Science, text and space: thoughts on the geography of reading

David N Livingstone

The idea of a 'geography of reading' provides a potential point of conversation between the cultural and scientific wings of our profession. Here I explore some dimensions of the geography of reading scientific texts. Drawing on a number of theoretical pronouncements – Gadamer's 'fusion of horizons', Said's 'travelling theory', Secord's 'geographies of reading', Beer's 'miscegenation of texts', Fish's 'interpretive communities' and Rupke's 'geographies of reception' – I focus on the spaces where scientific theories are encountered. The argument is that *where* scientific texts are read has an important bearing on *how* they are read. This realization points to a fundamental instability in scientific meaning and to the crucial significance of what might be called located hermeneutics. As a case study in the development of a cartographics of scientific meaning, I explore the different ways in which Darwin's fundamentally biogeographical theory of evolution by natural selection was construed in a number of different settings. The sites I have chosen to illustrate this are the scientific communities which congregated around the Charleston Museum of Natural History in South Carolina, the Wellington Philosophical Society and New Zealand Institute, and the St Petersburg Society of Naturalists in Russia during the second half of the nineteenth century. In each case the encounter with evolution theory, and the ways it was interpreted, are shown to have been shaped by local cultural politics, thereby disclosing the critical role that space plays in the production of scientific meaning.

key words reading spaces of science hermeneutics scientific meaning textual space Darwinism

School of Geography, The Queen's University of Belfast, Belfast BT7 1NN
email: d.livingstone@qub.ac.uk

revised manuscript received 16 June 2005

Introduction

When we talk about the production of scientific knowledge we are inclined to think of dedicated locations where the natural order is encountered in very particular sorts of ways. Conventional venues like the laboratory, the museum, the botanical garden, the observatory and the field station readily spring to mind. Now, thanks to a suite of studies over the past decade and more, we are realizing that scientific knowledge has also been generated in such unexpected sites as cathedrals and coffee shops, public houses and private estates, tents and think-tanks, exhibition stages and artists' studios, stock farms and survey ships (see Livingstone 2003a). In consequence, something of the ways in which science bears the marks of its diverse locations is beginning to be understood.

But scientific knowledge is not just about how and where the worlds of natural objects or material artefacts are experienced, nor about how the rendezvous between human culture and nature is stage-managed. It is also about the encounter with scientific *texts*. It is about engagements between publications and audiences, writers and readers, producers and consumers. We need to recall that knowledge usually does not move around the world as an immaterial entity. It routinely circulates in textual form. So whether we are considering Copernicus's astronomy or Paine's politics, Hume's

ISSN 0020-2754

philosophy or Marx's economics, Freud's psychoanalysis or Sartre's existentialism, the production and reproduction of knowledge has been intimately bound up with the making and moulding of textual meanings. Because – at least in large part – it is print (as the bearer of thought or theory) that is let loose upon the world, what might be called 'textual space' assumes importance (Livingstone 2002a 2003b). As a focus for such inquiries, historians of the book have begun the task of probing the ways in which knowledge has been shaped by the apparatus and architecture of textual form and by the changing conventions of reading itself (Febvre and Martin 1958; Chartier 1981; Darnton and Roche 1989; Johns 1998a; Darnton 1991; Martin 1994; Mason 1998; Cavallo and Chartier 1999; Fischer 2003). For writings – as a species of what Latour (1987, chapter 6) has dubbed 'immutable mobiles' – circulate from site to site as they mark out their own distinctive textual traces (see also Ogborn 2002). As for the scientific enterprise, it is characterized, as Nick Jardine insists, by textual multiplicity including not just research writings, but also 'routinely authored works – instrument handbooks, instruction manuals, observatory and laboratory protocols' that are basic to the regulation of empirical practices (Jardine 2000, 401; also Johns 1998b; Topham 2000). It incorporates too the circulation of textual matter from scribbles on mud-stained field notebooks to the polished prose of the printed page (Lorimer and Spedding 2005; Livingstone 2005). Each of these occupy their own distinctive niche in the cultural ecology of science; they each have their own textual spaces.[1]

This is the terrain I want to traverse here by arguing for the fundamental importance of the spaces where reading literally *takes place*, for knowledge is produced in moments of textual encounter. Indeed there are, I think, *several* interweaving geographies of reading that demand our attention if we are to get a handle on the nature of knowledge as a social formation. Allow me then to begin the task of disentangling a few of these strands before turning to a particular example – the reading of Charles Darwin's fundamentally biogeographical theory of evolution in a number of different locations. My aim is to give some sense of what a cultural geography of scientific reading might look like.

Geographies of reading

The idea of a geography of reading is multi-faceted. It connects, for example, with the material spaces of book production, the distributional networks of mass print, the cultural topography of book buying and the social morphology of lending libraries. It links too with the economic geography of what Franco Moretti (1998) called narrative markets, as much as with the 'decimal classification' system of Melville Louis Kossuth Dewey whose obsession with efficiency reduced the library's seductive disorganization to a rationalizing simplicity (see Battles 2003). In fundamentally important ways these geographies shape the map of knowledge at every turn. They are not, however, my quarry here. Instead I would like to dwell on the significance of location in *hermeneutic* encounters by attending to the spaces where texts and readers are brought into dialogue. This is because science, in fundamental ways, is about knowledge in transit, about modes of transmission, about acts of communication; and, as James Secord has recently remarked, 'every act of communication excludes as well as includes' (2004, 662).

