

global terms, and it is an exemplary work of scholarship. Thus, even its limitations offer instructive lessons for historians engaged in similar methodologies. Although the chapters by Sorokina, David-Fox, and Kremontsov give some flavour of the Russian side of this story, the volume focuses more on Germans in Russia than the reverse. This is partially an artefact—one third of the volume focuses on Zeiss's activities in Russia. Yet, this imbalance raises important questions. Were Russian scientists and physicians prevented from going abroad? If they left Russia, did they return home? Did they cultivate international friendships? Could they be "entrepreneurial"? Can that framework even apply to individuals or institutions from centrally planned economies? Did the rise of Communism ever lead to the migration of Russian scientists and physicians to Germany? Balanced transnational histories demand answers to such reciprocal questions, and this volume does not fully rise to that challenge.

Obviously, the authors of this ambitious volume could not probe every problem or ponder every silence. Yet the depth of their sources indicates another difficulty arising from analysing transnational relations. It is not enough to know that actors and institutions are engaging in different conversations. Rather, those incomplete and often contradictory conversations exist within at least two fully formed contexts. The nuances of those contexts are difficult to develop adequately in writing, yet that development is crucial as it reveals the ways that political and economic forces shaped policy developments in medicine.

Finally, although individuals and institutions re-emerge as the locus of transnational science and medicine, it is important to recognize that their work was comparatively superficial and insignificant. Transnational studies fascinate precisely because what they reveal to us about the development of national styles of science and medicine remains unclear.

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Neil Chambers (ed.), *The scientific correspondence of Sir Joseph Banks, 1765–1820*, 6 vols, London, Pickering & Chatto, 2007, total pages: 2823, £595.00, \$995.00 (hardback 978-1-85196-766-7).

Even during his own lifetime, impressions of Joseph Banks (1743–1820) diverged widely. Although celebrated in the popular press as the dashing young explorer who had sailed to Australia with James Cook, Banks was caricaturized by disaffected critics at the Royal Society as a bumbling virtuoso who refused to recognize—let alone understand—the significance of mathematical physics. Whereas James Boswell remarked that Banks resembled a placid elephant who would allow you to play with his proboscis, harsher colleagues accused him of coarse behaviour and sycophantically ingratiating himself with George III.

After his death, other versions of Banks proliferated, continually tailored over time to fit various political ends and historiographical trends. Victorian modernizers tried to make themselves look progressive by dismissing him as an old-fashioned autocrat, but although they effectively suppressed his memory in Britain, Banks was revived in the early twentieth century as the Founding Father of Australia, where his publicity value as the nation's first scientist still outweighs critiques of his involvement in the early penal settlements. Australian biographers have repeatedly argued that, despite his minimal publication record, Banks played a crucial role in science's history because of the administrative innovations he introduced at home and abroad during his forty-two year reign as President of the Royal Society. The definitive cradle-to-grave account remains Harold Carter's detailed tome of 1988, which extolled Banks's domestic influence and international achievements; since then, other scholars—notably David Miller and John Gascoigne—have presented more nuanced analyses demonstrating Banks's systematic strategies for consolidating the authority of the Royal Society and forging a mutually

beneficial alliance between science, state and empire. Now that globalization has become a historical buzzword, Banks is emerging as a key figure in imperial expansion whose powerful grip extended around the world.

Banks was a prolific writer, sending out an estimated 40,000 letters and receiving back perhaps 60,000. Often enclosing plant and mineral specimens (with occasional gifts of “Excellent Biscuits” or “2 brace of Grouse”), his correspondence covered an extraordinary range of topics, reflecting Banks’s influential engagement in scientific politics, agricultural reform and industrial innovation both in Britain and overseas. Sadly, even though he maintained a meticulous filing system, Banks’s papers were dispersed and selectively destroyed, so that now only around 20,000 survive, scattered throughout the world in public libraries and private collections. Reduced to around a quarter, these letters, nevertheless, offer an exceptionally rich resource for studying the global transformations that took place in the decades around 1800. Historians were delighted when in 1989, Carter established the Banks Archive Project at the Natural History Museum, with the aim of copying and cataloguing all the existing letters to make them readily accessible.

