

# From subjugated knowledge to conjugated subjects: science and globalisation, or postcolonial studies of science?

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It could be said that a title in need of an explanation—for example, the heading above this text—is a title in need of replacement. Then again, such coded headings sometimes might better evoke a set of questions, a problematic, than plainer versions. They can, like this one, serve both to coalesce and to disintegrate a method or field of investigation. The term ‘subjugated knowledge’ has multiple resonances, of course. An echo of Michel Foucault crying out for insurrection, it also suggests the postcolonial legacy of Marxist dependency theory and romantic visions of ethnoscience, along with the hopeful recovery of ‘Third World’ standpoints.<sup>1</sup> ‘Conjugated subjects’ is trickier. It is meant to hint at postcolonial hybridity and heterogeneity, suggesting a more complicated and entangled state of affairs, one requiring intimate engagement with various theoretical stances popular in the humanities at the turn of the last century. Together these terms thus trace the trajectory of postcolonial studies of science, technology and medicine over the past twenty years or so. Further, the subtitle indicates my intention to track the recent decline (from a low base) of *explicitly* postcolonial approaches as scholars choose now to fetishise ‘globalisation’. In science and technology studies (STS), as elsewhere, euphoric accountings of globalisation rapidly are displacing anhedonic postcolonial genealogies, often to the detriment of critical thought.

The minor postcolonial agenda in STS has been generally subsumed in efforts to describe how formal knowledge and practice travel, and what happens to them at their points of arrival, how they articulate across and within cultures.<sup>2</sup> I use the word ‘formal’ to avoid defining or privileging anything in particular—but we all know the focus, willing or not, has been on those modern forms of science, technology or medicine commonly associated with Western Europe and North America. Since World War II, these efforts to explain how science travels, becomes transformed and interacts with other knowledge and practice have drawn on political theories of modernisation and dependency, development anthropology, sociological interactionism, and actor-network theory (ANT)—to name just a few approaches. While the phenomena continue to excite some scholarly interest, no one seems entirely

satisfied with any of the proposed answers. 'If facts depend so much on ... local features', asks the historian Simon Schaffer, 'how do they work elsewhere?'<sup>3</sup> As the sociologist Steven Shapin observes, 'we need to understand not only how knowledge is made in specific places but also how transactions occur between places'.<sup>4</sup> So far, cultural geography has remained a minor supplement to epistemological concerns in science studies—at least if one judges the matter on the scant attention paid to it in the *Science Studies Reader*.<sup>5</sup>

Postcolonial theory and insight rarely have been mobilised *explicitly* in attempts to explain the transaction, translation and transformation of science and technology.<sup>6</sup> Even so, postcolonial science studies can still boast a number of designated conferences, special issues of journals, dedicated monographs and programmatic essays. Most of these are products of scholars situated comfortably within the field of science and technology studies, though some pioneering works came from those more readily recognised as postcolonial intellectuals, including Ashis Nandy.<sup>7</sup> One way to assess the impact of postcolonialism is to look at the various science studies handbooks. In the 1995 *Handbook of Science and Technology Studies*, 'translation networks' and 'social network models' occasionally were invoked to explain the spread of modern science.<sup>8</sup> One chapter, 'Globalizing the World', examined science and technology in international relations, avoiding most of the usual globalisation experts.<sup>9</sup> But Helen Watson-Verran and David Turnbull in their essay on indigenous knowledge systems did refer strikingly (and singularly) to 'postcolonialism', using Edward Said as their source.<sup>10</sup> In the most recent edition of the *Handbook of Science and Technology Studies* there is a whole chapter that Vincanne Adams and I wrote surveying postcolonial approaches to science and technology, some of them even blatantly claiming to be such.<sup>11</sup> But the greater proliferation in this volume of the term 'globalisation', implying a rupture with whatever went before, and now attached to the inquiries of Michael Hardt, Antonio Negri, Manuel Castells and Saskia Sassen, is perhaps more telling.<sup>12</sup>

