier best-selling book *The End of Oil*, Paul Roberts's *The End of Food* taps into these timely concerns.

Food crises tend to recur in history. The most severe in recent times was the world food crisis of 1973–75. Even the Old Testament of the Bible talks of years of glut and famine, and the role of good governance in smoothing out supply.

Are our worries about food different this time? Perhaps in the future we will see constantly high prices, the re-establishment of food scarcity in the developed

world after decades of surplus, and widespread hunger. Or perhaps a technological solution will lessen the tension between a growing human population and the natural resources that feed it. Will there be a continuation of the trends that Roberts documents so well, of perpetually lower prices, greater reliance on world trade to source the cheapest commodities, the spread of meat-intensive diets with increasing affluence, and more land used to grow corn for ethanol to fuel our cars?

Roberts's answers are clear. The global food system, as it is currently structured and driven, is heading for a cataclysm. Roberts offers a sobering scenario of a 'meltdown': "We are already growing fatter (and hungrier), depleting more soil organic matter, drawing down more water tables, using more fertilizers and pesticides, losing more acres of forests and farmland." Consequently, he warns, "There is no longer the possibility of discrete failure; a collapse of one part of the system will have extraordinary ramifications for everyone else."

The End of Food makes the case that system-wide collapse is inevitable. Roberts starts by recognizing that economic forces drive the world food system, although our basic biological needs for nutrition have not changed since we evolved. This tension between food as an economic commodity — produced, processed, even speculated on as if it were copper or steel — and as a biological necessity is not new. But Roberts argues that globalization of our food supply and the westernization of dietary demand have driven the entire system irrevocably out of balance.

The result is a list of woes. The industrialization of the food industry creates a need for sources of cheap inputs and continual supply of new products. The retail revolution has led to a tendency to offer 'supersize' portions to push up demand. Obesity is the



Supporters of the Gabriela political party protest against rising food prices near president Gloria Macapagal-Arroyo's palace in the Philippines in April.

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