Let me cut into the problem at four related points. Consider first, *spaces of textual circulation*. To appreciate what I am after here it will be useful to turn briefly to an essay entitled 'Traveling theory' by Edward Said which appeared in 1983. In this piece, Said's sight-lines converge on the way in which Lukács's *History and Class Consciousness* (1967), composed in Budapest in 1923, was taken up in markedly different ways, first in mid-1950s Paris by Lucien Goldman and later in 1970s Cambridge by Raymond Williams. The particulars are not important in the present context. What attracts is Said's realization that theory travels, and that as it travels, it is transformed. Here is how he begins the essay: 'Like people and schools of criticism, ideas and theories travel – from person to person, from situation to situation, from one period to another' (Said 1991, 226). But movement from one site to another is never simply relocation; migration always involves modification (Clifford 1992). Entry into a new space, Said reminds us,

> necessarily involves processes of representation and institutionalization different from those at the point of origin. This complicates any account of the transplantation, transference, circulation, and commerce of theories and ideas. (1991, 226)

In all conceptual circuitry there are prevailing conditions, inclining towards adoption or resistance, which confront the new theory. And this means that the idea in transit – whether accommodated or rejected – 'is to some extent transformed by its new

uses, its new position in a new time and place' (Said 1991, 227). These remarks encourage us to focus on how texts are differently received and mobilized in different arenas; to worry less about distinctions between authentic readings and misreadings of texts; and to recall attention to the connections between theory and location. Said again:

> No reading is neutral or innocent, and by the same token every text and every reader is to some extent the product of a theoretical standpoint, however implicit or unconscious such a standpoint may be . . . [T]his means that theory has to be grasped in the place and the time out of which it emerges as a part of that time, working in and for it, responding to it. (1991, 241–2)

Just exactly what goes on in the moment of textual encounter, of course, remains something of a black box. The altogether mysterious performance of reading and its relationship to the making and remaking of meaning is hard to elucidate. But I think it true to say that spaces of reading are always – to pursue a second theme – *sites of textual hybridity*. Let me illustrate this by turning to Gillian Beer's account of Charles Darwin's reading habits and what she calls the 'fictions of development' (Beer 1985). Her concern is to elucidate something of how Darwin's reading of fictional literature was intertwined with the narrative sequences he devised to disclose the complexity of evolutionary patterns, how he struggled with inherited language to convey new meanings, how his own vocabulary was freighted with the discursive features of the literature he relished, and ultimately how his writing 'profoundly unsettled the received relationships between fiction, metaphor, and the material world' (Beer 1985, 543). Along the way she alludes to a number of matters: to Darwin's exuberant embrace of metaphor and the ways in which he used it to 'overturn the bounds of meaning assigned', not least with such terms as 'struggle', 'master', 'slave' and so on; to the cultural relativism that he is likely to have derived from his reading of Montaigne's essay 'Of the Cannibals'; and to his own interest in the psychology of reading. But here I want to fasten specifically on a set of observations that she makes which have wider implications:

> Books do not stay inside their covers. Once in the head they mingle. The miscegenation of texts is a powerful and uncontrollable force. Commentators on Darwin all note that he read Malthus in late September and early October 1838. He records his reading . . . on 3 October. From that statement one might imagine a pure act of reading, sustained and uninterrupted, a virginal encounter. During October 1838, however, Darwin also read at least sixteen other works and in the preceding months very many more. What we have here is a network. Reading has related these random texts so that they are interactive. No one of them is quite the same as if they have been read without the others.
>
> We privilege Darwin's reading of Malthus . . . since it released and disturbed him creatively. But we should not isolate it. Darwin's rereading of Malthus – that is, his combative appraisal – relied on the intellectual conditions of his reading, on what he had read before, often without analytical scrutiny, and on what he was reading alongside it. (Beer 1985, 548–9)

While Beer uses this methodology to elucidate Darwin's cognitive and writerly life, it is clearly also of immense importance in making sense of any encounter with a text. Readers come to texts with different reading histories, and read in the light of their literary genealogies. The meaning that any new work has for an individual reader is shaped by the other texts and theories and practices they have engaged. Meaning bleeds, as it were, from one text to another. New texts take their place within an already established private web of textual interlacings. These are manifestly different from person to person, from place to place, from site to site, and have a key bearing on the spaces of knowledge making. Every space of knowledge is a site of textual hybridity in which texts and theories interweave in altogether promiscuous ways.

Another way to express all this is to speak – as does Hans-Georg Gadamer – of the 'fusion of horizons' in hermeneutic encounters. According to Gadamer, in every moment of genuine understanding the horizons of reader and writer come together to make meaning. Textual meaning, at least to some degree, is necessarily mobile because, as Gadamer notes, every act of 'interpretation has to adapt itself to the hermeneutical situation to which it belongs' (1989, 397). This means that

> the process of understanding that culminates in the fusion of horizons has more in common with a dialogue between persons . . . than it has with the traditional model of methodologically controlled investigation of an object by a subject. This latter mode . . . conceals the intrinsically dialectical nature of understanding that transforms both text and interpreter. (Linge 1976, xix–xx)