In case this looks like some pedantic effort at postcolonial gate-keeping, let me clarify. It is meant rather as an attempt to draw attention to the lack of traction the standard, or formal, postcolonial theorists have encountered on the slippery slopes of science studies. Most STS scholars have not seen the point of postcolonial theory, given the allure of ANT and now the social science literature on globalisation; and most postcolonial theorists, perhaps displaying lingering effects of a British imperial education in which humanities students are taught to loathe science, have flocked instead to the analysis of literary texts. Of course, there is a broader sense in which any critical account of how science travels and interacts, whatever its assumptions and theories, is *implicitly* postcolonial.<sup>13</sup> One might argue a postcolonial sensibility provides the conditions of its possibility. I am reminded of the charmingly dodgy lawyer in the Australian film *The Castle* who kept repeating when stumped for a legal precedent: 'It's the vibe, your honour, you know, the vibe.' And so it is.

But a vibe demands perhaps some further analysis, and maybe a little specification. Even if they leave aside explicitly postcolonial tropes and references, most scholars of how science travels—and changes as it comes to dwell elsewhere—are engaged in the challenge to Eurocentrism and involved in recognising the world colonialism has worked over. They are repudiating the old master narratives, listening to other voices and experiences, and finding heterogeneity and diversity in supposedly sovereign categories. Indeed, one might argue that the critical study of science and technology emerged more generally through the decolonising momentum of the 1960s, even if most of its practitioners have been reluctant to recognise their own anti-colonial intellectual credentials. Whether we admit it or not, we are all part of the vibe.

### **Actor-network theory almost becomes postcolonial**

Within science studies, actor-network theory provides an appealing account of the travels and new dwellings of science and technology. Bruno Latour, Michel Callon, John Law and many others have fashioned a useful non-formalist means to describe the transfer of formal knowledge and practice from one place to another. ‘The model of extended translation’, Callon writes, ‘does not oppose local and global, nor does it negate agency and passive behaviors. Rather, it describes the dynamics of networks of different lengths, degrees of irreversibility, diversity, and interconnectedness.’<sup>14</sup> Originally, ANT was meant to explain how a series of translations across a network could keep science and technology invariant in different settings. What makes the laws of physics pertain equally well in Paris and Gabon, for example? The extension and transformation of networks might stabilise facts like this, producing ‘immutable mobiles’. The more articulations develop with human and non-human actors, the more stable and robust the object becomes. Society, nature, and geography are thus the outcomes, rather than the causes, of these mobilisations, translations and enrolments. ‘Facts’, according to Latour, are ‘circulating entities. They are like a fluid flowing through a complex network.’<sup>15</sup>

In subverting master narratives, ANT fashioned a disruptive substitute for modernisation and dependency theories in science studies. In particular, it added another challenge to the facile diffusionism of most modernisation theory, deconstructing its arguments in favour of shared cognitive norms and institutional relationships, and dissolving fatuous distinctions between centre and periphery. Admittedly, it was hardly alone in doing this. But what made ANT especially powerful and attractive was its more general corrosive effect, as it functioned also to undermine the other challenges to modernisation theory, such as dependency and world systems theory, which relied on equally linear and homogeneous master narratives.

Still, Latour’s networks often have followed uncritically some of the older colonial contours. Unlike those French intellectuals who seek to repress or sublimate their own imperial emplotment, Latour started promisingly, advising us to look to the colonies, not the ‘home country’, in order to

‘follow [the] transformation of a society by a “science”’. In *The Pasteurization of France*, he argued that in the tropics ‘we can imagine best what a pasteurised medicine and society are’.<sup>16</sup> But then he chose to cast colonial relations in simple forms of dominance and submission, thereby displaying the unconstrained expansion of sovereign networks of French science. Later, in *Pandora’s Hope*, Latour took a field trip to the Amazon to bring order to ‘the jungle of scientific practice’.<sup>17</sup> In deepest Amazonia, scientists developed a laboratory in the depopulated jungle, remaining in conversation with their European colleagues in order to stabilise scientific facts on the margins of civilisation. More colonial *amour-propre* than postcolonial analysis, Latour’s engaging story manages to omit local agents and context, thus turning the network into a sort of iron cage through which no native can break. The emphasis on process and extension of agency—following Alfred North Whitehead—is disconcerting and stimulating, but the ‘local’ here seems quite abstract, strangely depopulated, and depleted of historical and social content. John Law has observed that some ANT ‘tends to ignore the hierarchies of distribution, it is excessively strategic and it colonizes ... the Other’.<sup>18</sup> Shapin criticises the ‘militaristic and imperialistic language that so characterize Latour’s work’.<sup>19</sup>