The first product of the Project’s ambitious long-term programme was a taster volume of 137 letters, edited by the Museum’s Neil Chambers, and designed to indicate the changing patterns of Banks’s interests over his long life. The most recent publication, also edited by Chambers, is a six-volume edition reproducing 2215 of Banks’s scientific papers. Arranged chronologically, these letters have been transcribed from over a hundred archives, and most of them have never been published before. For consistency with earlier publications, Chambers has broadly adopted Carter’s editorial principles, although he has introduced some substantial improvements. Most importantly, Banks’s erratic spelling and breathless punctuation are here faithfully reproduced, along with deletions and insertions, as well as full details of addresses, greetings and endorsements.

One immediate reward of this new collection is being able to see at a glance the sheer variety of matters with which Banks dealt on a daily basis. Within just a few weeks around the end of 1780, Banks was complaining about the rent arrears being run up by his tenants, explaining why he refused to believe that ants use tools for moving large weights, worrying about the legality of changing the Royal Society meeting times, and learning about the unfortunate man who coughed up a live toad he had unknowingly ingested several weeks earlier with some watercress. Nearly forty years later, despite battling against chronic gout, Banks was still preoccupied with an immense breadth of problems, including cabbages frozen by exceptionally bitter frosts, delays in exporting an alabaster sarcophagus from Egypt, the latest experiments on polarized light, and Dutch rivalry in Asia.

As well as staying in touch with close colleagues, Banks negotiated with unknown correspondents all over the world. Eminent figures such as Benjamin Franklin, William Hamilton and William Herschel feature among his regular contacts, but this collection includes many less distinguished correspondents who sent in not only reports of experiments or unusual events, but also requests for advice or pleas for help. Appearing particularly often in this collection is Charles Blagden, Banks’s major aide at the Royal Society; the 314 letters printed here reveal fluctuations in the two colleagues’ personal relationship as well as their combined impact on scientific affairs.

Unfortunately, although Chambers’ six-volume edition is extremely welcome and has many excellent features, its value is limited because the guidelines set up by Carter some twenty years ago still dominate the Project’s publishing strategy. Carter himself had already produced *The sheep and wool correspondence*, and he decreed that subsequent collections should also be organized thematically into supposedly mutually exclusive categories such as Political & Diplomatic Matters, Agriculture & Horticulture, and the Middle East & Africa.

As Chambers implicitly acknowledges in his introduction, sorting documents by such anachronistic criteria restricts the possibility of pursuing modern analytical concerns. The letters he has chosen are “scientific” only in the relatively narrow sense that they contain copious details of experiments, collections and observations. Fascinating as many of them are, they do not necessarily reveal how Banks meshed exchanges of information with his political and commercial ambitions. This renders the collection of limited value for pursuing research into current or future scholarly preoccupations such as globalization.

For example, on 10 June 1799 (letter 1512), Banks sent off a review of experimental procedures for preparing sweeteners from carrots or beetroot, which he suggested might provide viable alternatives to sugar. This letter appears less straightforwardly “scientific” when juxtaposed with one that Banks had despatched only two days earlier to the same recipient, Lord Liverpool, then an elderly but still influential politician. The earlier letter makes clear the complexities of “science” at this period, yet although reproduced in Chambers’ shorter chronological survey, it does not appear in this thematic collection: appreciating the closeness of the dates entails searching both publications. Banks started by emphasizing the commercial benefits of scientific research: “An expenditure, apparently considerable, must however be encountered in the outset; but as Science has never yet been applied to the search of Gold carried down by Torrents . . . I feel sanguine hopes that the produce of that valuable Metal may . . . be increased in Africa to almost any given extent.” A leading committee member of the African Association, Banks then spelled out the close links between scientific exploration and imperial expansion: “the first step of government must be to secure to the British Throne, either by Conquest or by Treaty, the whole of the coast of Africa from Arguin to Sierra Leone.” Banks also justified what he called an “Experiment” by claiming that a British-run trading company would

“govern the Negroes far more mildly” than “the Tyranny of their arbitrary Princes”. However genuine his desire to improve the lot of resident Africans, when read together, these two closely-dated letters do suggest that Banks’s comments on beetroot were related to his interests in supporting the West Indian plantations, whose massive sugar output contributed to the profitable circulation of gold and slaves that supported British manufacturing industries.