The bringing of one hermeneutic horizon to bear on another, of course, can be less fertile and more manipulative, less reciprocal and more judgemental. This has often been the case in Western encounters

with non-Western indigenous scientific texts. Fa-Ti Tan, in his recent study of British naturalists in Qing China, uncovers the 'reading strategies' that Victorian scholars brought to bear on their inspection of Chinese works of natural history. Their textual practices and interpretative tactics, paralleling how they read early Western texts, presumed their own cognitive, linguistic and taxonomic superiority and thus 'assumed that it was possible and desirable to separate empirical facts in Chinese works from the muddle-headed Chinese system of knowledge' (Tan 2004, 113). To achieve their aim they had to systematically 'misinterpret' Chinese scholarship, by translating it into a new frame of reference – essentially their own hermeneutic horizon – in order to 'fish pearls out of the mud', as it were. This 'hermeneutic process', Tan explains, meant that they 'had to decide how much they wanted to trust the Chinese texts' and what to make of any specific remark in its Chinese context (2004, 114). Some claims about particular species were thus dismissed as oriental exaggeration, others taken as potentially reliable, still others as solid evidence.

Said's account of 'traveling theory', Beer's notion of the 'misgenation of texts' and Gadamer's 'fusion of horizons' all display a relatively individualist inflection by virtue of their congregating around exegeses of the pronouncements of a number of notable intellectuals – Lukács, Goldman and Williams in the case of Said, and Darwin (and indeed Browning and George Eliot) in the case of Beer. There is much of value here. But this rather atomistic concentration needs to be supplemented by a broader awareness of the ways in which different traditions receive and interpret canonical works. We need to develop, then, what I want thirdly to call *cartographies of textual reception*. There are several potential entry points to such a venture. Take, for example, the Dutch historian of science Nicolaas Rupke, who has examined the different ways in which the writings of Alexander von Humboldt – particularly his work on the political economy of Mexico – were reviewed in different European countries (Rupke 1999 2000). Rupke's aim is to reveal 'the extent to which "local" circumstances were involved in the production of the diverse meanings that [the Humboldt corpus] acquired' (Rupke 1999, 321).[2] Elucidating the character of different reviewing cultures has a crucial bearing on the geography of reading, because reviews stage-manage texts and steer readers in particular directions. Rupke thus surveys which works were most heavily reviewed in which locations, the different styles of literary inspection from place to place, and the different species of periodical which carried reviews of scholarly works in different national settings. On the cognitive front, Rupke discloses how French and German reviewers of Humboldt's *Essai Politique*, for example, tended to focus on the ways his new determinations of longitude, latitude and altitude had delivered increased cartographic accuracy. The British, by contrast, dwelt on its more commercially strategic elements and how the work meshed with natural theology. Cultural preoccupations, in other words, channelled reviews in particular directions.[3] Cartographies of textual reception are thus a way of disclosing what Rupke calls 'the constitutive significance of place in the production of the various meanings that become attached to even a single work' (1999, 336).

Similar projects have recently surfaced in other fields of inquiry. We might consider Thomas Kaufmann's remarkable new book, *Toward a Geography of Art*, which draws attention to the role of place in 'the beholder's share' in aesthetic experience and to the located reception of works of art (Kaufmann 2003, 6).[4] Or we could turn to Diarmid Finnegan's (2004) research on how early glacial theory was differently received in various institutional spaces in Edinburgh, and how, in various textual situations, its language was mobilized by editors for different purposes. Or we could take Beau Riffenburgh's (1994) charting of the different ways polar exploration reports were differently read in different places. But I think enough has been said to confirm that reviewing cultures play an important role in how readers encounter texts.

To develop what I finally signal to as a *cultural geography of reading* will involve reaching beyond the elite work of scholarly journals. Here we are helped considerably by the work of the Cambridge historian of science, James Secord (2001), on the anonymous publication of Robert Chambers's *Vestiges of the Natural History of Creation* and the sensation it aroused in Victorian England. Placing the story in the context of the nineteenth-century creation of a mass-print culture, Secord charts in filigree detail the ways in which the book was printed, reprinted, staged, read, reviewed, modified, promoted and criticized. Then he begins the task of untangling what he calls the 'geographies of reading', by demonstrating the different ways the book was read in different local cultures. In circulating libraries, gentlemen's clubs, drawing rooms and

public houses, *Vestiges* was read and talked about in different ways. Social class, local politics, religious creed and professional interests all had a bearing on the book's patterns of reception. In every case, meaning was manufactured in the spaces of textual encounter. In every city there were spaces of appreciation and spaces of aggression, spaces of suspicion and spaces of bewilderment. And the book's anonymity affords Secord the opportunity of uncovering a geography of authorial speculation. As readers wrestled over how to identify an ethereal author, it mattered whether the writer was from the gentry or the working-class, was a believer or an infidel, was a gentleman or a cad. 'What if', Secord tellingly observes, 'the anonymous author was not to be found in London's fashionable Pall Mall, but a few blocks away in the squalid dens of Holywell Street, notorious for atheism and pornography?' (2001, 23). Because urban terrain and moral territory belonged together, conjecture was rife. And there were distinct spaces of surmise: names that circulated in Edinburgh rarely surfaced in Oxford, while 'those that were common in London's fashionable West End were barely known in the Saint Giles rookeries only a few blocks away' (2001, 24). What Secord's inquiries disclose is that the act of reading is a cultural performance.