Later versions of ANT have occupied a more varied terrain than smoothly colonising network space. For example, in their study of the Zimbabwean bush pump, Marianne de Laet and Anne-Marie Mol explain how this mundane object shifted shape and meaning while relations changed around it as it moved from one village to another—how it became a ‘mutable mobile’ while remaining distinctively a Zimbabwean bush pump.<sup>20</sup> As they edge toward postcolonial analysis, de Laet and Mol address the complexities of contact, recognising the appropriations, resistances, transformations and contestations occurring as science and technology travel over the uneven terrain that colonialism has worked. While they shy from any direct engagement with postcolonial studies, they seem to have picked up and amplified the vibe. Moreover, their effort to decolonise and demasculinise ANT might also suggest new paths and approaches for postcolonial studies, especially those leading out from the refreshing constructivism and materialist heterogeneity of ANT.<sup>21</sup>

### Postcolonial studies almost colonises science studies

In 1994, philosopher Sandra Harding issued a plea to ‘locate modern sciences on the more accurate historical and geographical maps produced by the postcolonial accounts’.<sup>22</sup> Using feminist standpoint theory, she imagined a multicultural science incorporating the knowledge and practice of Third World peoples. Harding made a number of specific proposals, including integrating indigenous scientific traditions into Western ‘ethnoscience’, supporting autonomous Third World scientific projects, and taking other sciences as models for the global science of the future. She positioned ‘Third World forms of democratic, pacific, life-maintaining and communal tendencies’ against the ‘imperialistic, violent, consuming and possessively individualistic

ones' prevailing in Western culture.<sup>23</sup> In crafting her manifesto for post-colonial science studies, Harding drew on recent historical studies of imperial science, anthropological accounts of ethnosciences, criticisms of development programmes and—perhaps most important of all—the scholarship and activism of Third World intellectuals like Ashis Nandy, Susantha Goonatileke and Vandana Shiva. In particular, she wanted science studies to encompass the insight of scientists and social critics outside the salons of Europe and North America.

Taking the 'standpoint(s)' of non-European cultures, Harding sought to challenge the 'triumphalism' and 'exceptionalism' of modern science. She lamented the 'persistence of legacies of male supremacy and Eurocentrism in the work of even progressive science and technology scholars'.<sup>24</sup> Yet her program touched lightly on the corpus of postcolonial studies. At times, she expressed discomfort with the idea of the postcolonial, since it seems to suggest to her an achieved condition, a status free of any colonial taint. Thus 'postcoloniality must be a desire, a dream, and a vision before it becomes a reality'.<sup>25</sup> For Harding, Western and other sciences are abstract and essentialised, each presenting a single standpoint, and they perform dominant and submissive parts, rather than appear heterogeneous and hybrid. While she might gesture toward the postcolonial, Harding rarely engages with conventional postcolonial critique—an omission which some may still applaud, of course.

Around 2000, Gabrielle Hecht and I put together a few workshops on postcolonial 'technoscience', using the compound word Latour had made popular.<sup>26</sup> Mostly we just hoped to bring postcolonial studies and science studies into a productive conversation, to get beyond the vibe, in a sense. In my case, I was interested specifically in what postcolonial theory—especially the work of Edward W. Said, Homi K. Bhabha, Gayatri Chakravorty Spivak and others—might offer science studies, though since then I have often wondered why I failed to follow up on my question of what an infusion of materialist science studies might do for postcolonial theory. Our workshops resulted in a special issue of *Social Studies of Science*, which elicited some interest from those entering the field, though it took some time to dent the methodological carapace of an older generation of STS scholars.<sup>27</sup> The general response (most pointedly among Americanists) was they could see no relevance of anything *colonial* to their work. Others seemed to find recondite theory a turn off.