Another disappointing aspect of these six volumes is the index. An irritating practical problem arises from the decision to refer to letters by their sequential number, rather than by the volume in which they appear. Since neither the dates nor the numbers of the letters appear on the outside of the books or even their title pages, locating a particular item can take some time. More fundamentally, searching for particular topics is difficult because virtually all the index entries are names of people, countries or organizations. No rationale is given for the few exceptions—ballooning, inoculation, Peruvian bark (a single mention in one short letter) and steam power. Although many medical topics are touched on in this correspondence, picking them out will not be easy.

The next two sets of volumes will be on Iceland (to appear in 2008, according to a Museum web-site of October 2007) and on the Pacific. Although there are clearly many “scientific” letters that could also be classified on a regional basis, such overall organizational decisions may well have been the best to make two decades ago. Chambers gives no indication of any plans to digitize the Banks correspondence, but viewing the Project from the outside, it would seem sensible to consider abandoning Carter’s original scheme, which relies on expensive thematic print publications, and to contemplate publishing the entire correspondence digitally with effective search facilities. Funding has been a major constraint since the Project’s inception, and its publications owe much to the dedicated commitment of scholarly editors. The Natural History Museum deserves much praise for

making Banks's splendid correspondence more readily accessible. Despite their limitations, these six volumes offer entertaining reading as well as a rich resource for future scholarship.

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Katharine Park and Lorraine Daston (eds), *The Cambridge history of science: vol. 3, Early modern science*, Cambridge University Press, 2006, pp. xxvii, 865, illus., £90.00, \$160.00 (hardback 978-0-521-57244-6).

What are Cambridge Histories for? They go back to *The Cambridge modern history* planned and initially edited by Lord Acton (1834–1902) though he did not live to see the first volume published in 1902. It appeared at a time when most Anglophone historians believed that all the major facts of history could be encompassed within the boards of thirteen volumes and that they demonstrated the progressive triumph of liberalism. Times have changed; many multi-volume Cambridge Histories have since been published ranging from Christianity and Literary Criticism to Russia, Turkey, Libraries and now the History of Science in eight volumes. Placed neatly on the open access shelves of national and university libraries, such histories convey a sense of authority which means that they are consulted by scholars in other disciplines seeking apparently easy access to the subject.

In reality, in our post-modern world, these volumes of collective effort, like any other text, provide a selection that reflects the interests, knowledge, prejudices, etc. of the editors and individual contributors. And this volume, of course, cannot by any means represent the sum totality, *pace* Acton, of what is known about science in the early modern period defined as “from roughly 1490 to 1730” (p. 1), that is from the voyages of Christopher Columbus to the death of Isaac Newton. Although some of the contributors, such as

Steven Shapin, seek to rise above the Whig origins of the genre of the Cambridge Histories, there is nevertheless a sense in the volume of looking forward to what comes after, perhaps best encapsulated in the heading ‘The artist as scientist’ (p. 786) for the discussion of Leonardo da Vinci (1452–1519) by the art historians Carmen Niekrasz and Claudia Swan—this is surely something that the editors should have picked up following Shapin's critique earlier in the volume of such anachronistic usage.

The volume is divided into four parts, the first dealing with the ‘New nature’ followed by discussion of personalities and sites of natural knowledge. This part includes some of the most interesting chapters such as William Eamon on ‘Markets, piazzas, and villages’, Bruce Moran on ‘Courts and academies’, and an especially excellent piece by Adrian Johns on ‘Coffeehouses and print shops’. The third part is entitled ‘Dividing the study of nature’. Despite having some good pieces, the title immediately raises the (unanswered) question of whether it is historically appropriate to divide natural philosophy, astronomy and astrology into three separate chapters, or natural philosophy from mechanics. Such divisions do not lend themselves to the understanding of the place of natural knowledge in contemporary society and culture and may obscure links. What happens, and William Donahue's chapter on astronomy is a particularly good (i.e. bad) example, is that history becomes the study of the relations between texts across time, rather than the study of the relationships between practitioners across geographical, social and cultural space.

The tendency of this volume to split knowledge apart becomes most marked in the fourth and final section ‘Cultural meanings of natural knowledge’. I do have to wonder whether having a set of chapters at the end of the book entitled simply ‘Religion’, ‘Literature’, ‘Art’ (music is treated as part of acoustics), and ‘Gender’, ending up with a piece on European expansion is the best way of discussing the place of natural knowledge