This account moves the analysis of reading beyond the public reviewing cultures that Rupke elucidates into private sites and conversational spaces (see Macpherson 2001). And this impulse might be taken yet further as Owen Gingerich's extraordinary research into the marginal annotations inscribed by successive owners on the pages of copies of the first edition of Copernicus's *De Revolutionibus* reveal. These notes provide clues to the ways in which this canonical text was encountered in different locations at different points in time, and constitute a kind of temporally extended set of reading clusters by which successive meanings were shaped in dialogue with previous readers. As Gingerich concluded from his Herculean quest to track down every surviving copy of the book – a mission that brought to light copies owned by saints and scallywags, architects and astrologers, humanists and heretics, doctors and dilettantes – the annotations collectively comprise 'a precious legacy of the way in which the book was perceived and read during the scientific Renaissance' (Gingerich 2004, 255).

In some ways these various inquiries connect with Stanley Fish's earlier development of the concept of 'interpretive communities'. To Fish, textual meaning is always the production of what he called 'community-constituted interpreters', who in turn constitute texts through 'the communal nature of the interpretive act' (1989, 141–2). The debate in literary studies that Fish's conventionalist understanding of the nature of literature has stimulated need not concern us here, nor indeed his role in the squabble over the infamous Sokal hoax. What attracts in this context is the inescapably collective character of interpretation and the way in which any individual reading is located in the reader's membership of a community sharing some foundational assumptions and interpretive strategies. It also moves the centre of gravity away from anxieties over the 'correct' reading of any text to what Fish calls '"ways of reading" that are extensions of community perspectives' (1980, 16). To the extent that interpretive communities occupy material or metaphorical spaces, they fall within the arc of the cultural geography of reading.

These four cuts at the project of developing a geography of reading are intended to highlight the spatiality of textual meaning. But they also disturb any assumption that a clear boundary line can be charted between acts of production and consumption – between 'the making and communicating of knowledge' (Secord 2004, 661) – as though there are sites of knowledge that simply summon ideas and theories and practices out of thin air. They remind us too that the generation of knowledge involves interpretation as well as invention, the creative encounter with existing texts, as well as the origination of the novel ex nihilo. This is because the coming together of texts and readers is a creative hermeneutic event, one in which meaning is made and remade. It is not to be thought of as a passive 'consumption' of ideas; it is rather a positioned conversation, a situated dialogue, a sited engagement between text and reader. This means that acts of reading always involve located hermeneutics. To put it another way, what we need to develop is a sensitivity towards what has been called the politics and poetics of place in textual engagement. Such a project, the feminist literary critic Nancy Miller observes, 'would acknowledge both the geographics of the writing it reads and the limits of its own project' (1988, 4). For if, as Jonathan Rose has recently put it, 'the history of reading is the history of interpretation' (2004, 39), then geographies of reading turn out to be geographies of interpretation.

It is now time to put these reflections to work in a particular case study – the way in which Darwin's theory of evolution was differently read in a range of urban spaces in the nineteenth century. The instances I have selected are intended to highlight something of how local circumstances conspired to condition the meanings that were attributed to Darwin's theories of the origin of species in different venues.

Reading Darwin

To begin, I want to turn to a number of conceptual and material spaces within three cities – Charleston, Wellington and St Petersburg. This can only be a thumbnail sketch, of course, but it is intended to convey something of how Darwinian theory travelled, how local cultures responded to the new theory, and how other texts which were circulating in these particular places shaped the reading of Darwin.

In Charleston, South Carolina, the mathematician and marine invertebrate naturalist John McCrady (1831–81) remained a life-long opponent of Darwin's theory of the evolution of the species (Stephens 2000). On the surface this is surprising, because McCrady devoted himself to the construction of what he called a 'law of development by specialization' which he believed encompassed all life. In the early 1860s he even noted that Darwin had 'furnish[ed] a most beautiful explanation of the *Modus operandi* which probably characterizes the law of development in the production of specific forms and varieties' (McCrady 1860, 102). But McCrady always conceived of development in ways akin to embryological growth which retained the identity – not the transmutation – of the individual and so he could never go very far with Darwin. Why? To answer that question we need to recall that McCrady was a tireless apologist for southern culture, issuing periodic commentary on the deterioration of civilization in the northern States, and extolling the excellence of its southern counterpart. The only hope for the South was secession for, as he put it on the eve of the American Civil War, 'a slave State never can be a centre of that form of civilization which now flourishes in Europe and at the North' (McCrady 1861, 604).

With this conviction, McCrady took to mobilizing his scientific law of development by specialization in the interests of an independent South and calling on geological metaphor to naturalize geopolitical disruption. 'The great Confederate Republic, founded by our forefathers, is about to break up into two or more confederacies', he remarked in 1861, in an article tellingly entitled 'The study of nature and the arts of civilized life'. The 'separation of this Union' he went on,

> will be a convulsion . . . but, like those vast convulsions of geological times, it will be a convulsion of development – a pang and throe of the birth-time of great nations which are yet to be – a grand and majestic step in advance. (McCrady 1861, 595)

Here political and natural history were at one for, as McCrady insisted,

> if this be the course of our development, then is it in perfect harmony with all other great developments in nature, proceeding as they do by a progress in specialization. (McCrady 1861, 597)

Thus far Darwinian language could doubtless have given him political sustenance. But Darwin's ideas about human origins and species transmutation were profoundly troubling. For as a southerner McCrady was dedicated to the idea of racial superiority and closely followed his teacher Louis Agassiz in insisting that the different races constituted different human species (Lurie 1954; Winsor 1979). Each race had a separate point of origin and any blurring of its transcendental individuality was both biologically and socially repugnant. McCrady thus repeatedly insisted that it was simply impossible to conceive that the white and black races could have descended from the same origin. To him, Darwin's theory of species transmutation was nothing less than a subversive threat to southern racial and religious culture, a culture rooted in its own 'system of Home Education, based upon our social structure, and drawing its materials from the semi-tropical nature which surrounds us' (McCrady 1861, 604).