In the introduction to the special issue of *Social Studies of Science*, I wrote, with a fervour that now surprises me:

A postcolonial perspective suggests fresh ways to study the changing political economies of capitalism and science, the mutual reorganization of the global and the local, the increasing transnational traffic of people, practices, technologies, and contemporary contests over 'intellectual property' . . . We hope that a closer engagement of science studies with postcolonial studies will allow us to question technoscience differently, find more heterogeneous sources, and reveal more fully the patterns of local transactions that give rise to global, or universalist, claims.<sup>28</sup>

Then I presented a brief overview of what I called colonial critique, postcolonial theory, and the emerging critical anthropology of development or modernity, along with a discussion of some scholarly reservations about these projects. Sometimes I wonder if more might have been achieved if I had connected these esoteric styles more securely to conventional approaches in science studies, but on the whole the argument still possesses, I believe, considerable force and pertinence. Certainly the essays collected in that issue advanced, empirically and theoretically, our understanding of ‘the localness of technoscientific networks, the situated production of “globality”, the transnational processes of displacement and reconfiguration, the fragmentation and hybridity of technoscience’.<sup>29</sup>

In a thoughtful response to my postcolonial ramblings, Itty Abraham supported the part of the project that ‘seeks to understand both the situatedness of local knowledge practices [and] their movement through space’. But he expressed serious misgivings when the postcolonial was identified, in his words, as a ‘site for understanding the clash of knowledges and the formation of alternative modernities’. He worried that ‘when the postcolonial ... is linked to a fixed site of irreducible knowledge claims, it articulates an ontology that ties knowledge to a location as a singular and essential quality of place’.<sup>30</sup> Admittedly, I had played with Latour’s claim that we have never been modern, arguing instead that ‘we have never had so many moderns’, adducing alternative modernities, new modernities and indigenous modernities, among others.<sup>31</sup> Perhaps I could have explained better how complexly hybrid, partial and conflicted these proliferating ‘modernities’ appeared to me. Abraham’s critique therefore seems far more relevant to those postcolonial scholars who tend to essentialise ethnosciences or propose certain place-specific thought styles. Writing from India, Abraham was acutely aware of the need to decouple questions of ontology from postcolonial science studies, lest we end up cheerleaders for Hindu nationalists asserting their own special modernity. Yet Helen Verran, writing with the Yolgnu people in Australia, might find essentialised indigenous knowledge performs quite a different politics, working strategically as a decolonising, rather than nationalist, strategy.<sup>32</sup> Perhaps this is just another example of the need to provincialise India in postcolonial studies—or, in Abraham’s more general stipulation, the need to situate postcolonial analysis in political and institutional context.

When Vincanne Adams and I next addressed postcolonial science studies, our enthusiasm for the classics of postcolonial theory was relatively muted, though never absent. Indeed, we chose to elaborate on Said’s ‘traveling theory’, his advocacy of a sort of critical spatial consciousness, with an emphasis on the territorial predicates of Western cultural forms, and the resistances to them. As the imperial project is taken apart—or at least heard as ‘contrapuntal’ rather than ‘univocal’—‘its incorporative, universalizing, and totalizing codes [are] rendered ineffective and inapplicable’.<sup>33</sup> Adams and I felt that:

This requires a multiplication of the sites of technoscience, revealing and acknowledging hidden geographical notations and power relations, and further study of the mechanisms and forms of travel between sites. It means we have to be sensitive to dislocation, transformation, and resistance; to the proliferation of partially purified and hybrid forms and identities; to the contestation and negotiation of boundaries; and to recognizing that practices of science are always multi-sited.<sup>34</sup>

We went on to argue that postcolonial analysis offers a 'flexible and contingent framework for understanding contact zones of all sorts, for tracking unequal and messy translations and transactions that take place between different cultures and social positions, including between different laboratories and disciplines even within Western Europe and North America'.<sup>35</sup> At this point we could have adduced Peter Galison's descriptions of 'wordless pidgins' and 'wordless creoles' that enable communication in the 'trading zones' of Big Science—analytic categories derived from his knowledge of postcolonial Pacific anthropology.<sup>36</sup>

Evidently, we were responding in part to the prevailing criticism of literary abstraction in postcolonial studies, turning instead toward more densely anthropological and historical engagements with postcolonial situations.<sup>37</sup> But we distrusted those critics who implied the different styles of analysis are incompatible, and we chose to imagine instead some happy hybrid compromise. We found intriguing the new ethnographic evidence of interactions and transformations taking place in contact zones, showing us the complex local politics of 'global projects', including technoscience. Like the anthropologist Anna Loewenhaupt Tsing we urged further exploration of the culture and politics of 'scale-making' and attention to emergent forms of subjectivity and agency in these global projects—a focus on new topologies as much as new flows. 'The task of understanding planet-wide interconnections', Tsing writes, 'requires locating and specifying globalist projects and dreams, with their contradictory as well as charismatic logics and their messy as well as effective encounters and translations'.<sup>38</sup>

Disguised somewhat hopefully as a ripping yarn, my later book on the transnational scientific investigation of the disease kuru, *The Collectors of Lost Souls*, was meant as an example of the postcolonial study of technoscience. In this book I sought to reconstruct the material cultures of scientific exchange in colonial New Guinea, recognising necessarily unequal reciprocity in transaction as well as the bewildering ambiguity and complexity of estimating value in this previously isolated community. Moreover, I wanted to recreate the exchange routes of scientific goods across the Pacific to the United States, the neo-colonial presence, and south toward Australia, the formal colonial power—and back again to New Guinea—applying Melanesian anthropology to scientists and bureaucrats in order to trace modern kula rings and other long-distance trade partnerships. In New Guinea and on the world stage I discerned a cast of sorcerer scientists, cosmopolitan 'primitives', and assorted hybrid personae. Above all, I tried to 'observe ostensibly global science as though it were assembled out of a set of rather peculiar local achievements'.<sup>39</sup> But perhaps I distracted readers with stories of cannibalism,

sorcery, brain-destroying proteins, Nobel Prizes, mad cows and sexual molestation.

### **'Science and globalisation' almost forgets the colonial**

In the twenty-first century, engaged critics of science and technology have lighted out into new territories, making fresh efforts to reveal the character and consequences of globalisation. Rarely, though, have these scholars taken postcolonial analysis seriously, or rendered it explicit in their work. Several seem to regard formal postcolonial approaches as vitiated reproductions of colonial discourse, reduced to simple claims of dominance and submission—accordingly, they opt for more 'complex' inquiries, which usually happen to be genuinely postcolonial in style, though not recognised as such. Others become so invested in technoscientific emergence and novelty they readily assume a rupture in the late twentieth century with any antecedent conditions—the modern flows they describe are apparently exhilarating and unprecedented.<sup>40</sup>

In one of the more significant recent contributions to science studies, Geoffrey C. Bowker and Susan Leigh Star explore histories of standardisation and classification—those eminently transferable mechanisms of ordering information—focusing on the international classification of disease (ICD). 'A simple agonistic reading of the ICD', they write, 'is that the system was set up in an age of imperialism and helped impose an imperialist reading of disease from the West onto the rest of the world.' But Bowker and Star offer a 'more subtle story' than this attenuated postcolonial version, in which the ICD 'played a part in the creation of the modern state'.<sup>41</sup> *Sorting Things Out* does indeed provide us with a complex and nuanced account of 'building an information system and building the state'—but a more thorough and sympathetic engagement with postcolonial approaches, especially the proliferation of studies of information gathering and the colonial state, would have further sharpened its analysis and offered even stronger support for its critical postcolonial claims.