In McCrady's case, the reading of Darwin was shaped by the cultural politics of his interpretive community – the circle of natural historians that rotated around the Charleston Museum of Natural History where scientific inquiry was routinely domesticated to the regional needs of the Old South. There, thanks to the work of figures like Edmund Ravenel, John Holbrook, Lewis Gibbes and Francis Holmes, a distinctive *style* of southern science had come to fruition which was shaped on the template of political ideology. Ravenel, for example, declared that the laws of nature could not be obliterated by abolitionists. Holbrook and Gibbes actively connived with Samuel George Morton, the Philadelphia medical practitioner, to marginalize monogenist

opposition to their thorough-going scientific racism. These men all threw their weight behind Morton and Josiah Nott – and the scientific luminary from whom they drew inspiration, Louis Agassiz – to confirm that the black and white races were different biological species, and thus to legitimize anti-abolitionist sentiment. *This* was the environment in which McCrady read Darwin's theory. This was the *textual space* into which Darwin's work was cast.

Now let me be clear about this. I am *not* arguing that all the Charleston naturalists read evolution in precisely the same way. Nor am I saying that opponents always shared the same grounds for their disquiet. John Bachman, for example, long believed in the permanence of species and rejected Lamarck's 'absurd' notions about how species were supposed to undergo transmutation. But he repudiated the way Agassiz mobilized ideas about natural provinces and centres of creation to justify different human species. And yet he too retained a life-long commitment to the idea that certain races were stamped with inferiority (Bachman 1850). The point is that the meanings which were attributed to Darwin's theory among the Charleston interpretive circle were shaped by what was taken to be the theory's implications for racial politics, post-bellum anxieties about the fragmentation of southern culture, sectional rancour and attitudes towards the liberalizing politics of reconstruction.[5]

Half a world away in New Zealand, things were different. Whereas McCrady read Darwinian evolution as subversive of racial hierarchy, here Darwin's theory was interpreted as underwriting the runaway triumphs of white colonialism. A set of public lectures presented at the Colonial Museum introduced the inhabitants of Wellington to Darwin's theory of evolution in 1868–9.[6] The speaker was the New Zealand politician, William Travers – an Irishman from Limerick, correspondent of Darwin, botanist and lawyer. As he read *The Origin of Species*, he discerned a theory with immediate implications for race history. Just as the European rat, honey-bee, goat and other invader species had displaced their New Zealand counterparts, so the 'vigorous races of Europe' were wiping out the Maori (Travers 1869, 313). It was a law of nature: in the struggle for existence whenever a 'white race comes into contact with an indigenous dark race on ground suitable to the former, the latter must disappear in a few generations' (Travers 1869, 308). Nor was this law of nature to be lamented. The historic successes of European culture meant that

> even the most sensitive philanthropist may learn to look with resignation, if not with complacency, on the extinction of a people which, in the past had accomplished so imperfectly every object of man's being. (Travers 1869, 313)

In reading natural selection through the lens of race relations, Travers was simply bringing to Darwin's text the long-standing colonial conviction that the Maori were fated for extinction by Nature. His encounter with Darwin's theory and the meanings he read in it were thus shaped by the contingencies of settler–Maori politics and the desire to enlist enlightened science in the service of colonial policy.

Travers was not alone. Other members of the Wellington scientific fraternity, no less schooled in the rhetoric of naturalized imperialism, were happy to confirm this exegesis. Thus the Wellington medical practitioner Alfred K. Newman (see Stenhouse 1996), in a statistical analysis of the 'causes leading to the extinction of the Maori', called on the breeding researches of Darwin, Wallace and Galton to underwrite his declaration that the 'feeble' Maori were 'dying out in a quick, easy way, and being supplanted by a superior race'. It wasn't, he noted, cause for 'much regret' (Newman 1881, 475). Again, Walter Buller FRS used the occasion of his 1884 presidential address to the Wellington Philosophical Society to declare that aboriginal peoples must recede in the face of civilization (Buller 1884). Pronouncements of this stripe have led John Stenhouse (1999, 76, 81), noting that the 'scientific establishment . . . favored Darwin from beginning to end', to observe that 'New Zealanders embraced Darwinism for racist purposes'. In this context, the idea of struggle as an irresistible primal force became the hermeneutic key to delivering a Darwinian apologia for *pakeha* (white-settler) politics. After all, Darwin himself was sure that civilized peoples were 'everywhere supplanting barbarous nations' (Darwin 1871, 128). And as the editor of Auckland's *Southern Monthly Magazine* declared,

> Whatever may be thought of Mr Darwin's views concerning natural selection and the origin of species, no one will be disposed to deny the existence of that struggle for life which he describes, or that a weak and ill-furnished race will necessarily have to give way before one which is strong and high endowed. (Giles 1863, 215)