During the past few years, studies of biocapital and tissue economies have reshaped science studies, opening up a new and exciting field of investigation. Kaushik Sunder Rajan, for example, has conducted an ethnography of a US corporation and Indian bureaucracy in order to uncover 'the global terrain of biocapital', the modern contours of capitalist exploitation of human biological value. Sunder Rajan observes his subjects substituting 'industrial theft' for 'colonial expropriation' as they undertake a 'corporate coding' of the nation state.<sup>42</sup> This and other examples of substitution and omission are terribly interesting, of course, and ripe for postcolonial analysis, but Sunder Rajan prefers a retro-Marxist framework, taking that reliable classic out for another spin. Still, he admits that in the South Asian setting 'some very old patterns of resource extraction and global inequities exist, even if they articulate or are resisted in new ways'. If only he had at least supplemented his extensive reading of Karl Marx—whose inattention to colonialism is legendary—with, for example, some of Vladimir Lenin's



writings on imperialism. 'The ethical-political terrain of technoscience', Sunder Rajan tells us, 'is increasingly constituted by its global reach, and elucidating this terrain requires a set of tools that takes the nature of global interactions and encounters into serious account.'<sup>43</sup> Surely, then, a post-colonial tool set would help?

'How can we characterize the diversity of transnational interactions created by [the] proliferation and complication of global tissue economies?', ask Catherine Waldby and Robert Mitchell in their brilliantly provocative book, *Tissue Economies*.<sup>44</sup> Waldby and Mitchell examine changing patterns of valuation and exchange of human tissues in Britain and the United States, blurring the categories of gift and commodity while emphasising technical entanglement and the 'social economies of citizenship'. Exploring the 'increasingly global nature of tissue exchanges', they carefully trace the deterritorialising flows and eddies created around regulatory salients of persistent nation states.<sup>45</sup> But their narrative often implies rupture with the past, or at least some postcolonial aporia, which renders the analysis more historically naïve and less forceful than it might have been.

Reluctance to recognise and engage directly with the postcolonial spectre haunting globalisation—or rather, the failure to activate a critical, not reconciliatory, postcolonialism—is not limited to science and technology studies. In many general inquiries into globalisation, a form of technological determinism—which treats as fetishes the new information and transportation technologies—readily combines with Thomas Kuhn's paradigm shift, an unfortunate conjunction that science studies might once have disassembled, rather than appropriated. In *Modernity at Large*—to take a popular example of the genre—Arjun Appadurai examines how electronic media and patterns of migration recently have rechannelled the 'work of the imagination', so that it now overflows old national spaces into a diasporic public sphere.<sup>46</sup> Unlike many other theorists of contemporary globalisation, he observes an increasingly heterogeneous and contestatory global cultural economy, shaped by uneven cultural flows of people, media, technologies, finance, and ideologies. According to Appadurai, this deterritorialising of group identities, this cosmopolitan projection, is radically different from any precursor. Yet such a bold assertion of novelty sits uneasily with many of his Indian case studies, especially those concerned with cricket and enumeration. 'Today's world involves interactions of a new order and intensity', he claims at one point. Later, though, we find the return of the repressed colonial. 'The fact is,' he grudgingly concedes, 'the colonial gaze, and its associated techniques, have left an indelible mark on Indian political consciousness.' Later still: 'the kinds of subjectivity that Indians owe to the contradictions of colonialism remain both obscure and dangerous'.<sup>47</sup> On another occasion, Appadurai states he is 'among those analysts who are inclined to see globalization as a definite marker of a new crisis for the sovereignty of nation-states'. But, then again, he admits globalisation operates to extend 'the earlier logics of empire, trade, and political domination in many parts of the world'.<sup>48</sup> Thus, for more astute observers like Appadurai, global flows continue ineluctably to meet postcolonial resistances.

In the 1990s, Stuart Hall lamented that postcolonial studies and the analysis of contemporary global capitalism kept their distance from each other, despite occupying common ground.<sup>49</sup> Sadly, it is this isolation of the different analytic frameworks that seems often to be recurring in recent accounts of the globalisation of science and technology, reproducing a sterile and false ‘culture versus economy’ distinction. Yet, as Ania Loomba and colleagues argue, we should be able to treat globalisation as ‘at once an extension of the world systems of modern capitalism and colonialism and a newer network that presents a complicated picture of national and transnational agents, capital and labor, suppliers and markets, NGOs and multi-lateral agencies’. They regard postcolonial studies as offering ‘a critical strain posed within and against, as well as antecedent to, dominant notions of globalization’. In postcolonial anthropology, especially, they find ‘more of what we might understand as a convergence of concerns: the destabilization of received geopolitical categories, the critical focus on Western forms of power, the inquiry into global inequities and their local articulation, and the affirmative recuperation of subaltern voices’.<sup>50</sup> This sounds to me like an adequate description, too, of the most telling work in postcolonial science studies, and a good prospectus for more to come.