The very principle that made Darwinian theory attractive to Wellington audiences, namely struggle,

was precisely what most perturbed the circle which gathered at the St Petersburg Society of Naturalists in late nineteenth-century Russia. Of central importance here were the interventions of Karl Kessler, who was appointed professor of zoology at St Petersburg University in 1861. In 1879 he declared on Darwin's theory in an essay tellingly entitled 'On the Law of Mutual Aid'. Here he condemned 'the cruel, so-called law of the struggle for existence'. To be sure, he allowed that overpopulation could generate intraspecific competition for resources; but he was sure that Darwin had given way too much weight to it. The sciences of zoology and sociology, he believed, had ignored 'the law of mutual aid, which ... is if anything more important than the law of the struggle for existence' (quoted in Todes 1989, 110–11). He reported that he himself had witnessed the survival value of reciprocated care and cooperation among bees, beetles, spiders, reptiles and a host of other creatures. In the human species, mutual aid undergirded society's material and moral progress.

Kessler's reading of Darwin did not remain an isolated textual event. It inaugurated a reading history that steered later Russian engagements with the text. In fact a number of Kessler's associates – such as Alexander Brandt, Mikhail Filippov, Vladimir Bekhterev and Modest Bogdanov – constituted what Daniel Todes (1989, chapter 6) describes as the 'Russian Mutual Aid Tradition'. And perhaps most visibly of all, Kessler's cooperative gloss was vigorously promulgated in the writings of the anarchist prince Peter Kropotkin, who achieved prominence through radical publications and political activism (Woodcock and Avakumovic 1950; Miller 1976). A member of the St Petersburg fraternity, he read the published version of Kessler's 'mutual aid' speech and later published the book on which his scientific reputation very largely rests, *Mutual Aid: A Factor in Evolution*. Here, in grand cosmic style, he traced the principle of correlative sociability from its application in the animal world, through primitive human society and medieval urban life, up to his own day. Like the evolutionism of his St Petersburg associates, this was Darwinism with its Malthusian teeth extracted. As he put it in a letter to Marie Goldsmith:

> Kessler, Severtsov, Menzbir, Brandt ... and finally myself ... stand against the Darwinist exaggeration of struggle within a species. *We see a great deal of mutual aid,* where Darwin and Wallace see *only struggle.* (quoted in Todes 1989, 104)

In *Mutual Aid* itself he insisted:

> The animal species, in which individual struggle has been reduced to its narrowest limits, and the practice of mutual aid has attained the greatest development, are invariably the most numerous, the most prosperous, and the most open to further progress ... The unsociable species, on the contrary, are doomed to decay. (Kropotkin 1939, 293; see also discussion in Livingstone 1992, 254–8)

These St Petersburg readings of Darwin, of course, were not conjured out of thin air. To the contrary, as Daniel Todes (1989) makes clear, the St Petersburg engagement with Darwinian evolution was moulded by earlier textual encounters, notably with Thomas Malthus's theory of population. Both on the political left and right in Russia, Malthus's atomistic conception of society had already been castigated, mostly since the 1840s, as a cold, soulless and mechanistic product of English political economy. Malthus may have rationalized poverty and inequity in England, but his commentators were certain that his theory would not apply in a harmonious Russia. It 'violated Russians' vision of a cohesive society in which all of its members were valued parts of the whole' and its ethos was seen as inimical to 'the cherished peasant commune' (Todes 1989, 29). In an environment where the laws of nature and society ran in tandem, Darwin's theory of organic change was interpreted in the shadow of the Russian rendezvous with Malthus. But reading lineage was not the only force shaping the encounter. Physical space also had a role to play. Kropotkin had spent lengthy periods of time in Siberia during the 1860s just prior to encountering Kessler's theory. There he found an environment, as did other scientific travellers, where scarcity and severity predominated. Nature displayed no plenitude here; no tightly-packed, wedged-in, ecological niches; no super-abundance and swarming life forms. The vocabulary of fecundity, overpopulation and intraspecific competition that Darwin and Wallace employed in the tropics just didn't seem right in this sparse northern world (see Livingstone 2002b). Just as the teeming tropics never left Darwin's mind, the wastelands of Russia's high latitudes remained with Kropotkin.

The St Petersburg engagement with Darwin, then, was a compound product of textual pre-history and environmental reality. Here Darwin was read through the twin spectacles of Russian geopolitics – social structure and territorial configuration. Just

as the colonial politics of New Zealand predisposed Wellington readers of Darwin to embrace its robust selectionism and the cut-throat ethics of struggle; just as the Charleston naturalists read Darwin through the lens of a racialized Agassiz-type creationism that leant support to southern social structure; so in St Petersburg, Darwin's theory of evolution, construed in the light of a customary disquiet over Malthusian social theory, was translated into the language of cooperation and reciprocal sociability. Malthus might have been a credible intellectual source of inspiration for Darwin and his disciples in England; his philosophy was profoundly troubling to a Russian society whose class structure and political traditions made it suspicious of competitive individualism. In all three venues, political factors were crucial to the local constitution of Darwinian meaning.

Conclusion

Along with my initial conceptual remarks, this brief survey of the different ways Darwin's theory was construed in a sequence of different spaces is intended to open up a few strands in the historical geography of reading. Attending to the *spaces of textual circulation* has alerted us to the different sites at which scientific theories are encountered and their local meanings constituted. As theory travels it is transformed. Paying attention to what I have referred to as the *sites of textual hybridity* compels us to take with greater seriousness the reading histories and interpretive communities in which encounters with any new theory are necessarily domesticated. But reading practices are not isolated textual journeys. They are structured by the reading traditions in which they are located, and this points to the need for charting what I describe as *cartographies of textual reception*, namely the ways in which works are reviewed, staged and judged for particular audiences in particular spaces. By developing even wider *cultural geographies of reading* in both public and private arenas we can begin to more fully understand the role that space, place and site play in the production, movement and reception of knowledge.

Acknowledgement

I am most grateful to Charles Withers, Nuala Johnson and Keith Richards for a variety of helpful comments on an earlier version of this paper.

Notes

1 See also the contributions to the discussion on 'Scientific Readers' in the 2004 edition of *Isis* (Blair 2004; Topham 2004; Daston 2004).
2 Earlier studies of how Humboldt's work was reviewed include Jones (1972–3) and Brock (1993).
3 More recently Rupke (in press) has pushed this work even further by revealing how the Humboldt phenomenon was appropriated for very different purposes in different cultural spaces. Thus 'nationalists and internationalists, fascists and communists, militarists and pacifists, moderates and radicals' have all aggressively taken possession of Humboldt's heritage. I am grateful to Professor Rupke for allowing me access to this work.
4 Significantly Kaufmann here mobilizes a much more consciously developed geographical lexicon than his earlier 1996 analysis of reception theory though even there he called for the *grounding* of aesthetic appreciation over against what he termed 'an ahistorical, phenomenological viewpoint' (Kaufmann 1996, 64).
5 The plurality of opinions on Darwinism in the South more generally is stressed in Numbers and Stephens (1999).
6 On the reaction of New Zealanders to evolution I have learned much from two articles by John Stenhouse (1994 1999).

References

Bachman J 1850 *The doctrine of the unity of the human race examined on the principles of science* Canning, Charleston SC

Battles M 2003 *Library: an unquiet history* Heinemann, London

Beer G 1985 Darwin's reading and the fictions of development in **Kohn D** ed *The Darwinian heritage* Princeton University Press, Princeton NJ 543–88

Blair A 2004 An early modernist's perspective *Isis* 95 420–30

Brock W H 1993 Humboldt and the British: a note on the character of British science *Annals of Science* 50 365–72

Buller W L 1884 Presidential address to the Wellington Philosophical Society *Transactions and Proceedings of the New Zealand Institute* 17 443–5

Cavallo G and Chartier R 1999 *A history of reading in the West* Polity, Cambridge

Chartier R 1981 *The cultural uses of print in early modern Europe* Princeton University Press, Princeton NJ

Clifford J 1992 Travelling cultures in **Grossberg L, Nelson C and Treichler P** eds *Cultural studies* Routledge, London 96–116

Darnton R 1991 History of reading in **Burke P** ed *New perspectives on historical writing* Cambridge University Press, Cambridge 140–67

Darnton R and Roche D eds 1989 *Revolution in print: the press in France 1775–1800* University of California Press, Berkeley CA

Darwin C 1871 *The descent of man and selection in relation to sex* 2nd edn John Murray, London

Daston L 2004 Taking note(s) *Isis* 95 443–8

Febvre L and Martin H-L 1958 *L'apparition du livre* Albin Michel, Paris

Finnegan D A 2004 The work of ice: glacial theory and scientific culture in early Victorian Edinburgh *British Journal for the History of Science* 37 29–52

Fischer S R 2003 *A history of reading* Reaktion, London

Fish S 1980 *Is there a text in this class? The authority of interpretive communities* Harvard University Press, Cambridge MA

Fish S 1989 *Doing what comes naturally: change, rhetoric, and the practice of theory in literary and legal studies* Duke University Press, Durham NC

Gadamer H-G 1989 *Truth and method* 2nd rev edn Sheed & Ward, London

Giles J 1863 Waitara and the native question *Southern Monthly Magazine* 1 209–16

Gingerich O 2004 *The book nobody read: chasing the revolutions of Nicolaus Copernicus* Heinemann, London

Jardine N 2000 Books, texts, and the making of knowledge in **Frasca-Spada M and Jardine N** eds *Books and the sciences in history* Cambridge University Press, Cambridge 393–407

Johns A 1998a *The nature of the book: print and knowledge in the making* University of Chicago Press, Chicago IL

Johns A 1998b Science and the book in early modern cultural historiography *Studies in History and Philosophy of Science* 29A 167–94

Jones C P 1972–73 The Spanish-American works of Alexander von Humboldt as viewed by leading British periodicals, 1800–1830 *The Americas* 29 442–8

Kaufmann T D 1996 Reception theory in **Turner J** ed *Dictionary of art* vol 26 Macmillan, London 61–4

Kaufmann T D 2003 *Toward a geography of art* University of Chicago Press, Chicago IL

Kropotkin P 1939 *Mutual aid: a factor of evolution* Penguin, Harmondsworth first pub. 1902

Latour B 1987 *Science in action* Open University Press, Milton Keynes

Linge D E 1976 Editor's introduction in **Gadamer H-G** *Philosophical hermeneutics* University of California Press, Berkeley CA xv–lviii