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### Notes

- <sup>1</sup> Michel Foucault, *Power/Knowledge: Selected Interviews and Other Writings, 1972–77*, Colin Gordon (trans), New York: Pantheon Books, 1980, p 71.
- <sup>2</sup> See Warwick Anderson and Vincanne Adams, ‘Pramoedya’s Chickens: Postcolonial Studies of Technoscience’, in Edward J Hackett, Olga Amsterdamska, Michael Lynch and Judy Wajcman (eds), *The Handbook of Science and Technology Studies*, 3rd edn, Cambridge, MA: MIT Press, 2007, pp 181–207; Steven J Harris, ‘Long-distance Corporations, Big Sciences, and the Geography of Knowledge’, *Configurations*, 6, 1998, pp 269–304; Roy MacLeod, ‘Introduction’, in Roy MacLeod (ed), ‘Nature and Empire: Science and the Colonial Enterprise’, *Osiris*, 15, 2000, pp 1–13; James A Secord, ‘Knowledge in Transit’, *Isis*, 95, 2004, pp 654–672; David N Livingstone, *Putting Science in its Place: Geographies of Scientific Knowledge*, Chicago: University of Chicago Press, 2004.
- <sup>3</sup> Simon Schaffer, ‘Late-Victorian Metrology and its Instrumentation: A Manufactory of Ohms’, in Robert Bud and Susan E Cozzens (eds), *Invisible Connections: Instruments, Institutions and Science*, Bellingham, WA: SPIE Optical Engineering Press, 1992, pp 23–56, p 23.
- <sup>4</sup> Steven Shapin, ‘Placing the View from Nowhere: Historical and Sociological Problems in the Location of Science’, *Transactions of the Institute of British Geographers*, 23, 1998, pp 5–12, pp 6–7.
- <sup>5</sup> Mario Biagioli (ed), *The Science Studies Reader*, New York: Routledge, 1999.
- <sup>6</sup> The history of medicine has found postcolonial analysis much more acceptable, perhaps because it has long been more closely aligned with social history and attractive to area specialists. See Henry E Sigerist, ‘The History of Medicine and the History of Science’, *Bulletin of the Institute of the History of Medicine*, 4, 1936, pp 1–13; and Warwick Anderson, ‘Postcolonial Histories of Medicine’, in John Harley Warner and Frank Huisman (eds), *Medical History: The Stories and Their Meanings*, Baltimore: Johns Hopkins

- University Press, 2004, pp 285–307. In medical anthropology, see Mary-Jo DelVecchio Good, Sandra Teresa Hyde, Sarah Pinto and Byron J Good (eds), *Postcolonial Disorders*, Berkeley, CA: University of California Press, 2008. With its lingering association with big ideas and civilisation, science has presented a particularly hard case. In the remainder of this essay I focus on science and technology, not clinical medicine and public health.
- <sup>7</sup> Ashis Nandy, *Alternative Sciences: Creativity and Authenticity in Two Indian Scientists*, Delhi: Oxford University Press, 1995.
- <sup>8</sup> Michel Callon, 'Four Models for the Dynamics of Science', in Sheila Jasanoff, Gerald E Markle, James C Petersen and Trevor Pinch (eds), *The Handbook of Science and Technology Studies*, Thousand Oaks, CA: Sage, 1995, pp 29–63; and Wesley Shrum and Yehouda Shenhav, 'Science and Technology in Less Developed Countries', in Jasanoff *et al*, *Handbook of STS*, pp 627–651.
- <sup>9</sup> Vittorio Ancarani, 'Globalizing the World: Science and Technology in International Relations', in Jasanoff *et al*, *Handbook of STS*, pp 652–669.
- <sup>10</sup> Helen Watson-Verran and David Turnbull, 'Science and Other Indigenous Knowledge Systems', in Jasanoff *et al*, *Handbook of STS*, pp 115–139. See also David Turnbull, *Masons, Tricksters, and Cartographers: Comparative Studies in the Sociology of Scientific and Indigenous Knowledge*, Amsterdam: Harwood Academic, 2000; and Linda Tuhiwai Smith, *Decolonizing Methodologies: Research and Indigenous Peoples*, London: Zed Books, 1999.
- <sup>11</sup> Anderson and Adams, 'Pramoedya's Chickens'.
- <sup>12</sup> See Charles Thorpe, 'Political Theory in Science and Technology Studies', in Hackett *et al*, *Handbook of STS*, 3rd edn, pp 63–82; Christopher R Henke and Thomas F Gieryn, 'Sites of Scientific Practice: The Enduring Importance of Place', in Hackett *et al*, *Handbook of STS*, 3rd edn, pp 353–376; and Susan E Cozzens, Sonia Gatchair, Kyung-Sup Kim, Gonzalo Ordóñez and Anupit Sunithadnaporn, 'Knowledge and Development', in Hackett *et al*, *Handbook of STS*, 3rd edn, pp 787–812.
- <sup>13</sup> My effort to distinguish explicit and implicit postcolonialism may match Simon During's distinction between critical and reconciliatory postcolonialism, with the latter complicit in globalisation (Simon During, 'Postcolonialism and Globalisation: A Dialectical Relation After All?', *Postcolonial Studies*, 1, 1998, pp 31–47).
- <sup>14</sup> Callon, 'Four Models for the Dynamics of Science', p 60. See also John Law and John Hasard (eds), *Actor-Network Theory and After*, Oxford: Blackwell, 1999.
- <sup>15</sup> Bruno Latour, 'A Well-Articulated Primatology: Reflections of a Fellow Traveler', in Shirley C Strum and Linda M Fedigan (eds), *Primate Encounters: Models of Science, Gender, and Society*, Chicago: University of Chicago Press, 2000, pp 358–381, p 365.
- <sup>16</sup> Bruno Latour, *The Pasteurization of France*, Alan Sheridan and John Law (trans), Cambridge, MA: Harvard University Press, 1988, p 140.
- <sup>17</sup> Bruno Latour, *Pandora's Hope: Essays on the Reality of Science Studies*, Cambridge, MA: Harvard University Press, 1999, p 47.
- <sup>18</sup> John Law, 'After ANT: Complexity, Naming And Topology', in Law and Hasard, *ANT and After*, pp 1–14, p 6.
- <sup>19</sup> Shapin, 'Placing the View from Nowhere', p 7.
- <sup>20</sup> Marianne de Laet and Anne-Marie Mol, 'The Zimbabwean Bush Pump: Mechanics of a Fluid Technology', *Social Studies of Science*, 30, 2000, pp 225–263.
- <sup>21</sup> For a vigorous condemnation of the 'linguistic idealism' of some postcolonial studies, see Benita Parry, *Postcolonial Studies: A Materialist Critique*, London: Routledge, 2004, p 3.
- <sup>22</sup> Sandra Harding, 'Is Science Multicultural? Challenges, Resources, Opportunities, Uncertainties', *Configurations*, 2, 1994, pp 301–330, p 305. See also David J Hess, *Science and Technology in a Multicultural World: The Cultural Politics of Facts and Artifacts*, New York: Columbia University Press, 1995.
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- <sup>25</sup> Harding, *Sciences from Below*, p 16.
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- <sup>29</sup> Anderson, 'Postcolonial Technoscience', p 651.

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- <sup>33</sup> Edward W Said, 'Traveling Theory', in *The Word, the Text, and the Critic*, Cambridge, MA: Harvard University Press, 1983, pp 21–39, p 29.
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- <sup>39</sup> Warwick Anderson, *The Collectors of Lost Souls: Turning Kuru Scientists into Whitemen*, Baltimore: Johns Hopkins University Press, 2008, p 7.
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