Livingstone D N 1992 *The geographical tradition* Blackwell, Oxford

Livingstone D N 2002a *Science, space and hermeneutics* University of Heidelberg, Heidelberg

Livingstone D N 2002b Tropical hermeneutics and the climatic imagination *Geographische Zeitschrift* 90 65–88

Livingstone D N 2003a *Putting science in its place: geographies of scientific knowledge* University of Chicago Press, Chicago IL

Livingstone D N 2003b Science, religion and the geography of reading: Sir William Whitla and the editorial staging of Isaac Newton's writings on biblical prophecy *British Journal for the History of Science* 36 27–42

Livingstone D N 2005 Text, talk and testimony: geographical reflections on scientific habits. An afterword *British Journal for the History of Science* 38 93–100

Lorimer H and Spedding N 2005 Locating field science: a geographical family expedition to Glen Roy, Scotland *British Journal for the History of Science* 38 13–33

Lukács G 1967 *History and class consciousness: studies in Marxist dialectic* **Livingstone R** trans Merlin, London

Lurie E 1954 Louis Agassiz and the races of man *Isis* 45 227–42

Macpherson R C 2001 When evolution become conversation: *Vestiges of Creation*, its readers, and its respondents in Victorian Britain *Journal of the History of Biology* 34 565–79

Martin H-J 1994 *The history and power of writing* trans L G Cochrane University of Chicago Press, Chicago IL (orig. 1988)

Mason H T ed 1998 *The Darnton debate: books and revolution in the eighteenth century* Voltaire Foundation, Oxford

McCrady J 1860 The law of development by specialization: a sketch of its probable universality *Journal of the Elliott Society* 1 101–14

McCrady J 1861 The study of nature and the arts of civilized life *De Bow's Review, new series* 5 579–606

Miller M A 1976 *Kropotkin* University of Chicago Press, Chicago IL

Miller N K 1988 *Subject to change: reading feminist writing* Columbia University Press, New York

Moretti F 1998 *Atlas of the European novel: 1800–1900* Verso, London

Newman A K 1881 A study of the causes leading to the extinction of the Maori *Transactions and Proceedings of the New Zealand Institute* 14 459–77

Numbers R L and Stephens L D 1999 Darwinism in the American South in **Numbers R L and Stenhouse J** eds *Disseminating Darwinism: the role of place, race, religion, and gender* Cambridge University Press, New York 123–43

Ogborn M 2002 Writing travels: power, knowledge and ritual on the English East India Company's early voyages *Transactions of the Institute of British Geographers* 27 155–71

Riffenburgh B 1994 *The myth of the explorer: the press, sensationalism, and geographical discovery* Oxford University Press, Oxford

Rose J 2004 Arriving at a history of reading *Historically Speaking* 5 36–9

Rupke N 1999 A geography of Enlightenment: the critical reception of Alexander von Humboldt's Mexico work in **Livingstone D N and Withers C W J** eds *Geography and Enlightenment* University of Chicago Press, Chicago IL 281–94

Rupke N 2000 Translation studies in the history of science: the example of *Vestiges British Journal for the History of Science* 33 209–22

Rupke N in press *Alexander von Humboldt: a metabiography* Peter Lang, Bern

Said E W 1991 Traveling theory in *The world, the text and the critic* chapter 10 Vintage, London

Secord J A 2001 *Victorian sensation: the extraordinary publication, reception, and secret authorship of* Vestiges of the natural history of creation University of Chicago Press, Chicago IL

Secord J A 2004 Knowledge in transit *Isis* 95 654–72

Stenhouse J 1994 The Darwinian Enlightenment and New Zealand politics in **MacLeod R and Rehbock P F** eds *Darwin's laboratory: evolutionary theory and natural history in the Pacific* University of Hawai'i Press, Honolulu 395–425

Stenhouse J 1996 'A disappearing race before we came here': Doctor Alfred Kingcome Newman, the dying Maori, and Victorian scientific racism *New Zealand Journal of History* 30 124–40

Stenhouse J 1999 Darwinism in New Zealand, 1859–1900 in **Numbers R L and Stenhouse J** eds *Disseminating Darwinism: the role of place, race, religion, and gender* Cambridge University Press, Cambridge 61–89

Stephens L D 2000 *Science, race, and religion in the American South: John Bachman and the Charleston circle of naturalists, 1815–1895* University of North Carolina Press, Chapel Hill NC

Tan F-T 2004 *British naturalists in Qing China: science, empire, and cultural encounter* Harvard University Press, Cambridge MA

Todes D P 1989 *Darwin without Malthus: the struggle for existence in Russian evolutionary thought* Oxford University Press, Oxford

Topham J R 2000 Scientific publishing and the reading of science in nineteenth-century Britain: an historiographical survey and guide to sources *Studies in History and Philosophy of Science* 31A 559–612

Topham J R 2004 A view from the industrial age *Isis* 96 431–42

Travers W T L 1869 On the changes effected in the natural features of a new country by the introduction of civilized races *Transactions and Proceedings of the New Zealand Institute* 2 299–313

Winsor M P 1979 Louis Agassiz and the species question in **Coleman W and Limoges C** eds *Studies in history of biology* Johns Hopkins University Press, Baltimore MD 89–117

Woodcock G and Avakumovic I 1950 *The anarchist prince: a biographical study of Peter Kropotkin* T.V. Boardman, London